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VOLUME 1, NUMBER 3

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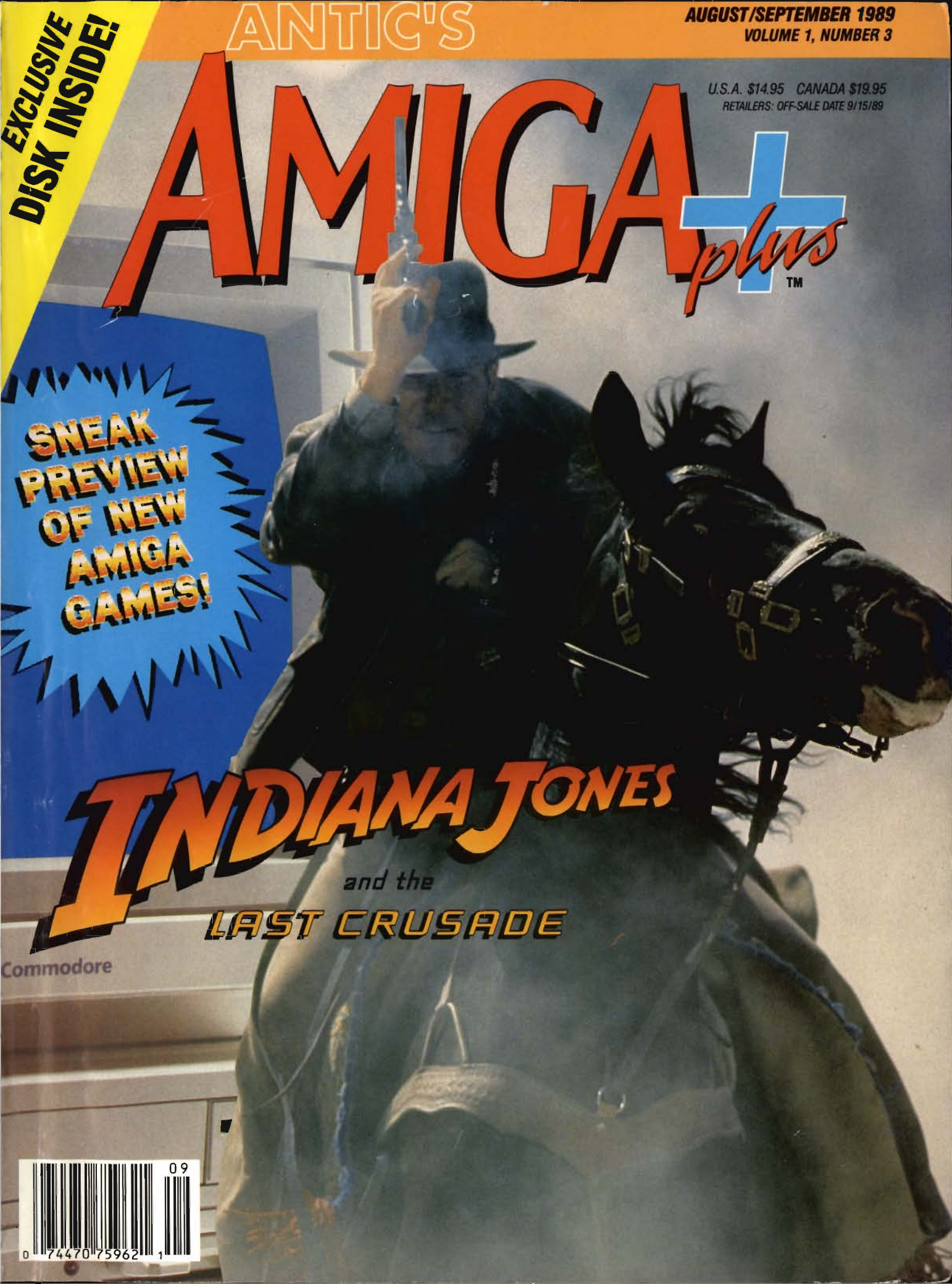

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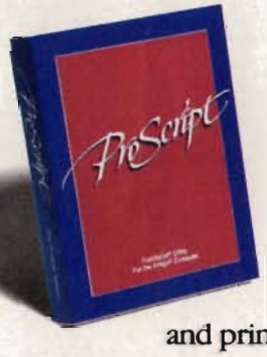

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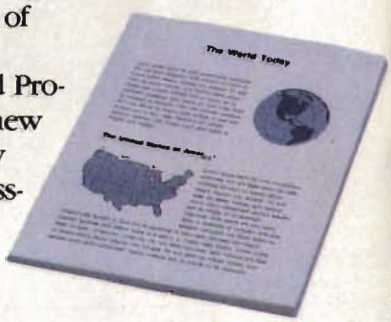

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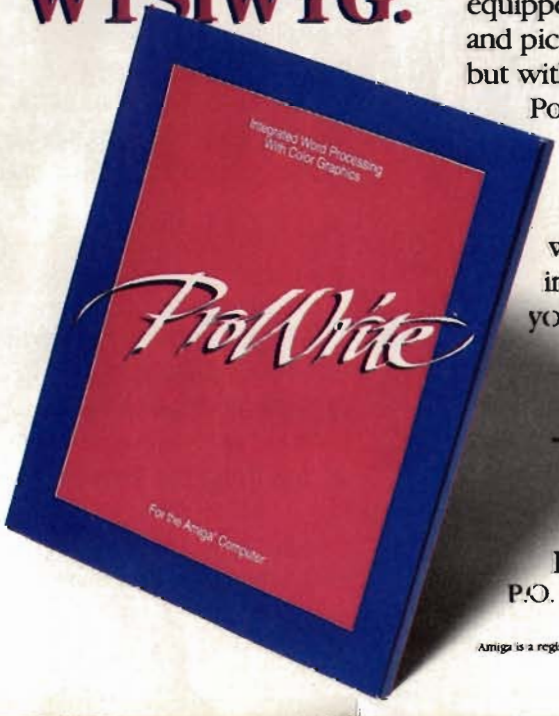

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ANTIC'S
AMIGA plus™
AUGUST/SEPTEMBER 1989
Volume 1, Number 3

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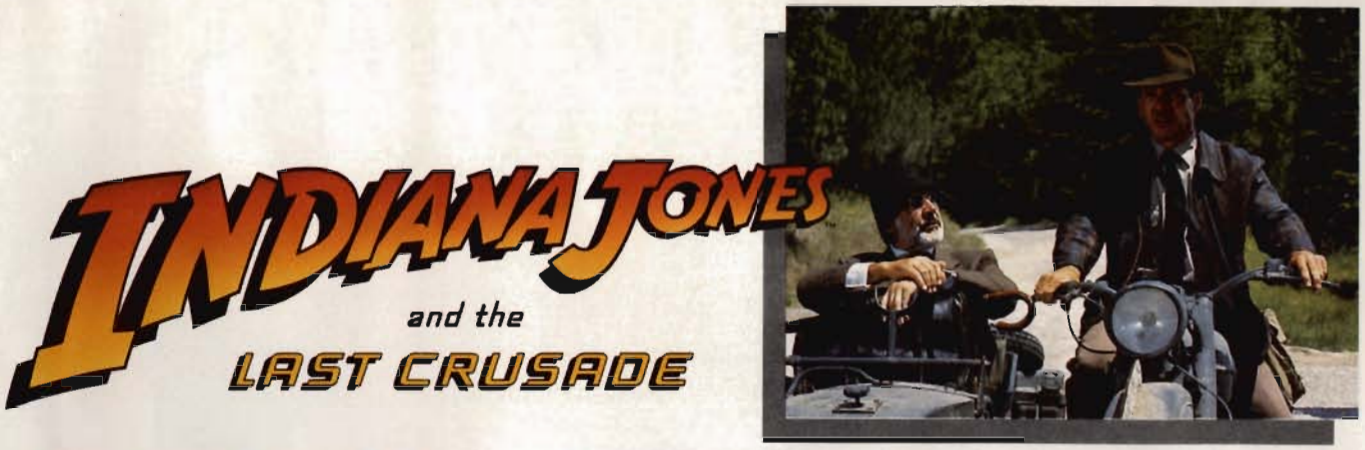

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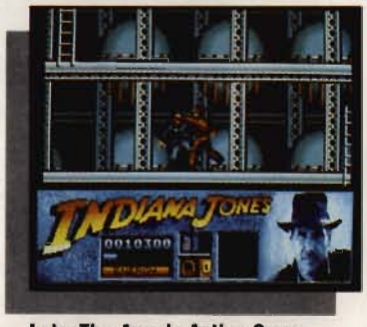

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- Hot market for Amiga animators

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EDITORIAL

There were a lot of other important things I needed to tell you in the first two AMIGA *Plus* editorials. So this announcement had to be saved for the third issue... We intend to create all pre-printing production of this magazine with Amiga desktop publishing in the very near future.

We believe that the people who put out a computer magazine should do as much as possible of their work on that computer -- and it's no secret that the Amiga happens to be a pretty formidable desktop publishing workstation. It's our goal to create totally finished page layouts in-house on the Amiga -- including four-color separations -- and have the camera-ready pages produced on a state-of-the-art PostScript typesetter.

Our main hold-up in completing this process has been lack of time between deadlines. Time is the element in shortest supply around here, as is often the case with new publications. Still, from the start we have managed to get some desktop publishing into each issue.

In the premiere AMIGA *Plus* we used an outside service to make color slides of our screen-shot files, using a Polaroid Palette with the American Liquid Light interface. By the second issue, we had our own Polaroid Palette and were even starting to produce screen-shot slides for Antic Publishing's non-Amiga magazines -- because the results were such an improvement over the method we had previously used. Also in the second issue was a graphics software comparison table that was typeset directly from an Amiga PostScript file.

For this issue, we actually put together several entire articles with Gold Disk's Professional Page software, including the editorial you're reading now. And we deliberately chose this issue's story with the trickiest text layout as our main test case -- Daniel Wolf's "Floating Point Math: Part 2," with all its odd-sized tables and charts that had to be inserted into the main text. For you Pro Page or PageStream jocks who may be wondering what the fuss is about, let me assure you that things get tricky quite fast when you are attempting to reproduce a professional photo-typesetting design instead of just using default fonts and settings.

As long as we can take a few more desktop publishing steps with each issue, we feel that we're on track towards making AMIGA *Plus* a true showcase for page production on the Amiga. It's a fascinating, highly rewarding journey and we look forward to sharing our most useful discoveries with you as we continue to learn.

By the way, speaking of the time-crunch mentioned earlier, during the last-minute push for AMIGA *Plus* #2, the 3-D Fontmaker conversion utility that was supposed to be the special disk bonus for Rick Gibson's 3-D Modeling article somehow got presented with our Amiga Fonts article. By way of apology, this issue's disk includes a Gibson 3-D tank model in a short VideoScape-format animation.

Nat Friedland

Nat Friedland
Editor, AMIGA *Plus*

Cover computer graphics by James Green

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The Processor Accelerator is THE affordable "speed-up" product for the Amiga. The creative engineers at CMI have designed this board incorporating a 16MHZ 68000 processor that replaces the existing 8MHZ processor. The end result is doubled processor instruction speeds from 7.16MHZ to 14.32MHZ What this means to the Amiga user is an increase in total system throughput of up to 40% depending on application.

The Processor Accelerator comes with a Math FPU socket that is either 68881 or 68882 compatible, and works with software packages that use the IEEE libraries under Workbench 1.3 recognizing the FPU as a peripheral device.

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NOTE: *When purchasing a speed-up board for your Amiga, be sure to understand the REAL differences in performance among the product choices. Not all 68020 boards will be faster for all applications. FOR EXAMPLE, the cheaper 68020 boards (which run at 6.26MHZ) provide substantially faster increases only when used with the very few software packages specifically written for 68020/68881-ONLY after the additional purchase of an MC68881. However, the Processor Accelerator will provide some performance increase in all cases.*

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With its vast bit-mapped graphics, superb animation, blistering sound, devilish obstacles, awesome firepower and 1 or 2 player options, **BLOOD MONEY** is the greatest challenge yet faced by any games player with a passport to outer space.

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TeX meets ARexx at Stanford

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The Amigas and the mainframes send commands back and forth. This has given the physics laboratory a user-friendly graphics interface for their mainframe which is practically indistinguishable from the Amiga environment.

The Stanford Linear Accelerator: Amigas Inside!

TeX meets ARexx at Stanford

The dudes at Stanford Linear Accelerator (SLAC), the famed physics laboratory featuring a two-mile-long atomic particle bombardment tunnel, already had computers—mainframes from IBM and DEC—when they saw their first Amiga.

SLAC's Marvin Weinstein and Willy Langeveld wanted to provide the lab's users with the standard mainframe interface they were used to. They also wanted to integrate the mainframe and personal computer environments so that users could either have the privacy, convenience and "user-friendliness" of a PC or the power and resources of a mainframe.

They also had a specific set of computing needs in mind. Their mainframe computer network currently serves 1,400 to 2,000 users at a unique facility administered by Stanford University and the U.S Dept. of Energy. The work of this army of PhDs and technicians includes doing calculations and mathematical simulations, sending electronic mail to colleagues around the campus and around the world—and creating scientific documents with TeX (pronounced tek), the powerful text formatting software known for its typesetting of complex equations and scientific graphics.

Versions of TeX on many mainframe computer systems share a standard text file format with embedded commands that control whatever output device (laser printer, graphics

terminal, etc.) is chosen. Creating documents is easy for the computer. The user has to know which commands to embed where and the computer just sees a text editor running. The hard part is previewing the document before sending it to the printer. This usually requires an expensive graphics terminal. It also requires a great deal of computation. In a multi-tasking, multi-user environment, tasks like refreshing the preview screen can become painfully slow, while also slowing everyone else's terminals. One thousand people previewing their documents at once would bring the system to its knees.

The Amiga's graphics co-processors make it a natural choice for a fast TeX previewer. Multi-tasking also makes the Amiga an ideal personal computer for remote terminal applications. Background terminal programs are available even on IBM PCs, but Amiga terminal emulators and other programs can run at full power simultaneously *and* communicate among themselves. This "Inter-Process Communication" (IPC) is the heart of the SLAC environment.

Enter ARexx

The state-of-the-art in IPC on the Amiga is ARexx, an implementation of the simple yet powerful REXX programming language used on many computers. ARexx programs (or "macros" or "execs") can stand alone or work closely with other Amiga programs which have an ARexx interface. ARexx uses a small central "host" program to coordinate communications between other compatible programs, using the Amiga's built-in message passing facilities. The IBM 3090 mainframe at SLAC also knows REXX, thus a large number of useful REXX programs were already in place.

Moreover, these execs would run immediately on the Amiga version. ARexx has Amiga-specific enhancements which allow it to access Amiga functions in shared libraries. This means that ARexx can use the intuition.library routines to create screens, windows, menus, etc. provided a small library file is available to tell ARexx about the contents of the Amiga library. One such file, the RexxArpLib written by SLAC's Willy Langeveld, allows ARexx execs to call functions in the intuition and ARP (Amiga Replacement Project) libraries. ARexx programs can now open their own windows and monitor their own gadgets rather than using some host program for all the friendly features Amiga users expect.

The Amiga's graphics co-processors make it a natural choice for a fast TeX previewer.

Using the Amiga's Intuition interface in ARexx programs is nice, but on an Amiga it is expected. What is unexpected is that REXX and ARexx communicate so well that ARexx macros can send commands to the mainframe and REXX execs on the mainframe can send commands to the Amiga. This has given the physicists at SLAC a user-friendly WIMP (Windows-Icons-Menus-Pointer) interface for their mainframe which is practically indistinguishable from the Amiga environment. This is a noteworthy achievement in itself, but it is overshadowed by the impressive structure of Amiga software, both home-grown and commercial, built upon it.

A major software component of the SLAC system is AmigaTeX, Thomas Rokicki's Amiga version of Donald Knuth's original TeX. AmigaTeX, with its TeX previewer, has an ARexx interface which allows it to load and save files using either the local (Amiga) environment or the mainframe. Another important component is VLT, the terminal program which Langeveld created from Dave Wecker's public domain VT100 terminal emulator. VLT has been significantly enhanced by the addition of Tektronix color graphics terminal emulation and of course, an ARexx interface.

Since these terminals like to use 43 rows of text, the Amigas at SLAC use interlaced screens and the PD program MoreRows. They are also equipped with Flicker-Fixer cards (from Microway) and Zenith flat screen ZCM1490 VGA monitors to eliminate that annoying flicker. ARexx and the Tektronix emulation have also been combined into a "paint program" to create the special Feynman diagrams commonly used in SLAC publications. The mainframe uses its Fortran libraries to compute these graphics and display them on the Amiga using the standard Tektronix output language. They can be sized, moved and redrawn using Amiga style drawing tools so that the user is never aware how much of the work is being done by an IBM or VAX.

Microsmiths' TxEd is the ARexx-compatible text editor used on these terminals. The libraries of ARexx macros created for use with TxEd give it vast new powers—from creating, addressing, sending and receiving network E-Mail, to loading commonly used TeX templates and calling the previewer to display the results. The close link between TxEd and the TeX previewer results in a nearly WYSIWYG version of TeX which will be the envy of those who *only* have Sun workstations to process their documents!

Amigas are now among the recommended personal computers at SLAC. There are currently about 50 installed at SLAC itself, plus a growing number in the homes of its researchers. According to Weinstein and Langeveld, Commodore has been very helpful and even sends representatives to visit from time to time. The Amigas at SLAC were also featured on the Public Broadcasting TV show "The Computer Chronicles," providing additional good exposure for the Amiga. ■

—ARNIE CACHELIN

Six Cricks, Amigans all: Michael, Barbara, Eric, Kindra, Cam, Francis

Seattle-area family heading for "Guinness Book of World Records"?

One Little . . . Two Little . . . SIX Little Amigas

In 1987, Michael and Barbara Crick of Bellevue, Washington went shopping for a new computer. Michael, a programmer at Microsoft, wanted an Amiga to design software. Barbara's feelings ranged between tepid and bored. One look at the Amiga and she fell in love. They purchased two.

What now? Conflict? There are four Crick children and the family had recently voted to eliminate television from the household. Everyone loves games and puzzles. The Amigas never cool down. While Michael is busy designing a new game, Barbara discovers telecommunications, music, and thinks about writing a program for cross-stitch design. The children are doing homework assignments on the computer. "We knew we had to do something when we found the children were queuing up every evening to use our two Amigas," says Michael.

The family conferred and were presented with a choice between expanding the house or purchasing an Amiga 500 for each child. A year and a half later, the boys—Alex, 15; Francis 8—and the girls—Kindra, 12; Cam, 10—agree that the unanimous Amiga vote was a wise decision.

Admittedly the Crick parents score well above average in computer experience. In college during the mid-sixties, Michael Crick learned to program on punched paper tape on the first PDP-1 ever shipped. He was a programmer at major computer firms and ran his own game company before joining Microsoft in the Seattle area. Michael's Olympic game simulation for the Commodore 64, originally released by HES in 1984, sold more than 100,000 copies in Europe. An updated Amiga version, **Go For the Gold**, will be released in the U.S. this fall by Discovery Software.

"I have no fear of computers" says Barbara Crick. "My mother is a computer programmer. Study of science and mathematics was the norm in my family." Barbara had a computer internship at Princeton while in high school and took special computer studies at M.I.T while earning a degree in economics at Wellesley College. She has worked as a business programmer with Fortran and assembly language.

Barbara finds that computer games are beneficial and preferable to the passivity of TV. She likes the cooperative group efforts the children make to find game solutions. The children all prefer the excellence! word processor for their schoolwork, especially the grammar checker. They find their spelling has improved without effort. Both Kindra and Cam create art work using Deluxe Paint III and plan to learn the APL programming language. Using Zoetrope, Cam is experimenting with animation. Alex writes original adventure stories and game walk-throughs. Francis enjoys games and reading.

The Seattle area supports an unusual number of Amiga-specific groups, stores, and Bulletin Boards. Barbara and Michael are busy participants. Recently they were instrumental in bringing Amiga artist Jim Sachs to Seattle to give a two-day seminar when they couldn't attend one he gave in Portland, Oregon.

As Barbara says, "Buying a computer for each family member might seem extravagant, but not when we looked at the long term—the interactive entertainment and learning advantages to the children. For us it was a practical solution." ■

—SUE ALBERT

Compuserve Hits Europe E-mail goes International!

CompuServe Inc. is expanding its information services into the European market, starting with the United Kingdom and Switzerland, followed by other European countries. The plan is to introduce the current CompuServe Information Service into the target countries by fall. A new, specifically European information service should be introduced by the spring of 1990.

This agreement, along with an earlier move into Japan, marks CompuServe's determination to take a leading role in personal computer telecommunications world-wide. According to Maurice Cox of CompuServe, "When the European service is in place, our interconnected electronic mail services will represent the world's largest international communications system." ■

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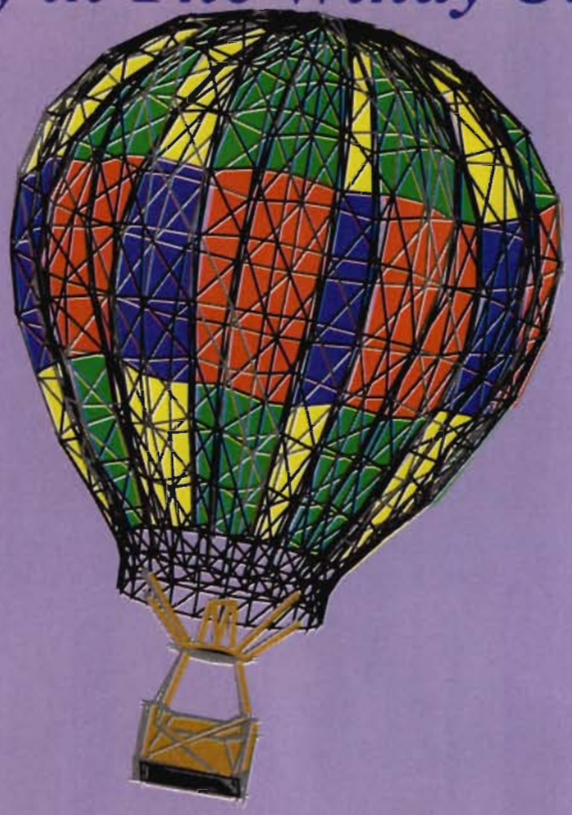

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AMIGA PLUS READER INPUT

Starting Suggestions

I'm delighted to receive and accept your invitation to subscribe to your new magazine. I have a few suggestions:

1. When I see a magazine on the newstand before I receive my subscription copy, I make a note not to renew my subscription.

2. Mr. X (*A well-known Amiga writer listed in our subscription letter as a first-issue contributor—* + EDITORS) has a bad reputation for overlooking serious flaws in the products he has reviewed for other Amiga magazines in the past. Let reviewers honestly reveal bugs, flaws and problems readers will encounter if they buy the product. Amiga users are some of the best informed consumers on Earth. If you don't tell it like it is, we will know and look elsewhere for the truth.

3. When games are reviewed, provide playing tips. For example, Dragon's Lair seems impossible to play. ReadySoft should have provided more help to get people started, but since they didn't, it's up to the Amiga press to provide enough helpful information to get prospective buyers to give the software another try.

Rich Kevin O'Brien
Renton, WA

Thanks for taking the time to raise a number of thoughtful points that are well worth replying to, Rich. Here's our comments:

1. All copies of our magazines leave the printer at the same time. (Why wouldn't they?) So it would be fairer if you boycotted the Post Office when the newstands get a magazine before subscribers.

2. I don't know what old *reviews you're talking about, but what Mr. X wrote for AMIGA* Plus *really blasted several products—which happen to come from our advertisers! The way we look at it around here is: If AMIGA Plus hasn't earned the confidence of its readers, the magazine isn't worth anything to an advertiser anyway.*

3. You can count on finding plenty of game playing tips in AMIGA Plus, *particularly for harder games like Dragon's Lair which we covered in the first issue.*—+ EDITORS

Return of O'Brien

Having written you previously to offer a few suggestions, I'm delighted with the first issue of AMIGA *Plus*. As requested, my subscription copy arrived in my mailbox before it appeared on the newsstands, so I can continue as a subscriber. Thanks to AMIGA *Plus*, Mr. X's career as a reviewer has taken a dramatic turn for the better. His work in the first issue is the best thing I've ever seen with his name on it, right on the mark.

Rich Kevin O'Brien
Renton, WA

Dragon's Lair Disagreement

I read your review of Dragon's Lair in the Premiere issue and found some grave errors. On the technical side, Dragon's Lair won't run on all 10Mb hard drives—only on those using the Comspec SCSI controller. Also, the sound is not true stereo, but rather two-channel monophonic. As for the music, there are only three or so songs in the whole game, averaging below ten notes each.

On top of all this, my copy of the game crashed every 10-20 minutes, which is very frustrating! As far as I am concerned, Dragon's Lair is merely a canned graphics demo in which the user tells it to continue the graphics by moving the joystick correctly. Once you learn the right move patterns (it took me only four hours to do so), there is no challenge left. Any $60 game which lasts only four hours is not worth purchasing. Your reviewer can't have played for any significant length of time, or these shortcomings would have been obvious.

Eli Goldberg
St. Johnsbury Academy
St. Johnsbury, VT

Reviewer R.F. Noyes responds somewhat indignantly: "My copy of Dragon's Lair was a normal in-store package and it never crashed. I talked to quite a few other users and none of them reported a lot of crashes. Maybe your drive needs to have its speed checked. My review raved about the sounds, not the music—but I admit you're right that it was not true stereo. You're also right about hard drive compatibility, but the editors (boo) took that information out of my original review. More than once, my review points out that this is a pattern recognition game—and I believe I provided a number of useful hints. I diligently played the game for days. *And I didn't resort to the undocumented keystroke combination that runs the entire game in demo mode. I doubt that anyone could work through Dragon's Lair for the first time in four hours. If so, I'd like to have all the quarters he invested in the old arcade version."* ▶

Français, Amiga?

We are looking for a video production program called Broadcast Titler, with which we should be able to make titles in different languages. We particularly need to be able to do French, with the accents. We have tried a program called Video Plus, but can't write letters with French accents.

Jean Neron
Saint-Jerome, Quebec, Canada

Broadcast Titler ($299.95) is available from InnoVision Technology, P.O. Box 743, Hayward, CA 94543. (415) 538-8355. It does not yet do French character sets—but a bi-lingual Canadian version should be out by the time you read this. No price at this writing.—+ EDITORS

Taxing Issues

I purchased your Premiere issue from a bookstore. Once home, I read your article "Federal 1988 Income Tax Spreadsheet," and discovered that I needed the program MaxiPlan to work with your spreadsheet template. Nowhere on the cover or the inside contents page did you say that MaxiPlan was required, and if I had known, I would not have purchased the magazine. How disappointing. How dishonest.

Two days later in the mail I received an invitation to subscribe to AMIGA *Plus*, with a different premiere issue cover and no mention of a spreadsheet article. How many premiere issues are there? How many more "firesales" will you have?

Jacques Bergman
Portland, OR

The 1988 Federal Income Tax Spreadsheet IS described in our table of contents (as well as in the story's subhead) as a "Plan/IT (MaxiPlan) template for IRS 1040 taxpayers". The first paragraph of the article says that you will need MaxiPlan. Admittedly we didn't say "MaxiPlan template" on the cover—but headlines on a magazine cover must make do with as few words as possible, so not every shade of meaning is always as clear as it should be. As for the sample cover on the promotional mailing, we tried to make the actual cover of the premiere issue look as much like it as possible. However, by the time the real cover was done, we had a much better idea of everything that was going into the issue, and that's what the changes reflected.—+ EDITORS

Raves and Requests

Today I received your fantastic Premiere issue. I couldn't wait to run the disk, but when I inspected it I found that the case was damaged. I decided to give it a try anyway, and I'm glad I did—I love it. (I'm sure the damage was the fault of the Post Office, but I think there will be many more like this one due to the packaging.)

Not all of us are programmers, so please consider those of us who just like to use productive programs. Other things I would like to see on disk would be graphics for use in desktop publishing programs, or music and sound programs.

Edward Nole
Waterbury, CT

There were several dozen damaged disks reported from this first issue, and we're working to cut this down. AMIGA Plus *will gladly replace any of our disks that don't work properly. Just return the bad original disk to: AMIGA* Plus *Disk Desk, 544 Second Street, San Francisco, CA 94107.*—+ EDITORS

Impossible Kamikaze

I'm very impressed with the premiere issue, but there is a slight problem with Kamikaze Chess. While it appears to be a good game, half the pieces are invisible on my monochrome monitor, since the pieces are black and white and the squares are black and white. You can only find the invisible ones by clicking on them. This gives the computer an unfair advantage because it knows where all the pieces are. Please tell me how to fix this.

Roy Sherman
Skokie, IL

Sorry, Kamikaze Chess—and all other AMIGA Plus *programs—are guaranteed to run only on monitors compatible with standard Amiga color monitors made by Commodore. You might try the public domain utility, Pop Colors, to see if you can alter the colors to four distinct shades of grey.*—+ EDITORS

Undiluted Praise

I just received the premiere issue of AMIGA *Plus* magazine, and I found it to be excellent. I have subscriptions to every Amiga magazine on the market, but I must admit that AMIGA *Plus* has topped them all.

It is hard to imagine that AMIGA *Plus* could get better, but if you only maintain the standard you have set I will be very grateful. The disk itself is worth the subscription price.

Ali Mesghali
Vineland, NJ

Hills are Alive

I just got my first issue of AMIGA *Plus*, and it's great! Most important to me is anything you have on music, and the article on New Amiga MIDI Software was of much interest to me. Good luck to you.

Chet Smith
Spring Valley, CA

Wish List

I thought your first issue was quite good. I especially enjoyed the article about the Mac emulator, and would like to see more. Other things I would like to see in AMIGA *Plus* are articles on the '286 bridgeboard, handy utilities, and tutorials in C, BASIC and Modula 2. Also, I'd like to see how-to hardware articles, interviews with programmers—and cartoons. Why are there never any cartoons in computer magazines? Comparisons of the Amiga against other computers would also be interesting. How does the Amiga stack up against VGA, for example, or even against the Atari.

Dan Larson
Terre Haute, IN

We appreciate your well-thought-out suggestions—and the similarly provocative communications from other readers who have written to us.—+ EDITORS ■

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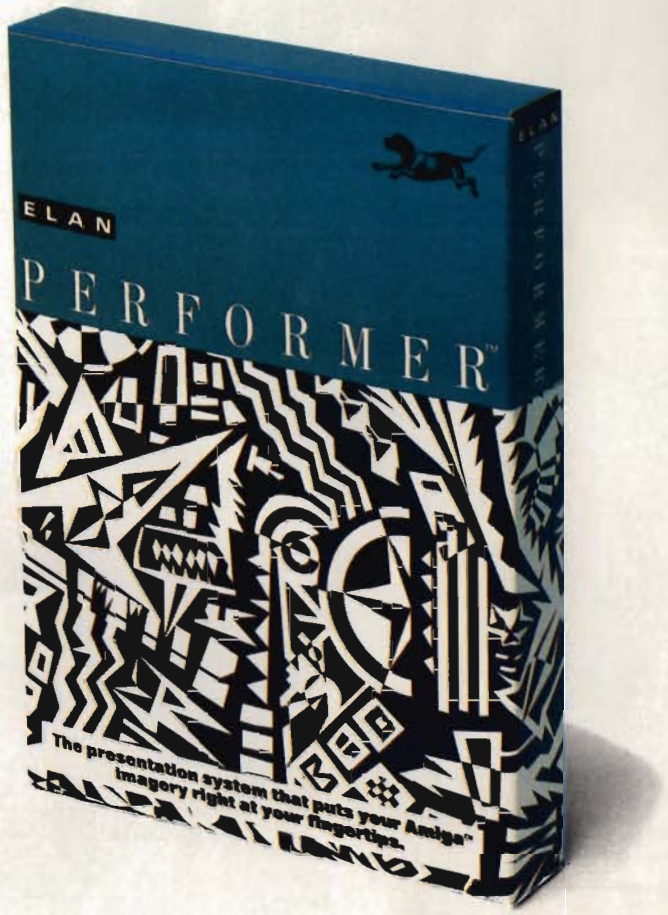

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Lucasfilm Games

Exclusive preview of the

Harrison Ford and Allison Doody catch a few rays while spelunking.

BY NAT FRIEDLAND
AMIGA *Plus* EDITOR

The action game has the glossy, high-detailed look you'd expect of the best from Rainbird or Psygnosis. The graphic adventure game plays like a turbo-charged version of Zak McKracken and the Alien Mindbenders.

The first question was: What type of computer game should be made from "Indiana Jones and the Last Crusade"—a graphic action arcade shoot-'em-up, a graphic adventure puzzle-solver, or some combination of both?

Before doing anything more with their computer adaptation of the third blockbuster Indiana Jones movie, that's what the Lucasfilm Games programmers and game designers had to decide.

Development Director Akila Redmer (generally called "Red" around the Games Division), explains, "There are two main types of computer game buyers now—action players and adventure players. They look for different things in a game, so the games that try to combine both formats rarely make it. Instead they usually disappoint the two different kinds of players."

The ultimate decision at Lucasfilm Games was that the newest Indy film epic would have enough audience impact to support *two* games—one for each market, thus doing away with any compromises forced by a watered-down format. Therefore, by mid-summer, Amiga users should expect to be seeing **INDY: Indiana Jones and the Last Crusade—The ACTION Game!** Then early this autumn, Amiga users will get **INDY: Indiana Jones and the Last Crusade—The GRAPHIC ADVENTURE!**

Decision Two

Having taken that step, there was yet another major choice to be made about the graphic adventure version. Virtually everybody who buys the game will already know the movie plot. So how could the adventure give you challenging puzzles while still being faithful to the film experience?

"We built a lot of scope into the adventure," says Red. "There are more than 200 screens (more than 100 'rooms') and usually at least three ways to overcome any obstacle. Players earn 'Indy Quotient' points for getting through a sticky situation more smoothly than Indiana Jones does in the movie. We think that players will want to keep coming back to the game to find out all the different ways to win it—and also to

and the Amiga Crusade!

two new Indiana Jones games

Graphic Adventure: Indy seeking the Holy Grail in Venice, Nazi Germany and the Catacombs.

improve their top scores. Anyhow, the adventure isn't that easy to beat, even if you're just trying to duplicate the exact solutions from the movie."

Essentially, there are three main branches to the ultimate solution. One path depends primarily on interactive dialog with the other characters, the second path involves graphic puzzle solving, while the third path requires Indy to overpower the opposition with his fists or bullwhip. But in any given situation, not every possible approach has an equal chance of success. For example, there's a giant Nazi soldier who pops up in several guises through the game. The only way that Indy can get past him is to make him drunk, and not just with a mere bottle of beer.

Exclusive Preview

AMIGA *Plus* obtained an exclusive early look at both new Indiana Jones games. We drove to George Lucas' Skywalker Ranch complex in woodsy Marin County, about 30 minutes north of San Francisco. Along the road, no signs mark the ranch. Once through the electronically opened gates, you drive to a guard booth where a friendly young lady phones ahead to make sure you really have approval to be there.

Then you drive up a winding hillside road for nearly a mile without seeing any buildings. The Lucasfilm complex is built on a high, grassy meadow. A handful of spectacular, meticulously-crafted buildings encircle a small lake. The Games Division is at the far end of the complex, in one of the Gatehouse buildings.

Inside, the offices make you feel as if you're doing business in a casually elegant, spacious, old-fashioned mansion—except that everything is brand new. Lucasfilm Games spokespersons Mary Bihr and Kim Domino explained some of the yet-unreleased movie's plot details which we would need to know in order to understand the games.

Then Red demonstrated the two new Indiana Jones games on a table full of computers in a large, parlor-like room. What we saw in mid-May were not completed products, but a number of nearly finished sequences that boasted many spectacular touches.

Action Game

The arcade action game, which will be released first, was shown on an Amiga 500 in 32 colors at 320 x 200 resolution. The game is actually being programmed in England by a team from U.S. Gold software under Lucasfilm's direction. The smooth-scrolling backgrounds have richly hghlighted textures of the kind you would expect to find in a top-line Amiga game from Rainbird or Psygnosis.

The action game has three different sequences, each with two scenes. There's a flashback sequence with ▶

the young Indy rescuing the Cross of Coronado from a cave and eluding his pursuers aboard a circus train. Then there's the Brunwald Castle sequence where Indiana fights his way through catacombs and climbs a high wall during a lightning storm to rescue his dad. The third sequence has

Indy: The Arcade Action Game.

Indy fighting his way through the interior of a Zeppelin to pick up the objects that would allow him to escape in a bi-plane and do some aerial dog-fighting. The Zeppelin frame bobs up and down in realistic motion.

The finale at the Temple of the Holy Grail is considered the most challenging. Indy leaps chasms, climbs rockslides and dodges deadly booby traps, fighting the clock in a desperate attempt to save his dying father with the life-giving water from the true Holy Grail.

Adventure Game

The graphic adventure game is being developed entirely in-house at Lucasfilm Games, using a complete proprietary system running on IBM PC clones with the latest add-on sound/graphics boards. That's the computer we saw the adventure on and we were assured, "This looks practically as good as it will on the Amiga."

Adventure gamers familiar with Lucasfilm's recent game, Zak McKracken and the Alien Mindbenders, which was reviewed in AMIGA *Plus* #2, will quickly recognize the well-conceived interface system which is just about entirely mouse-driven. However, this is a much more powerful version of the game system and the screens are now 320 x 200 bit-mapped pixel graphics with 16 colors, instead of Zak McKracken's lower-resolution character graphics.

With the new system, text can be displayed anywhere on the graphics screens and more fonts are available. Interactive conversations with the other characters are supported much better.

Some of the effects we saw included Indy's moving figure being viewed correctly through a grille as he steps beneath the Zeppelin catwalks and blending momentarily with the waterfall in the Venice catacombs as he leaps through it.

The Grail Diary has significant clues that must be used for solving adventure puzzles.

The adventure's copy-protection is off-disk (as is the action game's). The Grail Diary contains a number of significant clues that must be used as part of the gameplay. For example, to get through one secret passageway Indy must move a trio of statues into a pattern described in the diary. And even with this clue, it's not that easy. Every time you move a statue, it may also move the other statues in different ways which you must figure out.

How Lucasfilm Does It

Lucasfilm Games has built its own programming language to develop games quicker and speed up conversions to different computers. Based on UNIX run through a YACC compiler and using C structure, the language is abbreviated as SCUMM—Script Creation Utility for Maniac Mansion (the first game it was used on). The language is designed to move graphic images easily with English-like commands. "It allows us to turn great storytellers into computer-game programmers, rather than turning great programmers into storytellers," says Red.

Within the SCUMM language are a number of high-powered special modules for creating and moving figures or backgrounds. We saw a number of them in action at a design room in the Games Division and the interfaces were very similar to the Amiga's top-line paint and animation programs. In other words, graphics effects were created virtually in real time by clicking on icons or menu selections.

Movement programming is greatly simplified with a technique called "boxing" which tracks where a character must pass to get from one place to another. There's also a real-time debugger called Windex that multitasks on another synchronized computer, along with the scenes in process. However, Lucasfilm Games uses the PC version of Deluxe Paint to draw background art. "DPaint provided exactly what we need, so we didn't have to build our own software for this job," says Red.

Lucasfilm Games generally expects to release its Amiga products about 30-60 days after the IBM version premieres. That's because digitized sounds must be totally re-coded for the high-quality Amiga sound chip, Paula, while the Atari ST uses the same Yamaha sound chip as the Tandy PC clones that Lucasfilm Games models its PC sound programming for. "The better Amiga sound makes it worth the wait," says Red. ■

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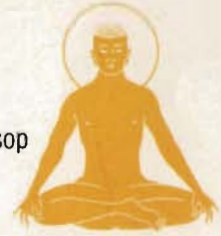
Amiga users' technical questions answered here



By Arnie Cachelin, AMIGA *Plus* Technical Editor and Betty Clay, CompuServe AmigaForum Asst. Sysop

A Disk Called C:

Q: In your May 1989 Guru Bashers, you stated that a disk named "fonts" would automatically override the "fonts:" assignment as long as the disk is inserted in a connected drive. Shouldn't the same be true for the "c:" assignment? I relabeled my disk "C-DIR" (which contains every c directory command from every one of my disks, and nothing else) with the replacement name of "c"—and my CLI commands would not work unless I either removed the disk, or typed "pathname:command" such as "c:dir". Is there any way I could get this to work using a different startup-sequence or a background program?

Ralph Shumaker, Jr.
Spring Valley, CA

A: *You would think that the c: assignment would be overridden by a disk called c. While programs that look for fonts read FONTS:, the CLI and Shell look for commands in directories specified by the "path." When you boot, c: is assigned as SYS:c where SYS: has already been assigned to your Workbench disk. Thus, if you type PATH, you will see that the directory searched for CLI commands is something like Workbench 1.3:c.*

To make the CLI look on the disk called C you must add it to the path (i.e. type PATH C: ADD). There is another catch. After the CLI has determined that it can't find your file, it just gives up. If you try the command again, it won't even search your Workbench again, let alone try looking on c. If you add c to the path now, it will search again. This is obviously harder than typing the disk name before the command.

One solution might be to add some ALIASes to the file S:Shell-Startup. This file is a script that is executed when a Shell is opened. (See my article, "Cracking the Amiga Shell," in Amiga Plus *#1.) To use some command like disksalv on C-DIR:, add a line like ALIAS disksalv C-DIR:disksalv. Then your Amiga will flash the polite "Please insert volume C-DIR" requester when you type disksalv—even if it is already in your Workbench C directory. It is almost possible to add all the ALIASes automatically using the Workbench 1.3 LIST command with the LFORMAT option. Type LIST >>s:shell-startup LFORMAT "@$%s$@ ALIAS %s %s%s". The %s in the LFORMAT string will be globally replaced by the path and filenames. The @$ are simply distinctive extra characters inserted to make the resulting list easier to clean up. You will have to edit the file to delete the words like "@$C-DIR:$@" at the beginning of each line, and this can easily be done with a global search and replace.*

Diskcopy to RAD:

Q: In your Guru Bashers article in issue #1 you mentioned RAD:, the new recoverable RAMdisk that came with the Workbench. I am having difficulty in using diskcopy with RAD:. The screen reads "reading 1 2 3 . . ." but it does not say "writing", as it would in a normal diskcopy. Then it has trouble validating the RAD:. Also, when I use info the screen reads "Validating" instead of "read/write" or even "read" only. I followed your instructions, increasing the "high cyl" to 79. I have an Amiga 1000 with a 2Mb Starboard attached, for a total 2.5Mb. Why is this happening?

Melvin Cohen
Bronx, NY

A: *I tried using a floppy-sized recoverable RAMdisk, RAD: and had no problem on an A2000 with a Commodore memory expansion (to 3 megs). Patience may be the key here—if you try the info command too soon after the diskcopy, you can get "Validating" or "not a DOS disk" as the disk status. This can also happen if you insert a floppy and type info immediately. Wait a few seconds, and the status will go back to "read/write."*

When you diskcopy to RAD: the write operations are much faster then floppy disk read/writes. Watch the screen closely, and you will see a dot flashing over the "a" in "reading" when diskcopy types its message. This is from the "i" in "writing" which is erased too quickly to be seen. When diskcopy is done, you should be able see the last "writing track 79" message, which was not overwritten.

Parallel I/O

Q: I am considering the Amiga as a stand-alone data logger for small benchtop experiments, and would like to use the parallel port for input as well as output. I did this a lot on the C64, and it was all very clearly explained in the Programmer's

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Guide. For higher speed, it was not hard to use machine language.

The Amiga's parallel port is also clearly set up for I/O but there is no documentation that I am aware of. The "official" Hardware Reference Manual has only one line on the subject, saying that it is generally used to drive a printer. Big deal, I hardly needed to buy the book to find that out. The pinout diagram also says that it is Centronics incompatible, even though my printer worked right off the bat.

Is there a good reference work that covers the parallel port in detail? The official manuals obviously want you to use the RS-232 serial port but there are situations when the parallel port would be much better.

Bernard Gottschalk
Cambridge, MA

A: *The parallel port is indeed available for I/O via the parallel.device in the DEVS: directory. PAR: (the parallel device) can be opened from Amiga BASIC, but only for output. The main point of this is to bypass the PRT: device which will filter out many escape codes you may want to send to the printer. The parallel port can be used for input and output like any other Amiga "device" by calling the exec library's device I/O routines. These can be called from most high-level languages (including BASIC) as well as from assembly language. Dan Wolf's "Exec I/O" article and assembler code on disk (Amiga* Plus *#1) explains and illustrates the process of using a device. His code has already done most of the work for you, just change all the WRITEs to READs.*

As for documentation, Commodore's "ROM Kernel Manual: Libraries and Devices" contains the information on the software interface to the parallel port. The "Hardware Reference Manual" does not. I also found useful information on programming the parallel device in Mortimore's "Amiga Programmer's Handbook" from Sybex. The parallel port on the Amiga 1000 is NOT Centronics compatible, thus A1000s require special printer cables. The parallel ports on the Amiga 2000 and 500 are Centronics compatible connections. Your version of the manual was apparently written before CBM brought out the A2000 and A500.

Amiga Parallel Ports

Amiga 1000 DB-25 male

Pin	Name	Description
1	–DRDY	Data Ready
2	D0	Data bit 0
3	D1	Data bit 1
4	D2	Data bit 2
5	D3	Data bit 3
6	D4	Data bit 4
7	D5	Data bit 5
8	D6	Data bit 6
9	D7	Data bit 7
10	–ACK	Acknowledge
11	BUSY	Busy (data)
12	POUT(clk)	Paper out
13	SEL	Select
14	GND	Signal ground
15	GND	Signal ground
16	GND	Signal ground
17	GND	Signal ground
18	GND	Signal ground
19	GND	Signal ground
20	GND	Signal ground
21	GND	Signal ground
22	GND	Signal ground
23	+5V	+5 Volts power
24	NC	No connection
25	–RESET	Reset

A500/A2000 DB-25 Female

Pin	Name	Description
1	–STROBE	Strobe
2	D0	Data bit 0
3	D1	Data bit 1
4	D2	Data bit 2
5	D3	Data bit 3
6	D4	Data bit 4
7	D5	Data bit 5
8	D6	Data bit 6
9	D7	Data bit 7
10	–ACK	Acknowledge
11	BUSY	Busy
12	POUT	Paper out
13	SEL	Select
14	+5V PULLUP	+5 Volts power (10mA)
15	NC	No connection
16	–RESET	Reset
17	GND	Signal ground
18	GND	Signal ground
19	GND	Signal ground
20	GND	Signal ground
21	GND	Signal ground
22	GND	Signal ground
23	GND	Signal ground
24	GND	Signal ground
25	GND	Signal ground

Pins with a minus sign (–) before the name are active low.

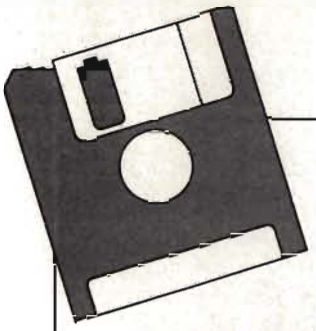
(Answers above by Arnie Cachelin,* Amiga *Plus Technical Editor. The following questions and answers were collected online by Betty Clay, a sysop on CompuServe's AmigaForum.—
+ EDITORS)

Crashing To Kickstart

Peculiar to the Amiga 1000, this problem surfaced after the coming of version 1.3. It happened to me, far too often. For many months, my computer had never required the Kickstart disk except when the machine was turned off. Suddenly, I was having more crashes than I had seen since 1.0, and most of them required the Kickstart disk. Most of the time, there was the related problem of losing the recoverable RAMdisk as well. Was it really worth giving up the stability of 1.2 for the extra features of 1.3? To owners of the A1000, this problem has been most perplexing.

A fix that turned up in discussions online was that the problem goes away if SetPatch and PatchWB are removed from your startup-sequence. But this is definitely not a satisfactory solution. SetPatch cures the known bugs in Kickstart 1.2, so removing it would bring those problems back again. In particular, SetPatch corrects known bugs in Alert, in Layers, in Exec's handling of the '020/'881, and in the AllocEntry routines. You can read this list for yourself—just remove the ">NIL:" from the startup-sequence.

One early observation from Phil Camp was that most of the system would not be active at the time the Kickstart hand was being displayed, except for the exception and alert display routines. For this reason, it was almost certain that DisplayAlert was involved in the problem. Martin Brenner provided the information that when the A1000 is booted, Kickstart memory begins at location $fc0000, and is writable at that time. A mirror image of the Kickstart routine is then placed at $f80000, and when the machine is re-booted, execution starts at the $f80000 address. At this time, the ROM code checks to see if the checksum is correct. If so, the writable control store is write-protected and execution begins. If Kickstart isn't there at all, or if the



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checksum is incorrect, the system asks for the Kickstart disk and loads in a fresh copy to replace the corrupted one before setting the write-protect.

According to Bryce Nesbitt of Commodore, there was an error in the 1.3 release version of SetPatch that left the writable control store unprotected during certain kinds of alerts. I learned elsewhere that SetPatch uses the RomTags to jump out of the Kickstart routines at an early stage. When they jump back in, they have bypassed the write-protect code, setting the stage for the corruption of KickStart memory. If a program has problems, it can write into the Kickstart memory, corrupting the checksum, and causing the KickStart hand to come up on reboot. Commodore is to correct this problem in the next release of SetPatch, which is supposed to be coming soon.

Fake Setpatch

Commodore is preparing a new version of SetPatch at the time of writing. But in early April 1989, a file began appearing online, falsely claiming to be SetPatch 1.32—the fix we need. Please beware! The Commodore-Amiga Technical Support staff said they have not yet released a new version. Who knows what other virus mischief might have been introduced into the phoney file? Be sure that the SetPatch you get is the real one.

Runaway Floppies

Occasionally, when a floppy drive has unusually heavy use, it seems to forget how to stop! The problem has been noticed most often by people who were backing up a hard disk to floppies. After a while the floppy simply refused to stop spinning. This problem is most likely to surface if you have two or more floppy drives and some of them are empty. It has been traced to a problem with the TrackDisk device, and will also be fixed in the next SetPatch release. While you wait for the fixed SetPatch, you can avoid the problem by keeping disks in all drives when you are using your drives heavily.

Disappearing Icons

Long before I heard of 1.3, the disappearing drawers problem struck me. I was working on a club disk and had rearranged a number of drawer icons, erased the icons, replaced them with a different image, plus some other things of this sort. Suddenly I discovered that I had no icons at all. I called for a directory and neither the icons nor the subdirectories were there. They did not show up with list, either. However, calling for the programs with the correct path would load and run the programs I knew to be there.

Files without drawer icons are not affected. The problem seems to have been noticed on hard disks more than on floppies, but my own experience was with a 3.5-inch disk. Trouble is most often reported when people are moving the icons around, such as in a clean-up operation from Workbench. Sometimes the victim watches helplessly while the drawers disappear one by one.

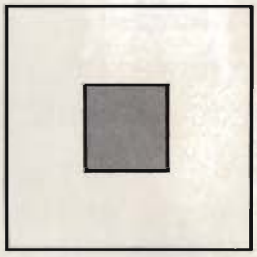
You can recover these files by copying them to another disk or partition, but they must be copied with the copy command. Diskcopy will not retrieve them. Some hard disk users have reported that even copying has not recovered their files. A Commodore representative says that this is a symptom caused by some of the earlier Fast File System software where the hash chain needed to have the files in a certain order. It was already fixed before 1.3 was released so it should never happen with the release version of 1.3. If you are still using an earlier version, it would be wise to back up your disk and then reformat it under the final release version. ■

Send your technical questions to Guru Bashers, AMIGA* Plus, *544 Second St., San Francisco, CA 94107. Please include your phone number, so that when necessary we can call for more info needed to solve your problems. In general, Guru Bashers needs to know precisely what equipment you are using with which software versions.

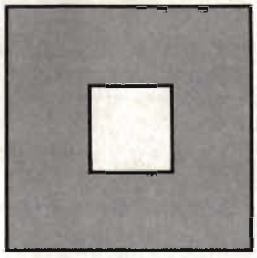
Get Ready For Super Agnus!

It's not just a new chip—it's the Amiga's future

BY RICK COOK



The Super Agnus means better screen resolution, more sound and more programming flexibility.



Now with chip memory doubled to a full megabyte, the Amiga becomes a serious workstation for creating business video presentations.

Commodore Business Machines is now shipping a new version of the Agnus chip that expands chip memory from 512K to a full megabyte. Announced in early April 1989, the new chip is being used in all 2000 series machines coming off the assembly line. It is also beginning to be available for retrofitting to existing Amiga 2000s—and with third-party customized fittings it could be made to work in Amiga 500s. However, Commodore says the new version of Agnus will not work in the Amiga 1000. The chip should be available by the time you read this.

Breaking A Barrier

For Amiga users, the Super Agnus means better screen resolution, more sound and more flexibility. For Amiga software developers, it means the ability to do more things more easily. For Commodore, the chip means greater potential in high-end markets such as desktop video for corporate presentation. The Super Agnus overcomes what has been a significant obstacle holding back programmers and users since the Amiga was released nearly four years ago—the 512K limit on chip RAM.

The Amiga gets much of its power from four custom chips—called Agnus, Denise, Paula and (in the 500s and 2000s) Gary. In many ways Agnus is the most important of these chips. Although it is often referred to as a "graphics chip", that is only part of what it does. In addition to handling graphics functions such as block moves, Agnus also controls the access of the custom chips to memory.

The Amiga uses a split bus. The first 512K of RAM can be decoupled from the main 68000 processor and manipulated by the custom chips with Agnus acting as a gatekeeper. This is one of the reasons why the ▶

Amiga can run rings around a Macintosh. Not only do the specialized chips give the Amiga better graphics and sound, but the split bus lets the computer do two things at once. While the main 68000 processor is working on one job, Agnus and the other custom chips can be doing something else, such as updating the screen or handling input/output operations. This explains why an Amiga can update its screen at 30 times a second—standard NTSC video—and still use a fairly slow version of the 68000 microprocessor.

The down side of the Amiga's design is that the original Agnus and the newer Fat Agnus chips can only address 512K of the Amiga's potential 8 megabytes of memory. Everything involving the custom chips has to be done in the first 512K of RAM. This first 512K of RAM is called chip RAM because it can be used by the custom chips. The rest of the Amiga's memory (if it has more than 512K) is fast RAM—so called because it can be accessed slightly faster, due to the custom chips never interfering with the 68000 processor. When the Amiga was designed, 512K seemed like plenty of memory for the special chips. After all, the Amiga was only supposed to be a super games machine and who ever heard of using as much as 512K to play games?

Doubling the amount of chip RAM gives programmers and users a lot more breathing room.

In retrospect, about the best that can be said of the 512K limit is that it seemed like a good idea at the time. But the split between chip RAM and fast RAM turned out to be a major annoyance, and the 512K limit on chip RAM has seriously cramped both programmers and users.

For example, one way to do fast animation is to display one screen while building the next one in memory. This is quick, but it means you need enough chip RAM to hold two full screens. Having only 512K of chip RAM limits the resolution of the screens. And because the sound chip also uses chip memory, the amount of music or digitized speech you can hold in memory is also limited. If you're a game designer trying to combine drop-dead graphics and high fidelity sound, the 512K barrier quickly forces you to make some unpleasant choices.

Some programs also eat chip RAM at a tremendous rate. Image enhancement programs like Pixmate from Progressive Peripherals take a lot of memory and it is easy to run out of chip RAM halfway through an enhancement. Finally, because DMA is also done through chip RAM, and because DMA is used to move things in and out of memory, DMA operations can fail when chip RAM is full. This can produce some very odd intermittent errors that can mimic everything from a bad disk to a bad RAM chip.

Stumbling Block

The 512K limit on chip RAM has also turned out to be a significant stumbling block in business video applications for the Amiga. Although the Amiga has a significantly better price-performance ratio for video applications than any other personal computer, the chip RAM limit held down its screen resolution. Apple Macintoshes and IBM PCs equipped to do video are considerably more expensive—but they can produce better-looking screens because all of their memory is available for graphics. Since image quality is very important in business video, some customers were willing to pay three or four times the cost of an Amiga system to get slightly better images.

The Super Agnus still can't address the full 8Mb of the Amiga's address space, but doubling the amount of chip RAM gives programs and users a lot more breathing room. A megabyte of chip RAM translates into higher-resolution screens, better animation plus more and better sound. For those reasons, software developers and knowledgable users have been eagerly waiting for the Super Agnus since it was first rumored.

Right now the easiest way to get a Super Agnus is to buy a 2000-series Amiga with the chip already installed. However, not all the Amiga 2000s on dealers' shelves have the Super Agnus, since some of them were made before the chip started shipping in April 1989. According to some bulletin board rumors, the 2000s with the Super Agnus have an orange sticker on the box.

A megabyte of chip RAM translates into higher-resolution screens, better animation, more and better sound.

The chip can be retrofitted to Amiga 2000s by a Commodore service center. Since the chip replaces the Fat Agnus used in the 500 and 2000s, it will not fit in a 1000. The Super Agnus is not being sold in a retrofit kit for the Amiga 500. However, it should work with the 500 just fine. Hopefully some third party developer will find a way to do this.

One thing the Super Agnus does not do is increase the number of colors available on the screen. And although the Super Agnus is highly compatible with existing software, there are some reports of incompatabilities with a few games. The chip should also work with most peripherals, including memory add-ons. ■

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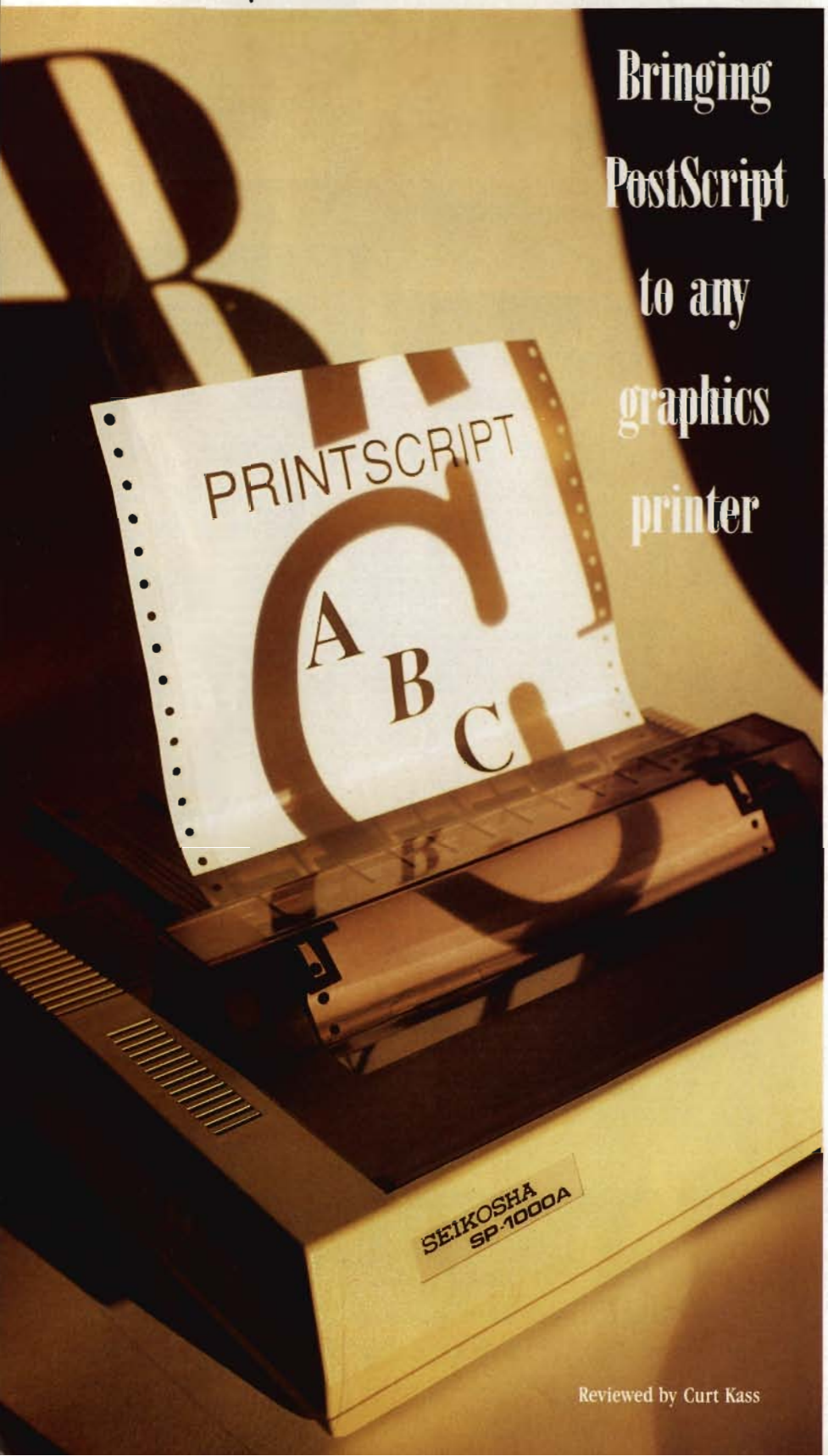


Bringing PostScript to any graphics printer

The most affordable way to bring the page layout power of PostScript to your Amiga. It's slow and memory-hungry, but it works!

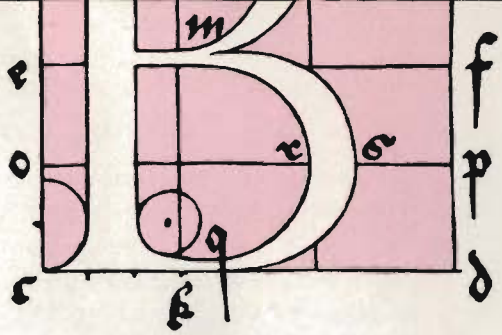
Reviewed by Curt Kass

PostScript is a computer language that describes page layouts to a printer. It is resolution independent—the description of the page has no relation to the resolution of the printing device. PostScript is not the pattern of dots that a printer device outputs, it is the instructions for how to create the desired pattern of dots.

Now, **PrintScript** ($89) from Pixelations Software puts the PostScript interpreter into your Amiga instead of in the printer. This reduces the cost of PostScript printing by at least $1,000. However, PrintScript does require additional Amiga memory. Pixelations recommends at least one megabyte for average page text with a couple of fonts. Note that PostScript printers usually have at least two megabytes of internal memory and one of the most popular models contains three and one half megabytes.

This reviewer used PrintScript on an Amiga 1000 with 2Mb and experienced some memory limitations which will be described later. Other users experienced probable memory crashes with 1Mb. It is not PrintScript solely requiring this memory; PostScript is the culprit here. Such is the price of using a sophisticated programming language and capabilities. Using more than one font and font size, slanting, rotating text, using structured graphics—especially anything involving curves—will eat up memory fast!

PRINTSCRIPT



However, if you're an Amiga user who wishes to output PostScript directly to your own printer, you now have a choice. You can either buy a PostScript printer, probably for at least $3,600. Or you can beef up your Amiga memory, probably for under $1,000, and get the job done—slowly—with PrintScript.

CLI Only

PrintScript 1.0 is operated through CLI. AMIGA *Plus* Technical Editor Arnie Cachelin pointed out in the May 1989 issue's "Cracking The Amiga Shell" that "quite a few Amiga users" avoid the AmigaDOS interface. This reviewer is one of those mentioned. We are called "IMers," which is short for Icon and Menu users. Pixelations assured me they are aware that we exist. They are working on an icon and menu version of PrintScript to treat our graphic dependency, and hopefully this should be available when you read this.

I proceeded to follow the PrintScript manual and spent the obligatory number of hours that IMers will take, struggling to open a CLI program. In all fairness to the manual, I will confess that I have typed exact commands from my AmigaDOS manual to no avail many times. I have yet to see a CLI program manual that cracked the IMer spell, and for a first release this manual is above the average. My secret for getting PrintScript to run was to use the CD command as follows:

```
1>cd printscript:
>printscript df0:filename
```

If you have two drives and you save your PostScript file on a data disk as I did, you will do a little disk swapping. By saving your PostScript file on the PrintScript disk, or installing your PrintScript files onto your word processor or publishing software, you can avoid this swapping. The Workbench disk must be in one drive because PrintScript uses the interface to the Amiga printer device. This enables you to select your printer in Preferences with the desired options, a convenient IMer feature.

With the proper settings in PrintScript and Pro Page I have produced many page layouts without infestation of bugs.

Pixelations points out that a "silly little bug" has surfaced at this point. In Preferences under Change Printer, Graphic 2, select Limits to Ignore and make sure that the Width Limit and Height Limit are set to 0 inches. If this configuration is not set, the "program stops dead in its tracks" and the message "Attempt to reference item 0 in an array" will display.

Manual Training

The initial PrintScript manual instruction is a configuration program to customize PrintScript to your system. Two very important features that this configuration sets up are the screen frequency (the number of halftone screen lines per inch,) and the screen angle (the angle between the half-tone screen lines and the horizontal axis.) These settings are necessary to support the grayscale printing of digitized or scanned or rendered bit-mapped images and structured graphics.

The PrintScript manual does a fine job of defining what halftone is, how grayscale images work, and how the screen frequency and screen angle configuration works while giving tips on suggested settings. Next you indicate whether you are using a Preferences printer or not. The "not" is an advanced feature enabling you to print raster graphics to a file for processing by another program. The last configuration choice concerns the technicality that most printers cannot print at the bottom of the page. Here you specify again to customize the program to your system.

To use PrintScript you need a program that can generate PostScript files as output. Most desktop publishing software and many word processor programs will create PostScript files because it is a well established standard. The 1.0 version of PrintScript contains only two analytic font metric files called Alpine and Tempora. They are equivalent to Helvetica and Times, two of the most popular typefaces in use. If you desire PostScript font output you must select Helvetica or Times in your word processor or publishing program.

PrintScript will print any additional bit-map fonts you save to PostScript as a typical jagged font image at whatever resolution you have chosen to print. Pixelations is aware of the typographical limitation this presents and is working to release at least 10 more typefaces this summer.

I have taken you step by step through set-up and configuration to indicate what PrintScript is supposed to do. Next I figured it would be appropriate to see if it worked. ▶

PrintScript Online Conference

(This spring, an online press conference with Pixelations representatives was held on CompuServe's AmigaArts forum. Below are some highlights.—+ EDITORS)

Why PrintScript?

Aside from a few thousand dollars, the major differences between buying PrintScript and using it with an inkjet or non-PostScript laser and buying a true PostScript printer are fonts (Adobe's are bundled with PrintScript printers) and speed.

Pixelations is working on reducing PrintScript's memory requirements all the time. The speed problem is closely related to communications rate, but a good deal of that is printer involved. Most PostScript printers now use faster 68020, rather than 68000 processors.

LaseXpress Bundling

Pixelations has entered into an arrangement with C Ltd. to support their LazerXpress printer. C Ltd. will be bundling PrintScript with the LazerXpress, a laser printer that uses a SCSI interface to dump data to the print engine from the Amiga's RAM. According to Pixelations, the set-up can print to the virtual page which can be dumped in about 7 seconds or examined via ExpressPaint 3.0. PrintScript on a Hurricane accelerator board with the LazerXpress produces PostScript speed, and you also get an 68030 for everyday use.

Fonts

PostScript printers come with a selection of fonts from Adobe. PrintScript supplies two font families (normal, bold, oblique and bold oblique for each) and three public domain fonts. The bundled fonts are compatible with Times and Helvetica (naturally).

Pixelations is negotiating with several font developers in the Mac world to bring their fonts to the Amiga. Once that pipeline opens, there'll be a flood of fonts. We are also developing a PostScript to screen-font converter, which will enable desktop publishing packages to show onscreen what you'll get via PrintScript.

Using PrintScript

To run PrintScript, you must use the PostScript output feature of your desktop publishing software to send the output to a file. Then type PrintScript <PostScript file>. Or you could start PrintScript on a pipe, for input, then send output to it from the desktop publishing package. A pipe is a special file device that one program can write and another one read, while multi-tasking.

You can also use PrintScript interactively to learn PostScript, if you like. You don't really have to know anything about PostScript to use it. However, there are lots of things PostScript (and PrintScript) can do that the Amiga software doesn't support yet. Learning PostScript will give you greater power and more options—such as running text along a curving path.

Upgrades

PrintScript is close to being a full PostScript handler, with 95% or more of the operators. Color PrintScript is definitely in the works. The next update, version 1.1, will hopefully be released by the time you read this. Version 1.1 will support clipping, a technique that uses a curved path as a boundary and only draws what's inside the boundary. This is useful for many special effects.

Some desktop publishing packages don't allow the background to show through the centers of letters (O, R, etc.). PrintScript lets a background show through, supporting both fill and eofill for paths. Putting a heading over a graphic of a brick wall, for example, is no problem for PrintScript.

The average PrintScript user's desktop publishing system is an Amiga 2000 with two megabytes, a hard disk and a DeskJet. PrintScript 1.1 will support Professional Draw in black-and-white mode. Publisher Plus doesn't produce the best PostScript, but City Desk is reasonable.

Printers

PrintScript supports any printer that Preferences lists, assuming it has graphics capability. With a 24-pin printer you'll get very nice results. With a Toshiba P321SL, 360 x 360 dots per inch wasn't as good as 180 x 180, because the paper movement wasn't precise enough. But if you get good results from your printer with graphics dumps, it'll work well with PrintScript. PrintScript can do halftones and the results are quite good. Even a 9-pin dot-matrix is not bad.

Engaging the friction feed provides better precision on short runs, but still, 180 x 180 is better. It seems that friction feed is better for short-term accuracy, while tractor feed is more important for long-term registration. We also get nice results with 360 x 180 dpi. ■

Cursor Show

If PrintScript loads and reads your file without mishap, a cursor appears in the CLI screen and whirls. This shows that PrintScript is busy checking out each curve in each character that must be computed. The animated cursor's spinning stop and go, fast and slow contortions are mesmerizing.

My first test run used a PostScript file created in Gold Disk's Professional Page. The original Pro Page file was still up on a background screen while I multi-tasked PrintScript in CLI. My test file was a quarter page designed mix of font sizes, some structured graphics, and halftone filled wide lines. Thirteen minutes after anim-cursor launch, my Hewlett Packard DeskJet loaded a sheet of paper. Four minutes later it began to print.

The last line began to appear first, since PrintScript begins printing at the bottom of the page. (If you are loading pre-printed letterhead, the paper must be upside down and backwards. The Amiga is continually educating my cerebral visualization process.) About ten minutes later I was holding my first 300 dots per inch (dpi) inkjet printer PostScript output. The results were impressive! The page was unquestionably laser PostScript quality.

Some credit is due to the DeskJet because its 300 dpi inkjet capabilities equal laser output. Using a non-PostScript 300 dpi laser printer would obviously equal PostScript laser output. Other dot-matrix printers will print as well as their dot-per-inch resolution and individual characteristics allow. Pixelations suggests that 9-pin dot matrix is primarily suitable for layout preview. Many 24-pin printers should produce excellent results. You can configure the print density to lower resolutions than the capability of your printer to speed up the PrintScript process for rough page layout proofing.

One problem I experienced with my Pro Page file was the loss of the left ¼ inch edge of my copy and graphics. Pixelations customer serv-

ice promptly returned a call with the answer. The DeskJet will not print the left ¼ inch margin of a page. The PrintScript configuration program needs to be set accordingly and it is useful to set your Pro Page margin to at least ¼ inch as a reminder not to put type or graphics within that area of the page.

With the proper settings in PrintScript and Pro Page I have produced many page layouts without infestation of bugs. I created files in Professional Page to test a popular electronic publishing environment offering full control over text, imported IFF files and structured graphics. Grayscaled images printed every bit as impressively as type. I also created files in excellence! by Micro Systems Software to test a popular word processor with PostScript and graphics capability. Here again, the text was impressive and the graphics capabilities are useful but more limited than with publishing software.

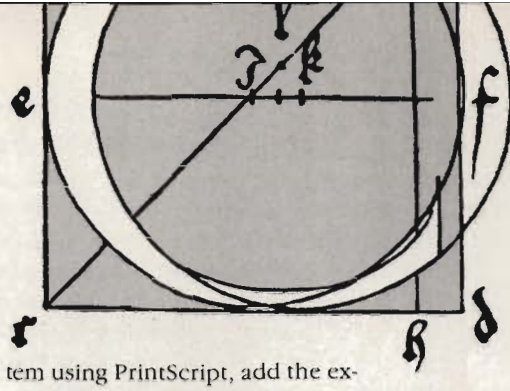
Elapsed time from the PrintScript anim-cursor launch to retrieval of a printed page ranged from ten minutes for letterhead or small logo layouts to 35 minutes for full-page layouts. Print time is an issue based on several differences between the PrintScript output system and conventional PostScript printer output. The initial time element is the processing of the PostScript interpreter. PrintScript takes longer to interpret a 300 dpi setting than a typical 300 dpi PostScript laser printer. PrintScript will take even longer to print when driving a dot-matrix printer because these are slower than a 300 dpi laser printer.

More Memory

I mentioned earlier that I discussed with two sources the problem of running PrintScript on a one megabyte system. Full pages are not a realistic option without more memory. Partial pages with minimal font choice or size, and limited IFF imports or structured graphics should run without a memory crash. On my two megabyte system I was able to run PrintScript and concurrently multi-task within Professional Page—minimizing the issue of printing time by staying productive. I was not as successful in multi-tasking within excellence!. Even two megabytes did not appear to be enough memory. (This was the 1Mb version of excellence! with program and dictionary loaded into RAM.)

PrintScript is an Amiga program that reduces the cost of PostScript printing by at least $1,000.

PostScript printers generally contain about two megabytes of built-in RAM. To draw a fair comparison between PostScript printers and a system using PrintScript, add the expense of at least one additional megabyte of memory to your Amiga.



Alternative $$$

Is PrintScript for you? The financial factors are straightforward. I will figure you have started with a 1Mb Amiga because this memory requirement is becoming the minimum standard for running applications. A 300 dpi PostScript printer costs about $3,600. When used with a PostScript-capable word processor or desktop publishing software, this type of printer is perceived as the standard desktop publishing solution.

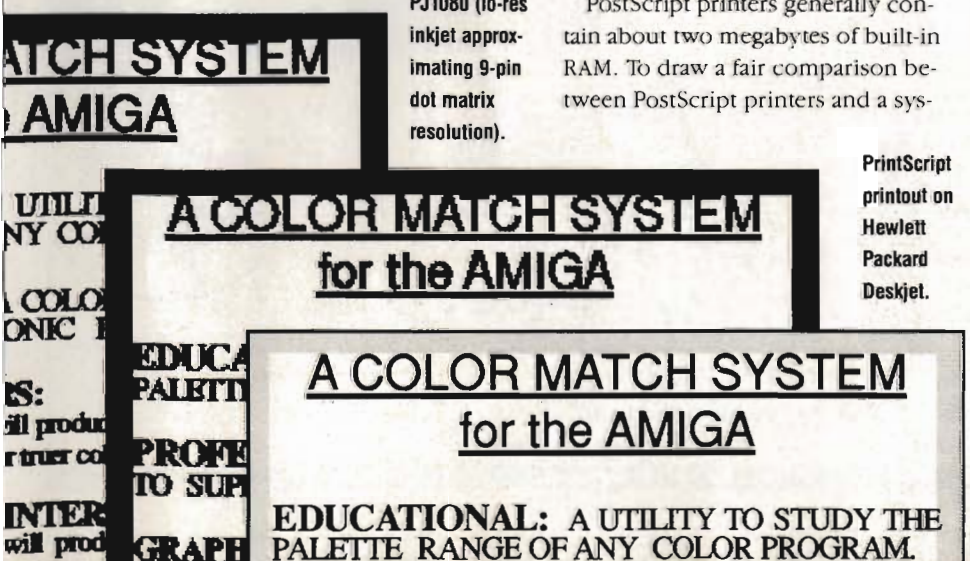
A comparable PrintScript system will involve purchasing this software, adding one or two megabytes of memory, and buying a non-PostScript laser printer, all for approximately $2,400. This equates to a difference of $1,200 between the true PostScript laser system and a PrintScript system. Substitute an inkjet printer like the 300 dpi Hewlett Packard DeskJet, at about half the cost of a laser printer, and the difference between the PostScript laser system and the PrintScript system becomes approximately $2,000.

PrintScript fills a niche in the Amiga market. The above figures show a wide enough cost spread to appeal to many Amiga users who can live with PrintScript's slower speed for PostScript output. With a future addition of more fonts and an icon and menu version, PrintScript holds the potential to be one of your most highly valued utility programs. With more and more word processors supporting PostScript, many users might not need to move up into the sophistication of desktop publishing programs. These Amiga users might already own a dot-matrix printer that would work admirably with PrintScript. ▶

PrintScript text printed on Xerox 4020 inkjet.

PrintScript printout on Canon PJ1080 (lo-res inkjet approximating 9-pin dot matrix resolution).

PrintScript printout on Hewlett Packard Deskjet.



Please, Mr. PostScript

"Page description language" spoken here

PostScript is the trademarked name for a computer language owned by Adobe Systems, Inc. PostScript is officially defined as a "page description language" and its purpose is to control high-resolution printers that output dots too small to show "jaggie" stairstep lines and curves—which you'd get with regular dot-matrix printers that output 72 dots per inch. PostScript is a widely supported language used by many software packages in graphic arts and publishing. For those of you with some experience with programming languages, PostScript is a combination of Forth and Logo.

Among the hardware devices commonly using PostScript are laser printers that can output 300 or 600 dots per inch, and laser photo-typesetting machines capable of 1,200, 1,600 and 2,400 dots per inch. All PostScript-compatible printers are really computers. It is not uncommon to find high-end PostScript devices with 68020 microprocessors and 80-megabyte hard disks built in. The input to these computing printers arrives as plain ASCII text files written in the PostScript language, and the output is high-quality printed pages.

The printer's internal computer translates the PostScript instructions into machine codes specific to the hardware of that particular device. PostScript devices do not permit direct binary code input, so in some types of operation they are inherently inefficient and slow. They also need lots of memory to translate the PostScript into machine codes. PostScript printers must have a minimum of one megabyte of RAM and some need 8Mb to do their job. To understand why all this power is necessary, think of how many dots it would take to fill an 8½ by 11 inch page at 600 dots per inch—33,660,000 dots, more than 4 megabytes.

Adobe charges a high license fee for each device using their programming language—approximately $500 each printer sold—which adds about $1,000 per device to the consumer. If you would like to learn PostScript, Adobe sells three manuals, but I suggest that you study Forth and Logo first.—LION KUNTZ

As the lower cost alternative for printing PostScript files developed in desktop publishing programs, PrintScript speaks for itself. Anyone seriously using the Amiga for graphic design and typography needs to proof their PostScript files before having an outside service print their files at resolutions of 1270 dpi or higher. PrintScript offers a practical alternative to produce moderate-resolution proofs or, for many, final copy. And if you decide to build a PrintScript system, you will probably find many uses for the additional memory you packed into your Amiga instead of in your printer. ■

PRINTSCRIPT $89

Pixelations, P.O. Box 547, Northboro, MA 01532. (508) 393-7866.
Requires 1Mb.

CIRCLE 271 ON READER SERVICE CARD

Curt Kass is an artist and designer in the graphic arts department of the University of Wisconsin at Milwaukee. He consults in the computer graphics field, specializing in the Amiga. Recently he introduced **Palette Printer**, *a utility to aid in color proof printing on the Amiga.*

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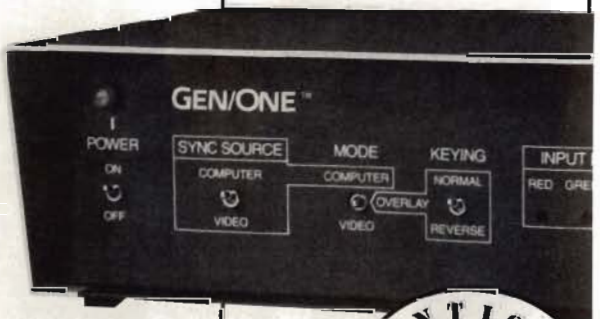

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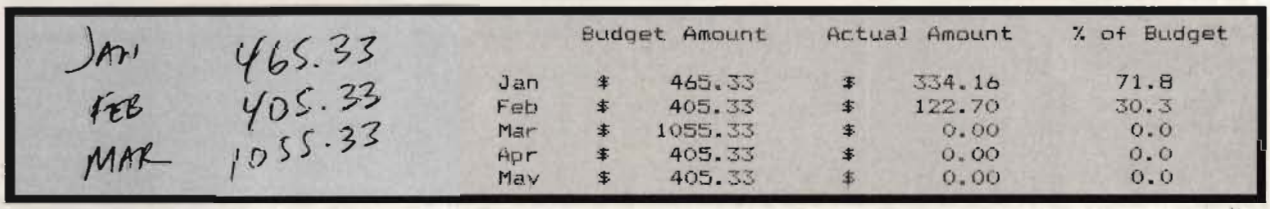
CIRCLE 011 ON READER SERVICE CARD

Desktop Budget

UNIQUELY EASY ICON-RICH PERSONAL FINANCE SOFTWARE

Review by Michael Brown



Double-click the icon for the checking account. A transaction window pops up in the shape of a check (complete with account number). Fill in the amount (say $150) and an optional memo (Nordstroms: shoes). Double-click on the transaction window and a series of gadgets appears to identify particular types of transactions, such as tax deductible expenses for later reporting.

Everybody talks about doing their home accounting on their computer, but few of us actually do it. Spreadsheets are great tools, but it's a daunting prospect (especially for the non-accountant) to conceive and design all the templates, macros, formulas and reports required to build an accounting system from the ground up. Business accounting packages provide a ready-made system, but they're expensive and come with a lot of tools superfluous for the home user. **Desktop Budget** ($69.95) from Gold Disk is designed to simplify the task of home budgeting and accounting.

Desktop Budget requires a minimum 512K of RAM. When running in this environment, however, the package shuts off a few features in order to conserve memory. Although only one disk drive is required, a lot of swapping between program and data disks would be necessary with only one drive. The program is not copy protected and instructions are provided for making a back-up disk and for installation on a hard drive. Workbench 1.3 is on the disk. Dates are critical in an accounting system and Gold Disk has not forgotten users of the Amiga 1000, which lacks a battery-backed clock. A nifty utility called QuickDate is provided for setting the system date and time.

Icons Everywhere

Desktop Budget is almost totally based on icons, which appear on an eight-color custom screen. This "desktop" is very similar to the Amiga's four-color Workbench screen. When running in a 512K environment, Desktop Budget "closes" the Workbench screen and uses a four-color custom screen. The desktop can extend beyond the visible portion of the screen, so a horizontal scroll bar is provided. This width is required due to the large number of icons that can be created when defining a budget. The desktop metaphor makes the program very easy to learn because users can carry over their knowledge and experience of Workbench directly to Desktop Budget.

Desktop Budget has an excellent ▶

file requester which automatically configures its device gadgets to whatever is available on the Amiga that the program is loaded from. On my A2000, for example, it correctly displayed gadgets for my two hard drive partitions, DH0 and DH1; the partition on my BridgeBoard hard drive, JH1; my RAMdisk, RAM; my recoverable RAM disk, RAD; and my internal floppy disk, DF0. The drawer gadget can contain up to 80 characters, which enables the nesting of many more sub-directories than most people will ever need. Hard drive users will find this feature particularly important.

Defining Accounts

The first step in using the program is to define accounts and budget categories. Accounts are either cash, checking, savings or credit card accounts. Budget categories are income (salaries, interest income, etc.), expense (food, clothing, rent, etc.) or assets (automobiles, homes, etc.). For every account and budget category that is defined, an icon is selected and placed on the desktop. Additional budget categories can be created and added to the desktop at any time. Over three dozen eight-color icons are provided on the disk and a icon editor is provided for creating customized icons. (The icon editor cannot be run concurrently with Desktop Budget on a 512K machine.)

Account icons have two windows associated with them. Info windows display such information as account type, account number (14 position, alpha-numeric), starting and current balance (seven positions to the left of the decimal), and next check number (eight positions for checking accounts only). Transaction windows are used to record checks issued from checking accounts, deposits and transfers made from savings and cash accounts, and charges made on credit accounts.

Income and asset icons also have two windows. A transaction window is used to record transfers and deposits from one account to another, such as deposit of a paycheck into a checking account. An info window displays budgeted and actual amounts for each month of the year. Income accounts display budgeted income and the actual amount received for each month of the year. Asset accounts display the budgeted and actual spending for each month.

All transactions are recorded through the use of icons, and this is where Desktop Budget is most unique and the most easy to learn and use.

Asset accounts also display the original purchase price of the asset, its current market value and initial equity. If you purchase an asset on credit, like a home, Desktop Budget tracks how much of the original loan has been paid off and how much remains outstanding. Expense icons only have info windows displaying budgeted and actual spending for each month.

Unique Recording

Once the initial budget has been defined, financial transactions can be recorded. All transactions are recorded through the use of icons, and this is where Desktop Budget is most unique and the most easy to learn and use.

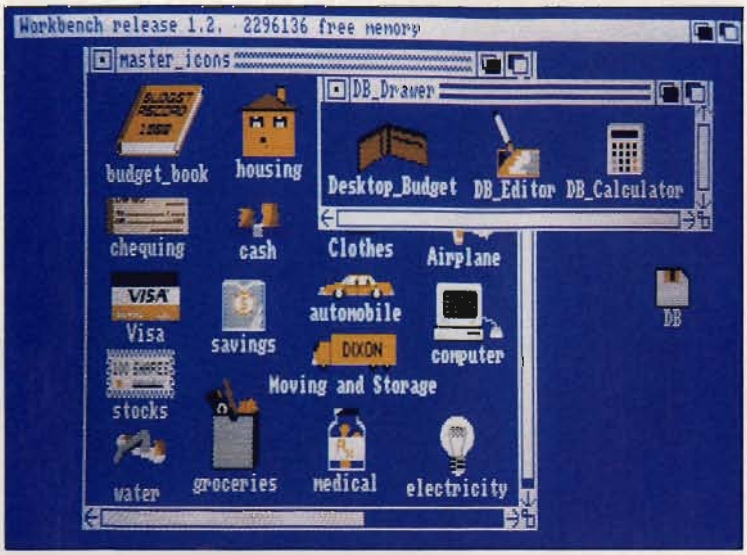
To record the purchase of a pair of shoes by check, for example, double-click the icon for the checking account. A transaction window pops up in the shape a of check (complete with the checking account number). Fill in the amount (say $150) and an optional memo (Nordstrom's: shoes). Double-click on the transaction window and a series of gadgets called tags appears. Tags are user-defined gadgets used to identify particular types of transactions, such as tax deductible expenses for later reporting. Now select the OK gadget. A new check icon appears on the desktop, with the amount of the check displayed underneath. Drag this icon on top of the clothing expense icon and release it. The check icon disappears into clothing expense. The check has been registered and clothing expense has been recognized.

Suppose, however, that you purchased two items with that check: a pair of shoes and an exercise video. A SPLIT gadget on the check window allows you to divide the dollar value of the check several times, generating check icons that can be dropped into several different expense categories. Payments, withdrawals, deposits and transfers to and from any savings, credit or other checking accounts are handled in the same fashion. There are no account names and numbers to memorize and no other entries to be made.

Reports and Filters

Recording financial transactions is, of course, only half of what is required from an accounting package. A means of reporting the results of these transactions is also needed. A set of pre-defined accounting reports (including a net worth statement, net income report and total spending reports) is augmented by a simple report-writing tool for extracting information, such as only those transactions affecting the checking account. Each of these reports can be printed or saved to disk in ASCII file format. A few simple graphs can also be created (but not on a 512K computer).

Other reports can be created with the use of filters. Filters are used to define conditions which must be met by all retrieved records, for instance "report all transactions with memos like Nordstrom's . . . " or "report all transactions with a tax deductible tag set . . . ." Filters have their own icons and are activated by dragging them over a budget category icon (they cannot be used on more than one



category at a time). The items in that category that pass the filter's criteria are presented in a transaction window, which can be printed like any other report.

Desktop Budget is a very strong program, but it is not without minor flaws. I found the manual to be well written, albeit a bit fragmented, and it is supplemented by an excellent index. An appendix describes how to back-up your data files, which is important because each budget is comprised of many individual files. One serious omission concerns defining credit accounts. If they are set up with a positive balance, the program will mistakenly treat the account as an asset instead of a liability and payments against the account will increase the balance, instead of decreasing it.

A useful calculator is provided (it is especially handy when used in conjunction with the Amiga's clipboard device). In a 1Mb Amiga it appears on its own custom screen, but on a 512K machine it appears on the desktop where it's most useful. Terminating the calculator fails to remove its custom screen, which wastes chip memory. The icon editor suffers from the same oversight.

All in all, Desktop Budget is an excellent program. It has a very short learning curve (it's not at all intimidating) and provides very useful and informative reports. Despite a few flaws, I recommend it highly. ■

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ON DISK

Gorilla, painted with Deluxe Paint I and printed in color at 120 × 120 dots per inch with a Xerox 4020 inkjet.

HARD-COPY OUTPUT

THE GORILLA NEVER LOOKED BETTER...

BY CURT KASS

Answering Your Questions About Printing

Welcome to this new AMIGA Plus *column. Hard-Copy Output is about producing all types of printouts from your Amiga—not only page layouts, but also slides, overhead transparencies, etc. . . . I'm on the Graphics Art staff of the University of Wisconsin at Milwaukee, where we create Amiga hard-copies on a wide variety of printers and other output devices. So send me your questions in care of AMIGA* Plus *and I'll do my best to answer them in these pages—undocumented tips and techniques are welcome too.*

Presentation of computer images away from the computer is a hot topic today, with prices dropping rapidly for machines capable of producing graphics and text of excellent quality. As proof, this issue's column takes one of the most familiar Amiga images and explains how we produced two state-of-the-art printouts—in black and white at 1,270 dots per inch (dpi) on a Linotronic 100 laser typesetter, and in color at 120 dpi on the Xerox 4020 inkjet.

Gorilla Memories

In 1985, the husband-wife team of Greg Johnson and Avril Harrison was ensconced at Electronic Arts in a small backroom with a couple of Amiga 1000s and a stack of photographs. They were under contract to produce a series of promotional sample graphics for a new Amiga paint program to be titled Deluxe Paint. While Avril was working on her famed golden King Tut, Greg was painting the Gorilla image featured in this issue. Adapted from a National Geographic photo, Gorilla was painted on DPaint I in low-resolution 320 × 200 with 32 colors. (The original Gorilla IFF file is on this issue's AMIGA *Plus* Disk.) By the way, Greg and Avril are still active in Amiga art and game design from their studio in Novato, California.

When Gorilla debuted four years ago, there were few affordable tools for effective color printing. The thermal-transfer Okimate 20 was the first color printer widely used and supported by Preferences. The first color inkjets were not as well established. The Diablo C-150 was a costly Amiga investment at that time, and the Canon PJ1080A did not have a Preferences driver.

Color For $1,300

This issue's Xerox 4020 color inkjet printout of Gorilla was made from a standard Amiga IFF graphics file. The file was loaded into Deluxe Paint III and the Gorilla screen was sent to print. The Deluxe Paint III Preferences were configured to the Xerox with Graphic II specifications Density set to 1 for 120 × 120 dpi. Dithering was set to F-S, which prints an image of this composition more realistically than the Ordered or Halftone settings.

The Xerox 4020 is an updated version of the Diablo C-150, sporting a more sophisticated operating system and color output. I use my own Xerox 4020 to render quite acceptable color proofs of jobs to be electronically produced and color separated.

The 4020 offers a standard graphics resolution of 120 x 120 dpi and an enhanced resolution of 240 x 120. Its four liquid ink cartridges—black, yellow, cyan and magenta—combine to produce thousands of variations of hue, value, and shade. Individual paper sheet-feed is possible, or you can mount more economical rolls either 8½ inches or 11 inches wide.

The 4020 retails for about $1,300. Too rich for your blood? Your user group could purchase such a printer and create your own IFF color-output service. A slightly less expensive alternative is the Hewlett Packard PaintJet which offers a higher resolution of 180 x 180 dpi, but is limited to 8½ x 11 inch paper size and delivers less intense color saturation.

B&W At $15 Per Page

The black and white version of Gorilla was printed at a resolution of 1,270 dots per inch, on a Linotronic 100 Laser Imagesetter (courtesy of Tom Schwerm and the Educational Communications Division, University of Wisconsin—Milwaukee). High-resolution typesetters by Linotype and other manufacturers will output onto photographic film or negatives. These machines are in wide use by professional typography services as output devices for graphic designers and publishers.

It is simple to import an IFF image such as Gorilla into a desktop publishing program and save the page as an ASCII PostScript file ready for telecommunication to a PostScript typography service. I used Gold Disk's Professional Page to electronically import, resize, screen and save to PostScript, the black and white version of Gorilla pictured here.

Your average cost for printing a page of mixed type and graphics at resolutions of 1,270 dpi or higher should be about $15–$25. If no typesetting bureau in your area is equipped to work directly from an Amiga disk, converting your file to IBM format with Central Coast's DOS2DOS will take care of the problem.

Paper Help

All printers have a most favorable paper. Many manufacturers supply a carefully designed paper to match their printing technology, some do not. Non-coated paper allows deeper

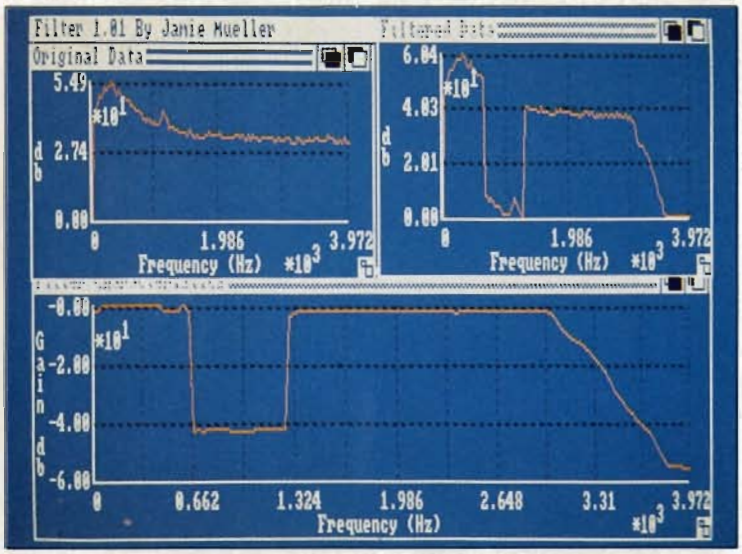
Continued page 37

ON DISK

Sound Effects Library

AMIGA Plus *Special Disk Bonus*

This issue's AMIGA Plus *Disk features a small library of interesting and surprising sampled sounds, plus two utility programs that let you hear them and alter them.*



Filtering the frequency spectrum of an IFF sound

To listen to any of the sounds in the AMIGA *Plus* Disk Sounds drawer, just double-click on their icons! This calls the program named Sound, which was written by R. L. Stockton of Gramma software. The C language source code for this tiny (8K) redistributable program can be found in the Programming drawer on the AMIGA *Plus* Disk. The powerful Sound program will play not only IFF format samples, but any file (including itself). However, be assured that text files, graphics, or program code will sound like a bunch of boring noise. Parameters such as playback rate, channel, number of repeats (looping) and stereo can be set using CLI arguments—or by using the Info menu selection from the Workbench. Additional instructions for this program are also in the Sounds Drawer and can be viewed by double-clicking the Sound.Doc icon.

A second sound utility on this issue's AMIGA *Plus* Disk edits standard IFF sound samples. Filter, a redistributable program by Jamie Mueller, works on your Amiga somewhat like a stereo system's "graphic equalizer"—except with 256 sliders. Using a variation of the Fast Fourier Transform (FFT) known as the Fast Hartley Transform (FHT), filter will display the Fourier spectrum of the sound, let you edit it, and then rebuild the waveform from the modified spectrum. This is useful for reducing high-frequency noise in samples, or for filtering out unwanted frequencies. The Filter program can display the 256-point spectrum (sound strength vs. frequency) of the sound along with the actual waveform before and after applying the filter. This program takes a long time to do its computation—especially with long samples. So try to plan the shape of your new sound carefully, before using the program.

Sampled Sounds

All sounds can be thought of as waveforms which show how the sound changes with time. A pure note looks like a sine wave, but these are very rare sounds in the real world—and boring too! Real sounds are a mixture of pure tones, producing waveforms that are much more complex than a simple sine curve. Musical instruments produce waves that are a combination of several pure tones, known as overtones or harmonics. The lowest tone is called the fundamental and will have the same pitch as the note the musician is playing. The pitches or frequencies of the harmonics will be multiples of the fundamental frequency and it is ▶

the relative strengths of these overtones which give each instrument its distinctive sound.

Other types of sounds, such as the voices and noises on this AMIGA *Plus* Disk, are also distinguished by their harmonics. But there is a *major* difference. Real world noises aren't played at a specific pitch, so there is no fundamental frequency! Because of this, most non-musical sounds have an infinite number of harmonics with frequencies varying continuously from zero to infinity. The exact blend of these harmonics produces the waveform.

However, there are other well-defined limits on a sound's harmonic frequency content—called the frequency spectrum or Fourier spectrum. At very low frequencies, sounds begin to resemble clicks. Most sounds do not have very strong components below 10Hz. For example, your non-electronic wristwatch ticks at 1 Hz (Hertz, or cycles per second). U.S. alternating current wiring carries a frequency of 60Hz. This makes a low buzz which is familiar to anyone who has an ungrounded stereo or bad flourescent tubes.

The high-frequency limitations on sounds are a bit more complex. Human hearing is said to range from about 20Hz to 20kHz (1kHz = 1000Hz). You can't hear frequency components above this, but they sure upset Fido! However, actual adult humans with excellent hearing will be lucky to hear 12kHz sounds. Many noises are fully recognizable even if their frequencies above 5kHz are cut off.

Amiga Sounds

To get sounds out of a computer such as the Amiga, data for the waveform of the sound must be available in memory. This is commonly done with a sound digitizer (also called sound sampler). These devices generally plug into the Amiga's parallel port and have jacks for microphones and/or stereo cables. The digitizer reads the waveform coming in from the microphones and records it to the computer at regular intervals. The number of recordings taken per second is the sampling rate (also in Hz). Sounds with a high sampling rate will have better quality. But they will also make bigger disk files. Higher sampling rates capture higher-frequency harmonics of the actual sound.

Sounds will be distorted if the sampling rate is not high, or if the actual sound has a large high-frequency component. The Nyquist Sampling Theorem, which is the rule for sampling rates, states that the sampling rate must be twice the frequency of the highest harmonic you want to capture.

After the digitized waveform is in your Amiga, the Amiga can read each point in the waveform and send it to the speaker at just the right speed to reproduce the original sound—more or less accurately. The Amiga has four channels for sounds. It can play four different waves at once, two on each stereo channel. ■

HARDCOPY OUTPUT

Continued from page 35

saturation of the printing medium. Coated paper retains more printing medium on the surface of the paper which helps create a brighter, vivid, sharper image.

With too much coating for your particular printer, your ink may dry too slowly and smear. Too little or no coating, and your ink will appear dull and lifeless. Different paper densities will allow ink to spread in various degrees. This can be the difference between seeing the individual dot, or allowing the dot to merge with its neighbors for a solid fill of ink. Different weights of paper can also affect the dot merge, but most printers can't feed paper heavier than the standard 20-24 pounds.

Anyone using the Canon PJ1080 inkjet or its Radio Shack equivalent will find that Hewlett Packard PaintJet paper works very well and is readily available. I use the Z-fold paper and tear off the micro-perforations—it is less expensive than the 8½ x 11 inch single sheets.

Preferences Secrets

Workbench 1.3 Preferences settings should be fully explored! We are incredibly fortunate to have such a sophisticated and diverse printer setup. I will never forget the day I received my beta copy of 1.3. My low-resolution Canon PJ1080 printer output suddenly improved dramatically. The new F-S setting made all the difference on many images. When I say explore Preferences, I mean a methodical examination, taking notes on the output you get from all possibile settings.

Some printing densities output better than others and it is not always the higher densities that are best. For example, the Xerox 4020 oversaturates many colors at its 120 × 240 dpi setting. I generally use the setting for 120 × 120 dpi on most 4020 output. On dithering settings, F-S is great for some painting/illustrations to add an interesting surface texture or to merge grayscales or color spreads. F-S can also cause the opposite effect, breaking up a surface on some images. F-S seems to works best for most image capturing, on low to medium dpi printers.

The ORDERED setting will work better in image-capturing at higher printer resolutions. ORDERED can be the way to go if solid, clearly defined color shifts are emphasized in your composition. Most printers will best print a solid block of color in ORDERED. The HALFTONE setting is worth experimenting with. Just don't confuse this setting with adjustable halftone screening measured in lines per inch. Newspaper photographs are generally screened at 85, magazine photographs at 133. In my research, HALFTONE has produced the least useful images. The exception to this is when attempting special effects. ■

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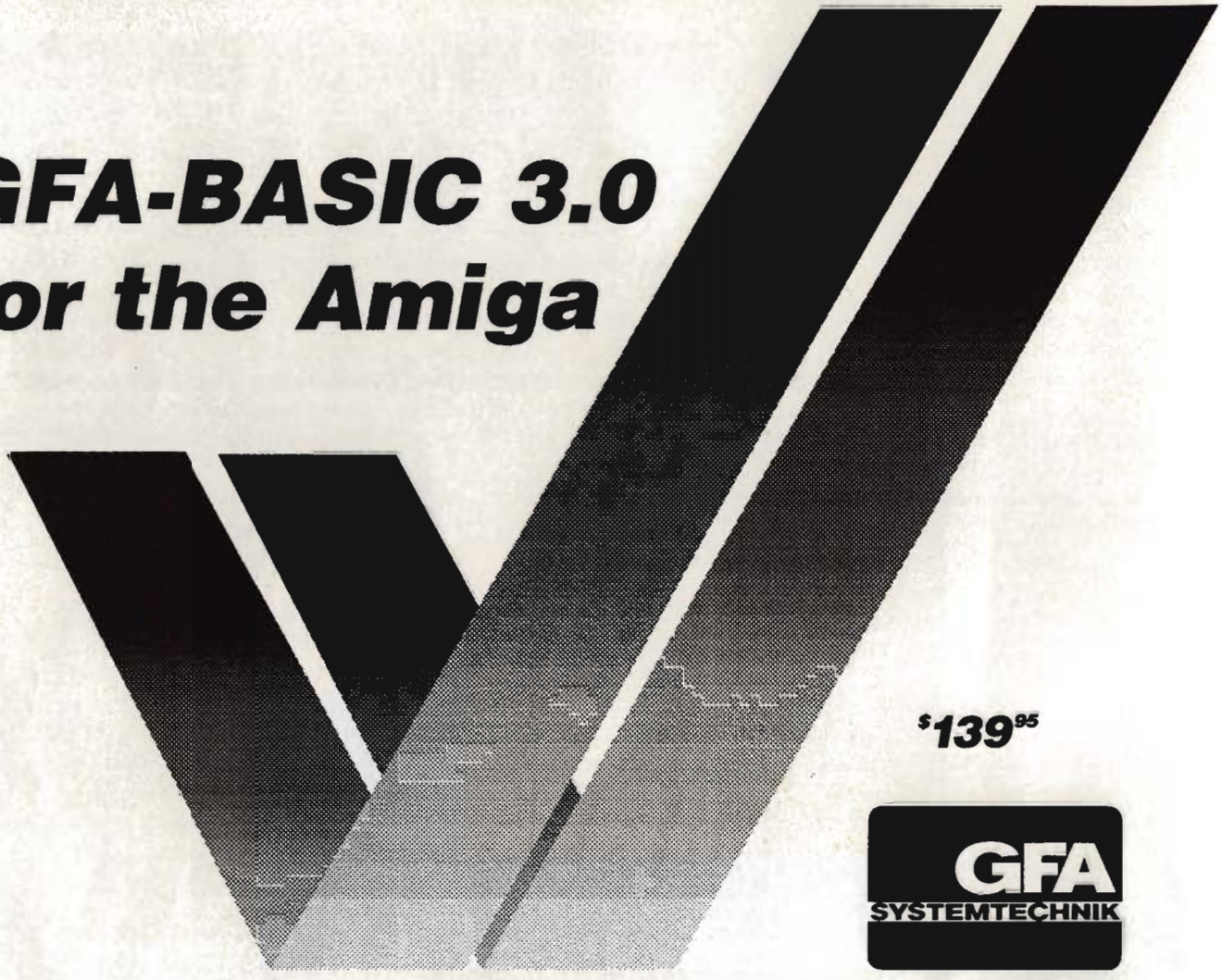

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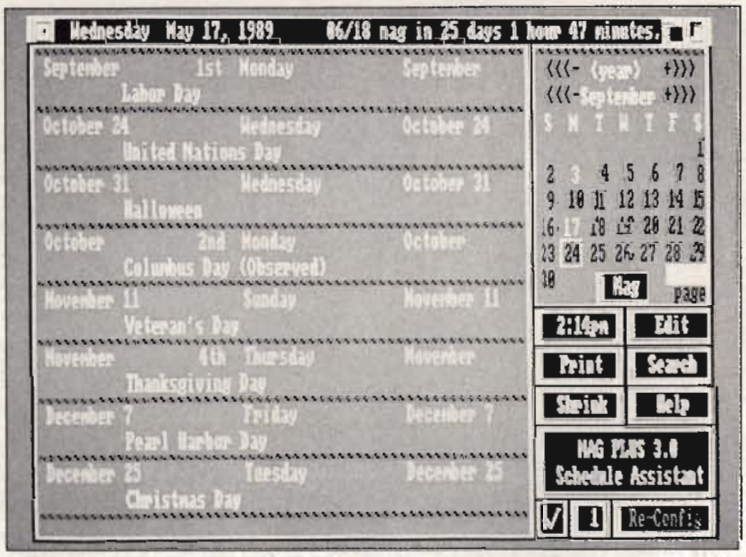
Appointment Schedulers

NAG Plus 3.0 and Who! What! When! Where!

Reviewed by Michael Brown

Thanks to multi-tasking, these programs work in the background, automatically popping up to remind you of appointments, deadlines, or special occasions.

NAG 3.0



Programs designed to help maintain schedules have been available on personal computers for a number of years. On computers lacking the Amiga's multi-tasking capabilities, utilities such as Borland's Sidekick for the IBM PC wait in the background until the user activates them. The only problem there is that *you* must remember to activate the program to check your schedule.

If you have trouble remembering your appointments in the first place, you might need more of a reminder to keep you on schedule. **NAG Plus 3.0**, from Gramma Software and **Who! What! When! Where!** version 1.1 from Blue Ribbon Bakery automatically remind you of scheduled appointments, no matter how involved you may be with another project. Thanks to the Amiga's multi-tasking, these programs can run in the background, popping up only when you tell them to remind you of appointments, deadlines, or special occasions.

Not only do these programs help keep you on schedule, but they both feature ARexx ports for linking to other ARexx-compatible software. NAG also features an Exec command, which can automatically execute AmigaDOS script files at scheduled times. Both programs run open windows on the Workbench and require only 512K. I was able to multi-task each with Scribble! on my unexpanded Amiga 1000, but not with WordPerfect. Neither program caused any conflicts multi-tasking with WordPerfect, Flow and several public domain utilities on my 3 meg A2000. NAG 3.0 is not copy-protected. Who! What! When! Where! uses the "look-up-this-word-in-the-manual" form of copy protection. Both programs, therefore, can be copied to a Workbench disk (space permitting) or to a hard disk.

NAG 3.0

When NAG 3.0 is loaded, a tiny window (about the size of a window ▶

close gadget) appears just below the Workbench menu bar. Clicking on this window opens the full NAG screen, which consists of a monthly calendar and up to 8 days of appointments, deadlines, birthdays, anniversaries and action items. A page gadget advances the display to the next eight days and a shrink gadget shrinks the NAG window back to its tiny window. A clock and several other gadgets comprise the rest of the screen. Gadgets are the order of the day with NAG—the program does not use pull-down menus.

Scheduling appointments with NAG is accomplished by selecting the day of the appointment on the calendar and entering the Edit window by clicking on the Edit gadget to open the edit window. Gadgets in the Edit window provide a choice of audible reminder modes (sound and/or voice), and time modes (ranging from "on time" to 30 days prior to the appointment). Appointment messages can contain up to 99 lines of text. Each line is counted as an appointment and NAG can retain up to 99 appointments per day. Messages can be identified as Action Items, Deadlines, Anniversaries, Birthdays or Appointments.

When the time arrives for a reminder, a small window pops up and displays the text of the message and the time of the appointment. If the sound option has been activated, the selected sound sample is played (an excellent selection of sound samples is provided on the disk). With the voice option, the text of the message is narrated by the Amiga's voice synthesizer. Both sound options provide controls for pitch, speed and other playback characteristics. Missed "nag" reminders not yet acknowledged by the user will reappear each time the program is run.

If more than one person uses the same computer, NAG can maintain multiple configuration files with separate appointments and customized settings. For example, if a secretary maintains appointments for several other people, a useful search feature will display and print only those appointments with specific message strings, such as names. The search feature can also be used for other purposes such as finding all appointments with a specified party or displaying missed "nags."

Gadgets on the calendar move the month and year forward and backward. Schedules can be printed by selecting a beginning and ending date and clicking on the Print gadget.

With Nag's voice option, the text of the message is narrated by the Amiga's voice synthesizer.

Notes can be attached to any particular day on the calendar using the Amiga's Notepad utility (different text editors can be selected through the configuration file). Notes can be viewed and edited by clicking on the calendar date with the right mouse button. Birthdays, anniversaries, or other regularly repeating appointments (occurring either every month or every year) need only be established once.

NAG 3.0 features extensive, context-sensitive online help, a very good users' manual, and will automatically dial telephone numbers if a Hayes-compatible modem is connected to your system. I liked NAG 3.0 very much, particularly for the gadget-oriented system that made it easy to learn.

Who! What! When! Where!

Who! What! When! Where! 1.1 goes one step further than NAG 3.0 by incorporating a sophisticated address directory with the appointment scheduler. Its method of reminding you of appointments is very similar to that of NAG 3.0, with both audible and visual reminders.

Who! What! When! Where! can support up to 14 separate users, defined as "owners," and each may choose to have a separate password. However, the program does not "hide" the password when an owner types it in, so if security is a big issue you must make sure no one is looking over your shoulder.

Each owner has a separate directory of names and addresses, which is displayed when the owner signs on. Two-thirds of the directory window displays one complete record containing fields for Name, Street Address (two lines), City, State, Zip Code (large enough for Canadian zip codes), Telephone Numbers (work and home) Birthday, Groups and Notes (3 lines). Phone numbers can be automatically dialed if a Hayes-compatible modem is connected to your Amiga. The other side of the window displays a directory of names—clicking on any name in the directory calls it up for full display.

A powerful feature of Who! What! When! Where! is the ability to "share" information in the directories between different sets of users. Individual records, appointments, "to do" lists and complete directories can be shared between any of the 14 users that the program is capable of tracking. If one user changes a record in a shared directory, the change affects everyone's view of that record. If one user deletes a record, however, the other users are not affected—they will continue to see that record in their database.

The directory window has a complete set of pull-down menus for accessing special program functions. One of the most powerful of these is the Search command. Search permits you to specify a string in one or more fields of a directory entry (except the Notes field) and display only those records that match the string. The string "Amiga developer video," for example, would display all Amiga developers involved in the video market, but would exclude Amiga retailers in the video market.

Of course a calendar window can be displayed, as well as the directory window. Abbreviations indicating

Continued page 48

ON DISK

order from chaos

Sierpinksi Triangle

You don't need to understand higher mathematics in order to appreciate the beautiful patterns of nature expressed in these fractal generation programs on the AMIGA Plus *Disk.*

PolyFrac's Tritree

VISUAL EXPLORATIONS IN FRACTAL GEOMETRY

BY ERIC GIGUERE

The motion picture "Star Trek II: The Wrath of Khan" featured some memorable animated sequences, especially the transformation of the Genesis planet. This transformation sequence used a fairly new kind of mathematics known as fractal geometry, which has revolutionized computer graphics. I know I was impressed. The word "fractal" was coined by mathematician Benoit Mandelbrot in the 1970s to describe a set of geometric phenomena that simply could not be handled by the standard Euclidean geometry of points, lines, circles and so on. These phenomena seem to form the basis of many common patterns in nature, including the shapes of leaves, the structure of clouds and the complex wanderings of shorelines.

The algorithms I used were mostly obtained from a wonderful book called "The Science of Fractal Images." (See the Further Reading section below.) To delve deeply into fractal phenomena requires an understanding of complex mathematics. But startling results can be obtained from simple processes—a few of which I detail here. And no understanding of mathematics is required to appreciate the beautiful graphics produced by fractal geometry!

All programs for the fractal phenomena described in this article can be run by simply double-clicking on their icons in the Fractals drawer of this issue's AMIGA *Plus* Disk. (You can run these executable versions without owning a C language.) Also included is Aztec C source code that should be easily translatable into Lattice C code. ▶

Dragon, Hilbert, and PolyFrac
Bonus assembler
programs on your disk

The fractals created by PolyFrac use a simple recursive algorithm to build figures of increasing intricacy. They provide a more direct (and thus faster) method of producing the self-similar designs of the Chaos Game. PolyFrac draws fractals based on five different generators which you chose from the menu.

The basic scenario goes like this—a straight line segment (the "initiator") is replaced by a certain shape (the "generator"). This shape is actually the first picture drawn by these programs. Polyfrac then replaces each line segment in the generator with a smaller version of the entire generator. This process is repeated until the next level becomes too small to see.

Dragon and Hilbert are optimized, stand-alone versions of the dragon and Hilbert curves drawn by PolyFrac. Executable versions of all three programs are provided on the AMIGA *Plus* Disk so you can run them without needing assembly language. Just double-click on their icons in the Fractals drawer of this issue's AMIGA *Plus* Disk.

The assembly language source code for Dragon and Hilbert is also included on the AMIGA *Plus* disk in the FractalSource directory. The code is heavily commented and gives a good example of recursion in assembly language. It also demonstrates a trick of checking whether the Workbench screen is interlaced, to determine how many levels of recursion to use. PolyFrac is provided courtesy of COMPUTE! Books. Source code for PolyFrac can be found in "COMPUTE!'s Amiga Machine Language Programming Guide" by Daniel Wolf and Douglas Leavitt, copyright 1988 by COMPUTE! Books.—DANIEL WOLF, P.H.D.

Chaos Game

Fractal phenomena are a form of ordered chaos, a randomness that isn't quite random and yet isn't quite regular either. This order from chaos shows itself in surprising ways, as demonstrated by the first example, the Chaos Game. The Chaos Game is simple to describe. Draw three points on a blank sheet of paper. These points form the three corners of a triangle (you might want to join them together). Now choose a point at random inside the triangle and mark it with a pencil. Choose a corner of the triangle at random (you can roll a die, just assign two of the faces to each corner). Then draw a point midway between the last point you drew and the corner you just chose. Repeat until you're too tired to continue.

Do this a few thousand times and the result will be the picture shown in *Figure 1*, known as a Sierpinski Triangle. *Always*. It isn't what you'd expect. The Sierpinski Triangle demonstrates an important phenomenon of fractal behavior—self-similarity. Magnify one piece enough times and it will begin to resemble the original fractal.

The elegance of the Chaos Game is best viewed on your Amiga, although you shouldn't expect this program to be a speed demon. Run the program Chaos from this issue's AMIGA *Plus* Disk by double-clicking on its icon in the Fractals drawer and watch the picture materialize. The program will run as long as you want, *slowly* filling in empty spaces in the pattern until the screen's resolution limit is reached. (Click on the close gadget at the top of the screen to exit.)

When I programmed the Chaos Game on my Amiga I added a second feature: points are plotted in one of three colors, depending upon which corner of the triangle is chosen. Amazingly enough, the colors don't mix! Encouraged by these results, I tried a second form of seemingly random phenomena.

Gingerbread Man

Say you have two arrays of points, call them x and y. The first element in each array is set to some (real) predefined value between -1 and 1 and the remaining elements are defined by the equations;

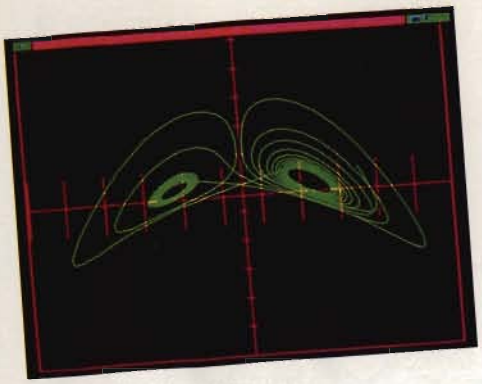
$$x[n] = 1 - y[n-1] + |x[n-1]|$$
$$y[n] = x[n-1]$$

In this formula, $|x[n-1]|$ means the *absolute* (unsigned) value of the array element $x[n-1]$. Plot a point at each location (x[n], y[n]) on a piece of graph paper. The gingerbread man of Figure 2 is one of the possible results that can be obtained by running the program GBMan in this issue's AMIGA *Plus* disk.

I say possible result, because in fact the final result depends largely on which point you chose as a starting position. Figure 2 was generated using a starting point of (-0.10051202, 0.00) and appropriate scaling factors. Alter the starting point slightly and the picture changes, sometimes dramatically. This is known as the "butterfly effect", or sensitive dependence on initial conditions. Small changes in initial conditions lead to large differences later on. GBMan can

Dragon Curve

Gingerbread Man



Strange Attractor Trajectory

be run by double-clicking on its icon in the Fractals drawer of this issue's AMIGA *Plus* Disk. It can also be run from CLI with optional arguments specifying the starting point. Just type GBMan X Y—where X and Y are the starting points.

Henon Map

Not all equations create such arresting images. Consider the Henon Map, given by the equations:

$$x[n] = 1 + y[n-1] - 1.4 * x[n-1] * x[n-1]$$
$$y[n] = 0.3 * x[n]$$

With a starting point of (-1.00, 0.00), the result is shown in *Figure 3*.

Henon Map

While not as impressive as the gingerbread man, the Henon Map demonstrates another fractal phenomenon—the strange attractor, a set of points which seems to "attract" all other points. The strange attractor is a well-documented, but not well-understood mathematical phenomenon. Henon can be run by double-clicking on its icon in the Fractals drawer of this issue's AMIGA *Plus* Disk. It can also be run from the CLI with optional arguments specifying the starting point. Just type Henon X Y where X and Y are the starting points.

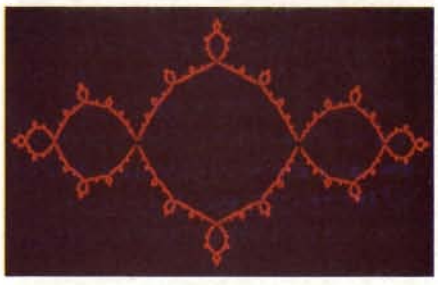
Julia and Mandelbrot Sets

The first three phenomena involve some fairly simple mathematics. The next two are more complex, and I won't bore you with the theory—references are found below and in the source code. I've included these two examples mainly for your viewing pleasure, though they take longer to draw. Make sure you have the file mathtrans.library in your LIBS: directory before running them!

Our fourth example is known as the Julia Set, shown in *Figure 4*. Notice once more the phenomenon of self-similarity. Run the program Julia on the disk and wait about two minutes.

The fifth and final example is known as the Mandelbrot Set, shown in *Figure 5* in 16-color splendor. Run the Mandelbrot program and be prepared to wait 10 to 15 minutes— this program does a lot of computation! (Those of you with math co-processor chips installed will likely notice a dramatic speedup in drawing ▶

Julia ***Continued page 48***



Strange Attractors

Bonus chaos demos on Disk

The chaotic behavior of a system with a strange attractor is quite common in nature. It has been observed in diverse phenomena ranging from weather patterns to animal populations to stock prices.

This behavior can be viewed in a graph showing its "phase-space trajectory." In a simple non-chaotic system—a pendulum, for instance—the trajectory will be a spiral. The pendulum swings back and forth and gradually comes to a stop. This is represented by the circling motion which spirals inward to stop at the center, the attractor.

In a strange attractor, the motion often seems to be caught in a steady spiral, only to jump out into another spiral. The jumps are erratic and unpredictable. In addition, these systems demonstrate "sensitive dependence on initial conditions" which means that two identical systems with slightly different starting positions will soon have totally different trajectories. This behavior was observed by Edward Lorenz in simple models for weather systems. He realized that it was a death knell for long-term forecasts, since tiny local conditions could never be fully modeled in a computer, no matter how huge.

The two strange attractor programs in the Fractal drawer of this issue's AMIGA *Plus* Disk can be run by double-clicking on their icons. These programs were written in Aztec C and show the development of such a system in time.

One program, StrangeTraj, shows the trajectories characteristic of a strange attractor in three windows which give three different perspectives. The other program, AttractorTime, shows the X, Y and Z positions versus time. Notice the regular oscillations punctuated with irregular jumps. Try varying the starting conditions by a little bit and see how soon the trajectories differ. Although the tangled spirals will look the same after a long time, the order in which they are filled is different and pictures drawn with only a few hundred steps should differ considerably.

Both programs can also be run from CLI with optional arguments to specify the initial position (in 3-D) and the number of time steps to go through. Just type the filename at a CLI prompt. The optional arguments should be separated by spaces. For example, type:

AttractorTime 1 1 .5 4000

This will start the evolution at the point (1,1,0.5) and go through 4000 time steps. To exit the programs, simply click on the close gadget of the top window.—ARNIE CACHELIN ■

GFA BASIC 3.0

PROVEN PROGRAMMING PERFORMER ARRIVES FOR AMIGA

Review by David Plotkin

GFA BASIC is a fast, powerful version of BASIC that enables you to use many of the features of Intuition from your BASIC program. It includes a text editor and features inline syntax checking of your code.

GFA BASIC first came to the USA in versions for the Atari ST and was so well received by that community that it is now the "language of choice" for ST BASIC programmers. Most of the features that made it so popular for the ST are provided in the Amiga version—plus new options to access the Amiga's unique features.

GFA BASIC can be started from the Workbench or from CLI. From the CLI, you can specify the file you want opened when the program starts. The first thing you see is the text editor, where you enter programs. This editor can be bypassed by using any word processor capable of saving ASCII text, but you then lose the advantage of syntax checking and auto-indent.

Text Editor

The editor screen has a double row of commands across the top which can be selected with the mouse or by pressing the appropriate function key. The function key alone activates the lower row of commands, while the [SHIFT] function key combination activates the upper row. Such common commands as Save, Load, Merge, List (print on the printer) and Run are available from this menu line. You can even switch to interlace mode, getting twice as many lines on the screen as in normal mode, though with some flickering.

Also, there are many options normally only found in a word processor. You can highlight blocks of text with the function keys (not with the mouse) and then move, copy, print or write the block out to disk. The editor also supports search and replace.

The arrow keys work as expected, and combinations of the [CTRL], [SHIFT] and [ALT] keys along with the arrow keys allow you to move to the beginning or end of a line, page up or down, and jump to the beginning or end of the text. The number pad can be configured to be used as it is on the IBM PC, and Wordstar command codes are available for those familiar with this rather arcane set of keys.

Easy Entry

Entering text in the GFA BASIC editor is simple—you just type it in and press [RETURN] at the end of the line. Each line is automatically checked for syntax errors when you enter it, and keywords are capitalized. One way to make sure you entered the right number of arguments with a keyword is to see whether it gets capitalized when you press [RETURN]. If not, then you either misspelled it or didn't get the right number of arguments.

The editor also automatically indents program text that is nested. That is, program lines contained within DO LOOPs, FOR NEXT loops, or PROCEDURES are automatically indented several spaces, with deeper nesting producing deeper indents. This makes it much easier to follow your program structures. For example, it is much easier to see what is going on with:

```
FOR Ip%=1 TO 10
  FOR Iq%=1 TO 10
    PRINT Ip%,Iq%
  NEXT Iq%
NEXT Ip%
```

GFA BASIC does not use line numbers. Instead, it supports labels. To actually run a GFA command directly, you must switch to the "direct" mode, where all commands are acted on immediately.

Each line is automatically checked for syntax errors when you enter it, and keywords are automatically capitalized.

Commands and Functions

The language is quite a complete implementation of BASIC. It supports BYTE, INTEGER, WORD, FLOATING POINT and STRING variables, as well as BOOLEANs. A full complement of mathematical functions is provided, including addition, multiplication, logarithmic, trigonometric and shift (left and right). There are even "quick" versions of SINE and COSINE, which do table lookups instead of calculating the results. While the accuracy of this method is limited, it does provide a ten-fold increase in speed. Time and Date, automatic string sorting, binary, hexadecimal and octal conversion functions and boolean logic functions are also included.

Graphics commands let you draw circles, boxes, polygons, points and lines. The circles, boxes and polygons can be filled with solid colors or patterns, and the colors of the outline and fill can be set. Graphic text can be drawn at any position on the screen, and specifications such as italics or underlines can be set. A full range of OBJECT commands is also available for detecting collisions and setting the shapes, velocity and acceleration of BOBs.

Both random access and sequential files are supported, and commands to convert strings to numbers and back for the purposes of saving files to disk are available. However, a more direct method has also been provided, making these conversion commands seem somewhat antiquated although they may still be needed for compatibility with other BASICs. PRINT USING and file handling commands such as NAME/RENAME, KILL, LOF (length of file), EOF (end of file detector) are also provided.

GFA's looping and decision functions are very advanced. In addition to FOR/NEXT and IF/THEN, you can also use SELECT/CASE (with the DEFAULT option). With this command, multiple possible values are tested for, with different results for each possible value. This may make nested IF statements a thing of the past. IF supports ELSE and ELSEIF for more flexibility. WHILE/WEND and REPEAT/UNTIL are included, as is DO/LOOP, which can only be exited with an EXIT IF statement. A variation on the DO LOOP construction lets you put the modifiers WHILE and UNTIL after either the DO or LOOP (or both), opening up a large number of possibilities for making loop structures.

Procedures, Not Subroutines

GFA is a highly structured language, not supporting the "normal" subroutines common to to other BASICs. Instead, GFA's GOSUB command jumps to a PROCEDURE. PROCEDUREs are far more useful than regular subroutines because they are virtually stand-alone programs contained within the main program. Thus, PROCEDUREs can- ▶

not be accidently executed (they can only be executed by a GOSUB), and parameters can be passed to a PROCEDURE. This means that a PROCEDURE can be written using a set of variables declared in the first line of the PROCEDURE. A PROCEDURE is called from the main program (using GOSUB) and the variables you want the PROCEDURE to use are included in the GOSUB statement.

The values of the variables in the calling GOSUB statement are used in the PROCEDURE, and the programmer has the option as to whether the main program variables (called GLOBAL variables) have their values modified by the PROCEDURE. PROCEDUREs can have LOCAL variables, which can have the same name as global variables but are only valid in the PROCEDURE and don't change the value of the global variables with the same name. Thus, PROCEDUREs can be moved from one program to another without worrying about whether they interfere with variables in the new program (try that with a subroutine!).

A special type of PROCEDURE is the multi-line FUNCTION, which can be used just like a system function (like SIN or COS) and can return values to the program. The advantage of multi-line FUNCTIONs over the single-line DEFFN call (also available in GFA BASIC) is that any program code you like can be included in a FUNCTION.

GFA directly supports menus, which can be built within the program. It also allows you to set up screens and windows, and add various gadgets to the windows, including drag, resize, close, and front/back gadgets. There are commands for moving, resizing and adding titles to windows.

When setting up a window, it is important to enable the messages to receive, so your application will "know" when the user has moved or resized the window, clicked on a menu item, or pressed a keyboard key. Each of these events returns information in an array, which may be useful to your program. Although GFA will return a message stating that the window has been resized, it doesn't tell you what the new size is!

You can also use commands which will automatically jump to a PROCEDURE when a specified event occurs—pressing a key, selecting a menu, or receiving a message. Again, this will only take place if you enable the event when you set up your windows. The manual is quite unclear on this, although a little experimentation will show you how it works. In addition to the built-in commands, GFA lets you access the system directly, getting to the exec, graphics, intuition, layers and dos libraries. As with most other languages which provide this capability, you are pretty much on your own as far as finding out how to use these commands and what the valid limits are on the parameters. A good book on Intuition will help.

GFA BASIC lets you access both the simplicity of BASIC and the power of the Amiga.

Manual Labor

There are two schools of thought when it comes to manuals. The first says that manuals should be arranged with logical commands grouped together. This has the advantage of discussing similar commands at the same time and showing samples of each command. This arrangement makes for a better learning experience. The other school says that the commands should be arranged alphabetically, which makes the language harder to learn but makes the manual easier to use for reference.

Personally, I prefer the alphabetical arrangement. You only use the manual once for learning the language, but many, many times as a reference. Unfortunately or not, (depending on your viewpoint) the GFA manual is arranged in a "logical" fashion, which makes finding information on a particular command more difficult. However, Indexed Tables of Commands and Libraries are provided in back.

The manual itself is generally pretty good, showing few of the mistranslations which made the earlier Atari ST version such a horror. But some sections are confusing, a few make no sense at all, and some portions desperately need more explanations (using windows and messages, for example). Fortunately, the manual is currently being rewritten, which should clear up some points, and correct some of the typos that are reproduced verbatim from the Atari ST version (such as the reference to FORM_ALERT, an Atari ST system call not present in the Amiga version). The manual is easy to use, published in a three-ring binder. It really needs a quick-reference card, however.

Summary

If you want to do some serious programming on your Amiga, Check out GFA BASIC. This is a very complete implementation that lets you access both the simplicity of BASIC and the power of the Amiga. To use GFA BASIC to its full extent you need to be familiar with Intuition, but that's true of most BASICs (and Cs, for that matter). For someone else to run your program, there are utilities in the package that let you create run-only versions—a compiler is not yet available, but should be out this summer. ■

GFA BASIC 3.0 $139.95

GFA Systemtechnik, distributed by Antic Software, 544 Second Street, San Francisco, CA 94107. (800) 234-7001. Requires 512K.

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David Plotkin is a chemical engineer for Chevron Oil in Northern California. He reviewed MichTron's HiSoft BASIC in the previous issue of AMIGA Plus.

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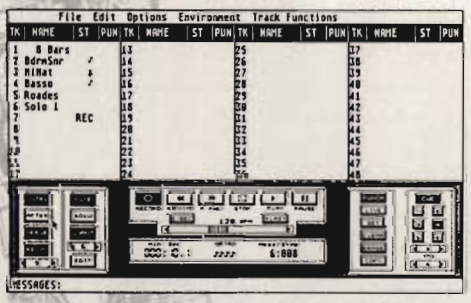

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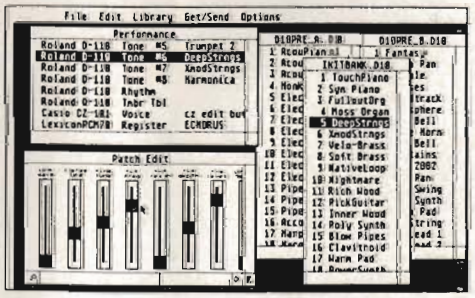

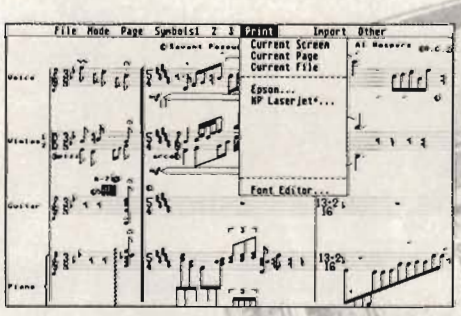

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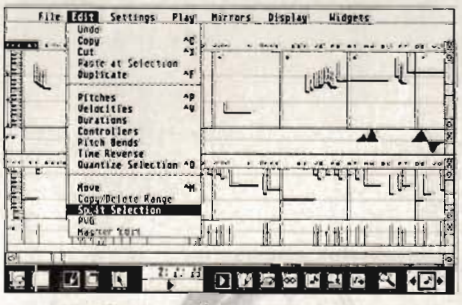

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Commodore Magazine

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Amiga World

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ORDER FROM CHAOS Continued from page 43

time.) Both Julia and Mandelbrot can be run by double-clicking on their icons in the Fractals drawer of this issue's AMIGA *Plus* Disk.

Source Code Notes

For C programmers, complete source code for the above five program examples is also included in the FractalSource directory on this issue's AMIGA *Plus* Disk. The code was compiled with the Manx 3.6a C compiler (both a makefile and a script to compile and link the programs are included) under both 16-bit and 32-bit libraries. Lattice C users will have to make some minor changes as documented in the source code.

I've tried to keep the program examples as modular as possible. Each program uses the Fractal.c module to do basic housekeeping chores and to activate the fractal drawing routine. Since these programs use math routines, you must remember to link in the floating-point libraries appropriate for your compiler when you link the programs.

Fractals seem to form the basis of many common patterns in nature, including the shapes of leaves, the structure of clouds and the complex wanderings of shorelines.

Further Reading

The programs in this article only scratch the surface of fractal images. I encourage you to experiment with more examples of fractal phenomena. A good starting place for those with a background in mathematics is "The Science of Fractal Images," edited by H.O. Peitgen and D. Saupe (Springer-Verlag, 1988, ISBN 0-387-96608). The classic text is Benoit Mandelbrot's "The Fractal Geometry of Nature" (W.H. Freeman and Co., 1977). And to everyone, mathematician or not, I recommend "Chaos: Making a New Science" by James Gleick (Viking, 1987, ISBN 0-670-81178-5) as the perfect introduction to all forms of chaotic phenomena. ■

Eric Giguere is a C programmer from Waterloo, Ontario, Canada.

APPOINTMENT SCHEDULERS Continued from page 40

scheduled appointments are displayed on the appropriate days of the calendar and a click of the mouse on that day opens a window displaying the details of the appointment. Complete schedules can be obtained from a pull-down menu.

Who! What! When! Where! provides many more options for printing information than does NAG. In addition to printing appointments, Who! What! When! Where! can print complete directories, phone lists, address labels, to-do lists and monthly calendars, either on paper or to a disk file. Other extra features of Who! What! When! Where! include a menu-bar clock/calendar and an alarm clock.

Unfortunately, the program also has the most obnoxious "look-up-this-word-in-the-manual" copy protection I've ever experienced. The requestor pops up at random during a work session and can do so more than once. A non-protected version of the program is available directly from the publisher for an additional $10. If you run Who! What! When! Where! on a floppy disk-based system you must always boot with the same Workbench disk. Another restriction with this program is that it must be run at least once a week to maintain accurate timing.

A powerful feature of Who! What! When! Where! lets users "share" information in their directories.

Which Is Better?

Who! What! When! Where! takes up more screen "real estate" and it's awkward to use the directory window and calendar window at the same time. But I still found these windows to be more effective than those of NAG 3.0. I liked the use of gadgets in NAG 3.0, but Who! What! When! Where! offers oodles of features in its pull-down menus.

If you work in an environment where several people are sharing a single computer—or even if you would like to maintain different schedules for different purposes—the ability of Who! What! When! Where! to share information between users will be a strong point in its favor. These extra features do give Who! What! When! Where! a steeper learning curve than NAG 3.0, but I think it's worth it. ■

NAG 3.0 $79.95

Gramma Software, 17730 15th Avenue NW, Suite 223, Seattle, WA 98155.
(206) 363-6417.

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Who! What! When! Where! $99.95

Blue Ribbon Bakery, 1248 Clairmont Road, Suite 3-D, Atlanta, GA 30030.
(404) 377-1514.

ON DISK

3-D Tank Model

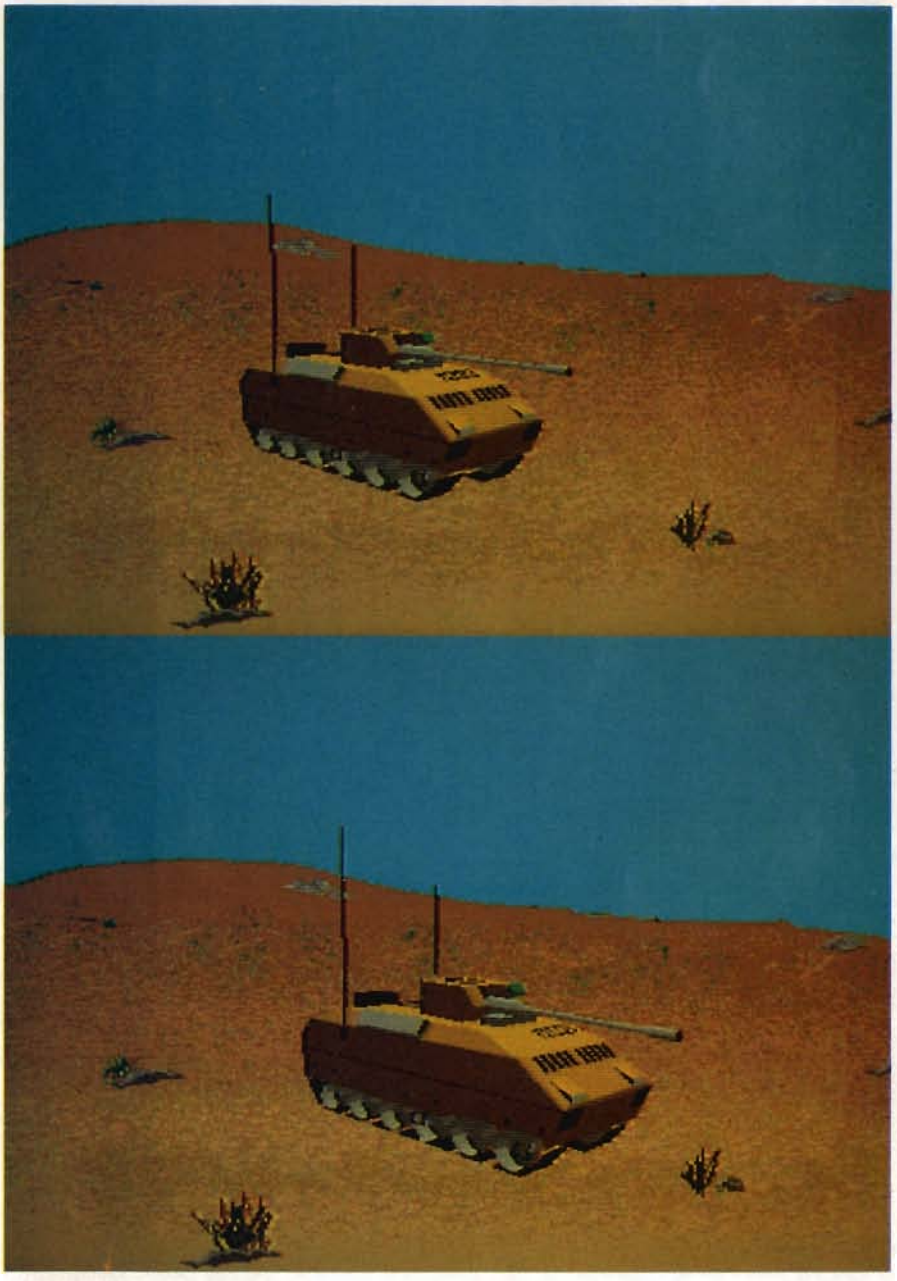
VideoScape animation loop on AMIGA Plus *Disk*

BY RICK GIBSON

On this AMIGA Plus *Disk, you will find my 3-D model of a Bradley army tank in* ***Aegis VideoScape 3D*** *format. For owners of VideoScape 3D, the tank stars in a complete little animation loop.*

Feel free to use the tank model for your own animations. (Don't forget to start with the off settings in the motion files, so the cannon and barrel will be positioned correctly for your original animation.) You can convert this 3-D tank into either Sculpt 3D/4D or Turbo Silver formats with Interchange by Syndesis.

The AMIGA *Plus* Disk's Videoscape show is in the Tank drawer. It is contained in five directories—GEO, MOT, CAM, PIC and SET. The actual tank model is in the GEO directory, along with separately movable modules for the barrel and cannon base. The MOT directory contains the motion and positioning files. The camera is in CAM. The PIC directory contains a background picture, which I created to bypass VideoScape's fixed palette. In the SET directory are the settings needed to create an animation. Just load up VideoScape, then load the settings and the animation will run. ■



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Games Galaxy

HOSTAGE, DUNGEON MASTER, BAAL, WAR IN MIDDLE EARTH, EVIL GARDEN

Hostage

I got my first impression of this new game from Mindscape the same way you just got yours, by reading the title. What is more surprising is that after booting up I found, as you will, that the action in this arcade simulation delivers on every promise **Hostage** has made.

The hostages are embassy workers, the villains are terrorists. Your goal: to successfully direct six of the Assault Force's best men on a daring rescue mission. After successfully supplying a copy-protection keyword from the manual, you select a rank of Lieutenant, which determines difficulty, and one of the five missions, which sets the time you'll have to rescue the victims. If you manage to complete the Assault mission as a Lieutenant, you will be promoted, via a secret password, to Captain, then Commander. Of course, the key word here is "if."

Hostage Rescue Mission: Fight terrorism with your Amiga!

I refer to this game as an "arcade simulation" because the program, while sporting arcade quality action and graphics, also puts you through multiple sequences which differ in basic ways, rather than a single action sequence (as in Pac Man) which merely becomes more difficult. The resulting game simulates all phases of a given endeavor, such as flying a plane, racing a car, or, as is the case here, rescuing some innocent embassy employees. You start out in Hostage by moving three of your men into strategic positions surrounding the embattled embassy. As each man is activated via a function key, he dashes to his spot, ducking in and out of doorways and jumping over alley fences to avoid the randomly scanning spotlights which draw machine gun fire toward your heroes.

Once you get at least one man into position, phase two follows with three more men dropping from a chopper onto the fortified building. Maneuver each to an edge of the roof, climb a rope down the wall and gain entry by smashing through a window. Once inside, the final phase of the game has you searching a labyrinth of rooms for the hostages. Just remember, behind each door could lie a hostage or a terrorist. You won't know which until you break down the door. And, as in real life, a loss of hostages is looked upon unfavorably.

Once the simple flow of Hostage is learned, advanced players will seize upon all the subtle strategies inherent in the command of a six-member assault team. Each member, once in place, is only a function key away from obeying your every order. For ▶

Dungeon Master: Overcome monsters and grab treasures in 3-D.

instance, if one of your men who have infiltrated the building finds himself in a bind, a sniper may be able to help out by eliminating a troublesome terrorist who carelessly strays too close to a window. This skill should be mastered early, as proper coordination of team members is the key.

Throughout the game, the graphics and sound effects are first rate. With the exception of the terrorists, whom I felt more closely resembled knockdown targets than actual living dangers, all action is finely detailed and smoothly animated. Particularly notable is the way your stray machine-gun bullets riddle the walls—as well as any unfortunate terrorists who get in the way. The musical soundtrack which accompanies the action is catchy and only mildly annoying after lengthy sessions.

The documentation takes the form of a top secret briefing booklet whose 28 generously illustrated pages leave no aspect of the game to your imagination—except the strategy necessary to complete it. Often with arcade simulations the control pattern is both difficult to learn and to use. Such is not the case with Hostage. The most difficult aspect of the game, the descent down the side of the building, is a simple matter. Move the joystick right to descend, left to stop, and up to climb, while the button kicks you away from the building followed by, hopefully, swinging in through one of the windows. Although this sequence took a few tries to get used to, it quickly became second nature.

After you complete your final mission as Commander, you are given a secret password to gain access to yet another level. However, regardless of whether you get to this portion of the program, Hostage is guaranteed to keep you and your Amiga captive for weeks to come.—STEVE PANAK

HOSTAGE $44.95

Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062. (312) 480-7667. ■

CIRCLE 261 ON READER SERVICE CARD

Dungeon Master

I waited a long time for a good graphic adventure that captures the essence of Dungeons & Dragons role-playing games. And now, with **Dungeon Master**, my wait is over. It is the most realistic game of its kind,the best graphic adventure for the Amiga to date. Boasting a detailed 3-D dungeon, dazzling graphics, real-time action and interactive sound cues, Dungeon Master is also extremely easy to control. Every action is selected with the mouse and executed with maximum of two button clicks. In addition, the game is well balanced between arcade action and problem solving.

The player's viewpoint puts you truly in the middle of the dungeon. What you see is what the party would see from that location. The graphics are clear and colorful, yet detailed. Objects in the dungeon cast shadows and disappear in the distance. Monsters move independently from the player, even in battle. They might ambush and surround your party, or run away. There is no separate battle screen as in so many other graphic adventures.

Everything takes place in real time. As the player stops to think, or sketch a map, a monster might appear from the corridor just beyond the circle of light. Finally, the sounds give continuous information of what is happening around the party. You must listen carefully for monsters and other important sound clues.

Controlling Dungeon Master is a real joy. Every possible action has an icon, fast and convenient to use with the mouse. Swapping objects, examining them and reorganizing the inventory can all be done in a matter of seconds. No more frustration in getting the crew ready for the next step!

Dungeon Master offers just the right mix of action and thinking. The main objective is not drafting wall-sized maps, but solving intellectual riddles as you guide a four-member party into a dungeon to search for a wizard's staff.

Most of the screen is taken up by the dungeon view showing the corridor directly ahead of the party, up to a distance of about 30 yards. Status bars for each champion are also displayed among the main movement and action icons. By clicking on the movement arrows, the party travels in the desired direction. The movement itself is quite jerky. When the party travels, the view shifts abruptly to the next position. One step forward immediately brings up a door located some yards ahead.

Clicking the right mouse button brings up the inventory display, which contains individual character statistics, inventory and some lesser action icons. Character selection is adequate, but has no option to create customized adventurers. Therefore, party members can only be picked from a stock of 24 pre-determined characters, each with a complete set

of skills and equipment. There are nine general attributes—health, stamina, and magical energy (Mana) being most important. The "occupation" of the champion is defined by these values. There are only four classes of characters: fighter, priest, ninja, and wizard.

Use of magic is also different from other adventure games. There are 24 spell signs, or syllables, divided into four groups—power, elemental influence, form, and alignment. To cast a spell, the player must know the right combination of symbols. This knowledge is gained as the game progresses and the wizard finds scrolls explaining the uses of these syllables.—AKI RIMPILAINEN

DUNGEON MASTER $39.95

FTL (Software Heaven), P.O. Box 112489. San Diego, CA 92111. (619) 543-5711. Requires 1 Mb. ■

CIRCLE 264 ON READER SERVICE CARD

Baal

Baal is a colorful, well-animated game that effectively combines strategy and arcade elements into a very playable contest. You are a member of an elite squad of space soldiers, trying to destroy Baal, the essence of evil. Baal has been accidently freed by a careless archeologist, so you must transport into his underground lair to do battle.

You are represented onscreen by an extremely detailed space soldier, armed with a laser rifle and a rocket pack. Using your joystick, you make the soldier walk, jump, climb ladders and leap over chasms. The underground lair is a world of girders connected by ladders, and negotiating your way around this world can be tricky. You can fall short distances without harm, but falling too far causes you to dissolve in an explosion, costing one of your five lives.

You must master the trick of leaping over the holes in the girders. You can only leap short distances, but you can clear some of the gaps. Unfortunately, activating the jump feature means pressing the stick to one of the upward diagonals, which can be hard to do accurately. If you miss, the soldier walks calmly forward to his death.

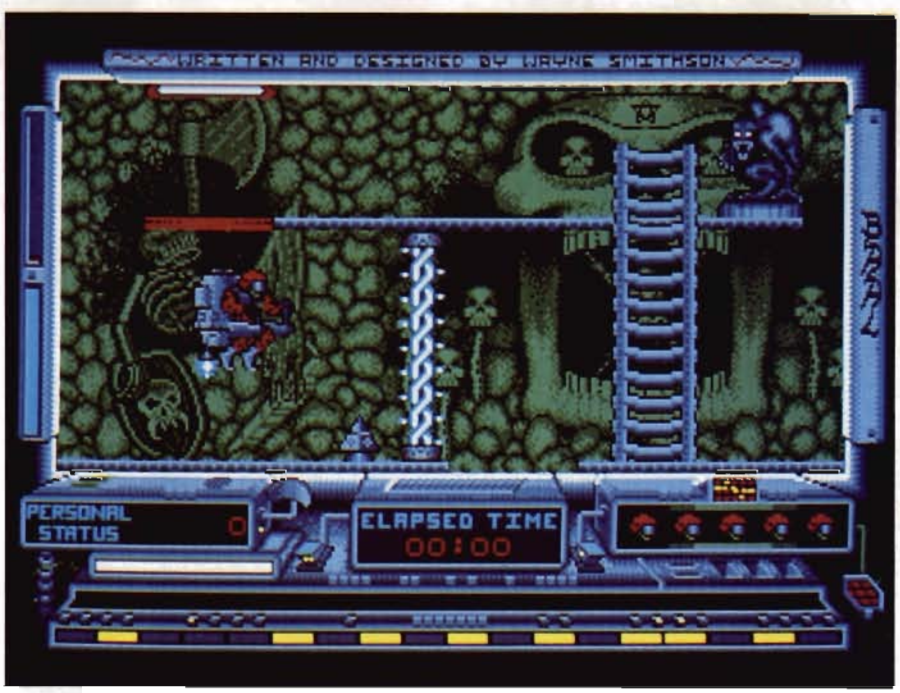
The underground lair of Baal contains force fields, which will block your way. The force fields are powered by electrical generators, which you can blast with your laser rifle. The trick is to figure out which force field is powered by which generator—they can be widely separated.

Baal's lair contains a large variety of strange creatures, from spitting serpents to winged, bouncing gargoyles, with everything imaginable in-between. Most of these creatures shoot at you, although your personal force field can withstand many hits from them. Some of the creatures cannot be shot, as they are too low to the ground. Others are very agile, and you must time your shots carefully to hit them. Of course, the touch of any creature is fatal.

Your force screen and laser rifle are powered from an energy source you carry. The condition of this energy source is indicated by a blue bar on the left side of the screen. When the energy runs out, you lose a life. You can also carry rocket fuel, though you don't have any at the beginning of the game. Cannisters of rocket fuel are scattered around the cavern. Some groups of girders cannot be reached except by using a special chamber, which activates the rocket pack on your back. You must then find another of these chambers to disengage the rocket pack before the fuel runs out and you explode and die. Of course, you don't know where these other chambers are located, so you must search frantically.

Your laser rifle is effective against the denizens of the lair, but many hits are required to destroy them, especially in the early levels, where the rifle's power is quite limited. The laser rifle has four possible power levels, but you must find power cartridges in the cavern to upgrade the rifle. Even a level 2 laser is a considerable improvement over level 1, which has no effect at all on some of the creatures. A level 4 laser is truly a magnificent weapon. You will need to obtain upgrades before you can advance past a certain point in the game.

Besides everything else, pieces of a war machine necessary to defeat Baal litter the caverns. Your ultimate goal is to gather these up on three levels, then transport to the next level. ▶



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CIRCLE 025 ON READER SERVICE CARD

Gathering all of the war machine leads to final confrontation with Baal. You can also find refueling points in the caverns to charge your energy pack. These look just like miniature gas pumps, right down to the BP (British Petroleum) stamped on the base.

You can save a game while you are at the refueling station as well. This is most welcome in a game as large as Baal. You can only save one game to the game disk, but this game is NOT erased if you die.

The graphics and animation in Baal are very good. The colors are sharp and the highly detailed shapes are very realistically animated. The sound is excellent, from the laser shots and digitized screams to the hum of the electrical generators.

There is one problem with Baal. Certain sections of the girders cannot be exited without special equipment. Normally this wouldn't be a problem because you can't enter these sections unless you are carrying the right equipment. However, when you die, you are not reincarnated in the same place. Instead, the game seeks a "timegate" and sets down your new soldier wherever it finds one. Often this places you in a section of the girders where you can't exit without just jumping off and dying. Even this doesn't always work, because the game may just place you right back in the same place again. You might as well quit and start over, which can be very frustrating.

Baal is a huge game, one of the few arcade games where it is necessary to map your way. You can play it for a long time without seeing the end. It is also very addictive, because your death is usually from an identifiable mistake, so you are tempted to try "just one more time" to do better. For a smooth combination of strategy and arcade action, I highly recommend Baal.—DAVID PLOTKIN

BAAL $29.95

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CIRCLE 270 ON READER SERVICE CARD

Save Middle Earth from the Dark Lord

War In Middle Earth

The good news, if you are a lover of the works of J. R. R. Tolkien, is that the tales of Bilbo Baggins and all the other creatures that inhabit Middle Earth have finally been brought to life. The bad news, if you're a lover of D&D style games, as I am, is that the vehicle for their premiere is somewhat less than I would have hoped for.

Although the background for **The War in Middle Earth** is as vast as all of J. R. R. Tolkien's works on Middle Earth, there are only a few things the player need be aware of. First, there is a powerful Ring which you must transport to Mt. Doom. Second, there are evil forces seeking to thwart you. This goal being established, your band of three brave hobbits set forth.

The design of the game is as simple as the goal, with play divided into three levels. The map level gives you an overview of the entire world of Middle Earth, with small colored dots representing the various forces. Clicking on the magnifying glass moves you down to campaign level, which most closely resembles the format used in most simulations of this type. The display contains one small area of the world, and by moving the pointer to the edge of the screen you scroll adjacent regions into view. It is at this level that movement commands are given.

Finally, the animation level allows you to control aspects of individual characters, and this level is accessed whenever such control is necessary or desired. However, it is also at this point that the limits of the game become apparent. It simply didn't have enough possible actions to make it realistic enough to engage me for an extended period of time. For example, in a battle you have only the options of charge, engage, withdraw, or retreat. Unlike some other adventures, you are unable to position your men, select weapons, or perhaps gang up on a strong opponent.

The good news, for beginners at least, is that the command interface is simple and easily mastered. Most of the display contains a depiction of either your map or your group, depending on the current level, while the top right hand corner contains the mouse activated options. These allow you to check character status, adjust game speed, get and use objects, save your position, move characters, and jump between the three game levels. And while options change with game level, similar commands use the same icon in the same position, which speeds learning.

The graphics in the game are very highly detailed, although I felt characters sometimes got lost against the realistic, earthy pastel colors used in backgrounds. Also during testing, some screen handling errors occured when the pointer wiped a color streak across the display. The sound

Continued page 94

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☐ **#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.

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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** - StarTerm 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. Persmait-a DataBase for keeping records of friends, family, associates, customers or employees. MORE.
☐ **#146 Calendar** - A very good personal calender 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 helps 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, seal 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 Missle 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 Bournes 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. Xmon-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.

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Behind the scenes with award-winning Dynamic Cablevision

BY RICK RODRIGUEZ

The finished logo, ready for prime-time. Additional broadcast graphics courtesy of the Amiga.

Local cable channel competes in quality with the big boys—thanks to the Amiga's graphics and animations.

Some of the kinder words that come to mind when thinking of local cable television channels are "low budget" or "limited." It's really not that cable producers are any less capable or creative than their broadcast counterparts. The fact is that most local productions face limitations that any video professional would find daunting.

Besides a general lack of cash for things that look good in front of the camera, local cable stations usually also must do without much of the equipment that's commonplace in both broadcast and commercial video facilities. The rapid rate of advancement in high-end video generally means that the equipment owned by a cable station belongs to a bygone era.

Things were not quite so bleak at Dynamic Cablevision of Florida back in 1985. Our parent company, Colony Communications, a division of the Providence Journal Company, has traditionally devoted a substantial portion of its revenues toward running impressive local television operations—and our cable channel was no exception. With three production studios, a remote production truck and a complete commercial production editing suite, Dynamic is one of the best-equipped cable systems in the country. What was lacking in 1985 were some of the capabilities that help separate broadcast video from industrial video—graphics and animation. As you probably figured out, what we were missing was the Amiga.

Logo Make-Over With Amiga

Last year, I wanted to upgrade our on-air look and the first place I began was by redesigning the logo for our local Spanish channel, Miavision. I didn't have a problem with the logo's typeface, it just didn't seem to have enough weight. Also, the colors didn't lend it any credibility. I sat down with artist Jorge Aldana and asked that he give the type a three-dimensional gold treatment.

Jorge worked exclusively with Deluxe Paint II. Beginning with a digitized logo, it was cleaned up to only consist of two bitplanes (*Figure 1*). Next, Jorge created a range of yellow to brown. Rather than do a simple gradient fill from light to dark or vice versa, Jorge placed the lightest color in the center of the gradient. Therefore the gradation darkens at both the top and the bottom (*Figure 2*).

Using the straight line tool, Jorge picked up the digitized logo as a brush and "extruded" it slightly to the upper left (*Figure 3*). Next, using the original brush as a stencil, he placed it over the gradation (*Figure 4*). Now, the letters took on a gradated look. Picking up this new logo, he placed it over the extruded area (*Figure 5*). Next, he added three gradated fills to the extrusion (*Figure 6*) and used the smooth function to anti-alias the finished graphic (*Figure 7*).

Using similar dithering techniques, Jorge created many backdrops for the station with a high-end look. The finished logo and diagonal bars are used throughout the day to identify Miavision.

—RICK RODRIGUEZ

Amiga to the Rescue

In October, 1985 I was producing commercials for Dynamic, and getting frustrated by the lack of visual punch in the spots I created for local clients. The Amiga seemed to be the solution to sprucing up our product.

When I became program manager in 1986, one of my first purchases was an Amiga 1000 for the main studio. Now entering our fourth year of using the Amiga as a vital production tool, our cable system utilizes the computer in virtually everything we do. And the Amiga's evolution has been a major contributor in the evolution of Dynamic's on-screen product.

I have also undergone something of a metamorphosis over the years. Beginning as a computing neophyte, I am now known around town as an Amiga guru. That seems to be the miraculous thing about the Amiga—it helps its users maximize their potential and reveals talents that had previously been hidden. (*In AMIGA* Plus *#1, Miami Stadium Amiga Artist Joel Tessler credited Rodriguez with help on the 1989 Super Bowl graphics.*— + EDITORS)

Besides producing advertisements for local insertion on CNN, ESPN, MTV and USA networks, Dynamic has two of its own ad-supported productions, Dynamic Headline News and Miavision. DHN consists of five-minute local newsbreaks inserted on CNN Headline News every half hour. Miavision is Dynamic's 12-hour per day local Spanish channel. The channel features a blend of locally produced news, public affairs, sports and variety programming and purchased movies, soap operas and classic television series.

This Amiga scrolls program listings day and night.

Dynamic Cablevision employs five Amigas at its Coral Gables studio facility, located on the University of Miami campus. One A1000 is dedicated to Miavision. When the channel is off the air, that computer continuously displays program schedules and classified advertising using JDK's Pro Video Plus. Graphics are generated on an A1000 and an A2000 for use on our productions. Two other A1000s are on hand for graphics or general use. One is located in my office, where the more mundane aspects of managing a studio are handled, including word processing, budgeting, database management and desktop publishing.

I am amazed at how smoothly the Amigas were integrated into just about every aspect of the business.

Looking at it now, I am amazed at how smoothly the machines have been integrated into just about every aspect of our business and how difficult it would be to do without them. Without our Amigas, we would have no graphics for our news, no backgrounds for program bumpers, no graphic opens or closes for our shows, no easy way to colorize sponsors' logos, no program schedules . . .

It Began With a Genlock

In today's genlock market, it may be difficult to remember when Commodore's A1300 was the only product available. We had the same problems with its poor NTSC encoding as everyone else, but I think I lucked out with my unit. Comparing its sig-

nal to others I have seen, our A1300 was quite acceptable. In fact, as soon as we acquired it, the A1300 allowed us to put our Amiga online.

The major weakness of the A1300 is its degradation of the incoming reference video. We got around that by placing the Amiga "upstream" in our studio. This means the Amiga is fed the same reference which ties all of our video devices together and the Amiga's synced output is then fed to our production switcher. Keying of the Amiga's output onto video is handled by the switcher. Therefore, there is no degradation to our video and artifacts in the Amiga signal are reduced by adjusting the "clip" on our switcher.

Prior to the Amiga genlock's introduction, graphics for our newscasts were done on art cards and shot with a camera. Now with the Amiga online, we can create specialized graphics for each story and key them directly over the shoulder of our news anchor.

We had three Amigas in our system before another genlock device was released for the computer. The Genkey from Sci-Tech offered a big improvement in signal quality over the A1300 and the built-in proc amp allowed us to tweak the NTSC output to more closely match the RGB original. Unfortunately, the Genkey introduces an instability to the Amiga graphic which doesn't exist in the original.

Last year, when we bought the A2000, we also bought the Magni 4004 genlockable encoder. This card has been the answer to our prayers. The output is absolutely broadcast quality and puts the two other genlocks to shame. Unfortunately, Magni hasn't created a unit that can be attached to the A1000, so the Genkey remains in service while the A1300 has been retired.

Amiga Character Generator

One of the assumptions people often make when I tell them about the Amiga is that we use it as a character generator. Today, the machine has two excellent professional cg programs in Pro Video Plus and Broadcast Titler. However, I prefer to use a dedicated character generator in the studio, despite its limitations, because it still looks better than the Amiga. But there have been a couple of occasions when we have pressed the Amiga into service as a character generator and on at least two of these, the entire world was a witness.

The Amiga's evolution has been a major contributor in the evolution of Dynamic's on-screen product.

When two major boxing events were held in Miami, the promoters hired Dynamic to do the productions for live feed via satellite to most of the U.S. on FNN/Score, as well as to parts of the Caribbean, Central and South America and as far away as Europe. We don't have a dedicated character generator in the remote production truck and on relatively short notice the Amiga was our only option. It was quite an experience, to put it mildly, to attempt to title a live event—the return of Roberto "Hands of Stone" Duran—with TV*Text and the A1300! Fortunately, we were keying the graphics and text through a Grass Valley Model 100 switcher and the results were terrific.

The next time around, we were a little better prepared, having the Magni and Pro Video Plus at our disposal. The Amiga performed like a real champ!

We are currently broadcasting 10 professional soccer matches featuring the Miami Sharks. This time around, the character generator duties will be handled by InnoVision's Broadcast Titler, which comes very close to challenging the studio's dedicated character generator for font quality. If Broadcast Titler or JDK's new and improved Pro Video Gold work out, I might soon add yet another Amiga to the studio.

Paint Programs & Animation

Most Amiga users create graphics which are complete unto themselves. In our applications, we rarely use the Amiga output alone. Usually, the graphic is either keyed onto video or the video is keyed onto the graphic. Sometimes, we generate images on two computers and mix them together onto a third video source.

Hardly an Amiga graphics software package is released without our purchasing it, but the real workhorse at our station continues to be EA's Deluxe Paint. The original version had so many capabilities and was so simple to use that it quickly became everyone's favorite. Each successive release has raised its performance standards without compromising its user-friendliness. Its latest animation capabilities allow us to utilize animations much more frequently than we had been accustomed to. Prior to DPaint III, our most frequent choice for animation was InnoVision's Video Effects 3D. Although this program is slow, the smoothness of its animations make up for it.

For digitizing logos, we use NewTek's Digi-View. We often take images off videotape with the aid of the color splitter from SunRize. I've yet to find a HAM program anyone at the studio feels entirely comfortable with. We'll frequently hop between Digi-Paint, Photon Paint and Diamond on a single graphic. The only software that is guaranteed to be used every single day is Pixmate, from Progressive Peripherals. This is a feature-packed image processing program, but we use it for only one thing—displaying our graphics. No Amiga program centers and displays overscan images as consistently as PIXmate and that is vital for us.

I am a big fan of 3-D animation, but I have yet to find a way to incorporate the Amiga's many 3-D programs into our daily productions. Videoscape 3D, Sculpt-Animate 4D ▶

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and Turbo Silver have all been seen on our system in one way or another. But the process is still too arduous for our stock 68000 processors. The times I have used 3-D on the air, I have single-frame recorded the animations by hand. This is not as difficult as it sounds, when you use a top-quality edit controller and an accurate tape deck with SMPTE time code capabilities.

Another drawback to 3-D is that the best results come in HAM mode. Unfortunately, HAM is less than predictable when used in our type of set-up. Objects change intensity throughout an animation, and the variations make keying the animation difficult.

Recently, we purchased the VDI frame buffer and digitizer from Impulse. I have generated some stunning Turbo Silver images with 16.7 million colors. Development of a paint and animation program for this or a similar buffer is the final step to making the Amiga indistinguishable from high-end paintboxes. A digital effects system is also high on my wish list, but I probably will pass on the Video Toaster. Indications are it will only accept a camera input and the pixelized look of its video output is unacceptable for our needs.

If there was an award for Overall Commitment to the Amiga, Dynamic Cablevision of Florida would be a shoo-in.

The only reason I began using the Amiga way back when was to enhance the production values of the programming we produce. Undeniably, the computer has done just that. As the computer and its hardware and software products have matured and improved, so have our productions. The National Academy of Cable Programming recently bestowed on Dynamic Cablevision three System ACE (Award for Cable Excellence) nominations, including one for Overall Commitment to Local Programming, the highest honor given by the Academy. This is the second year in a row when Dynamic received this prestigious nomination, effectively placing us among the top five cable operations in the nation. ■

Besides being program manager at Dynamic Cablevision, Rick Rodriguez is president of VRS Media, an independent video production company which recently released its first Amiga-related product, "The World of Turbo Silver," a 60-minute tutorial on the ray-tracing and animation software. Rick is also former president of the Miami Amiga Users Group.

HOT CARS

Three Racing Simulations

THE DUEL: TEST DRIVE II, OUT RUN AND LOMBARD RAC RALLY

Reviewed by Wolf Griffey

THE DUEL/TEST DRIVE II, CALIFORNIA CHALLENGE, THE SUPERCARS

Do you like the idea of high speed racing, testing yourself and your vehicle against the clock or another top contender? Okay, step into the world of **The Duel: Test Drive II**, from Accolade.

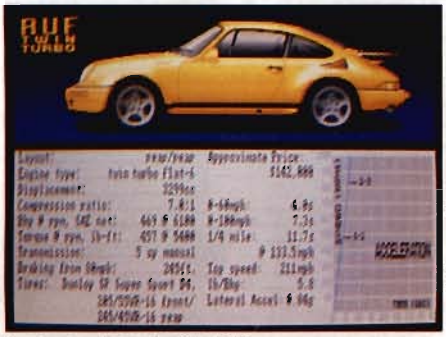
If that sounds good, it can get better. Why not add six of the more recent top-end road machines, from **The Supercars** disk, or how about a choice of roads to do this on? Duel has three routes to drive—and the scenery disk **California Challenge** has another seven to increase the thrills.

The core of the simulation is Accolade's The Duel. It includes two cars, the Ferrari F40 or Porsche 959, topping out at 197 and 201 MPH respectively. Control responses are quick, sure and accurate. The background updating stays ahead of the player, for a thrilling racing simulation. With such high-powered cars, some care in steering and gearing is required to keep them at their peak. Oversteering and blown engines are common the first few times on the road.

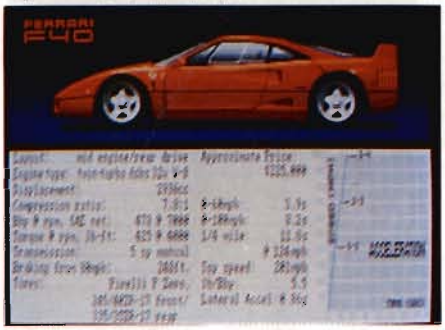
Getting on those roads is simple: pick a car, skill level and computer or clock opponent, and you're off. Then all you have to do is watch for the required gas stops and speed along in the race.

It sounds easy, but these are public roads, so look out for traffic and your friendly Police. Yes, your machines can outrun them, but don't always count on that. A ticket will cost you time, so keep a sharp eye out for the black and whites. At the end of each run (at the gas station) The Duel will give you your time, your opponent's time and the best time for that route. This gives you something to judge your efforts against in future runs.

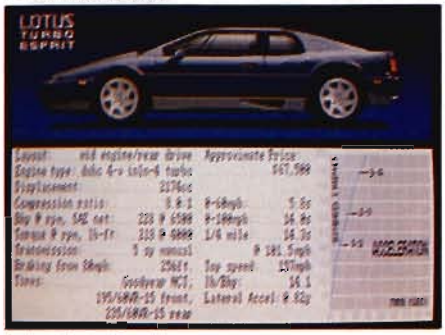
Since every car has something it does better than the next, Accolade makes it possible for the player to chose from an even wider selection, The SuperCars disk. These five new units are all hot and run the gambit from sleek to just plain mean road machines. Try out a '88 Lotus Turbo Esprit, Ferrari Testarossa, Porsche 911 RUF or maybe the '88 Lamborghini Countach 5000S or the '89 Corvette ZR1. As in The Duel, each supercar has its own chart full of information on the car and its performance. Accelerations of 0 to 60 in under 5 seconds don't neccessarily go with a top speed like 211 MPH or good road hugging turns. Speed alone does not ▶



Supercars: Porsche 911 RUF



Ferrari Testarossa



Lotus Turbo Esprit

These cars can exceed the posted speed limit.

make a winner in the long run. For the normal highways Duel uses, handling and acceleration can be bigger factors than top-end speed.

With The Duel and The Supercars, you have seven cars and three roadscapes to try out. With the California Challenge scenery disk you get 600 miles of additional road to conquer. Starting at the California/Oregon border heading south to Mexico, you will find seven new roadscapes to challenge those hard-earned driving skills.

The journey takes you through a twisting redwood forest, or up a steep mountain ridge to see the bottom drop out on the other side. Other views include the Golden Gate Bridge, or maybe a fast scan of the Pacific as it passes by on the snake-like road from Carmel to Santa Barbara. Each stretch is a challenge in itself, and the car that's best on one route may not do as well on the next.

All together, these three products combine to provide many hours of challenge and thrills. With the large number of selections, cars and routes, it's not too easy to say "I've seen it all" in a hurry. The design is also great, with solid graphics, excellent backround updating and some very good control responses. This group of top-end machines is made for getting the joy of high speed, without having to pay triple insurance rates after being caught doing 80 mph in a 35 mph zone.

THE DUEL—TEST DRIVE II	$44.95
THE SUPERCARS	$14.95
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CIRCLE 278 ON READER SERVICE CARD

Out Run

Out Run by SEGA has a speedy car, some reasonable control responses, and generally interesting background graphics to keep your attention. But, don't spend your time looking at the view. There are a few things out there to stop you—hairpin curves, hidden over-the-hill turns, some moving and non-moving hazards (slower traffic, medians and the occasional large tree), and most important of all, the clock.

To begin with, you're given a hot car, a number of routes to complete and a time limit for finishing a given leg. Beat the clock on each route and you win. Let time run out on any route and you become just another name on the point board.

The driving skills you need to stay on top consist of accurate steering and smooth gear changes. If you lose control, landing on the dirt or running into one of the hazards will cost you—a little for a fender-bender and a lot for a major spill. Steering and speed are controlled by either mouse or joystick. Gear switching is required, and timing and technique are very, very important to maintain tight control at all times. Your car tops out at 295 kilometers per hour (around 183 miles per hour for you non-metric types out there).

The start is always at Coconut Beach. From there you have five possible finish lines, with 20 different ways to get to them. The variety helps eliminate boredom and keeps the challenge alive.

Speed is the thing in Out Run. The colors and graphics are not as rich or solid as I like. A more solid background makes judging the relative movement easier. Updating is all right, but sometimes the delay in control reponses makes it too easy to overcontrol.

But, if speed is what you want, Out Ruv will give it to you. It even has a choice of music to help your go juices flow.

OUT RUN	$49.95

Mindscape Inc., 344 Dundee Road, Northbrook, IL 60062. (312) 480-7667.
512K, joystick recommended. ■

CIRCLE 279 ON READER SERVICE CARD

Lombard RAC Rally

Ever wanted to enter a truly big-time car race and have your name mentioned with the other racing greats? Well then, go get a copy of the realistic race simulation **Lombard RAC Rally**, by Mandarin Software.

The Lombard RAC Rally ran yearly in England from 1932 to 1939. When it reappeared in 1951, a tradition of great racing was reborn. From the start, the race drew the best in machines and drivers from around the world, and continues to challenge all comers with its unique style of multiple legs and varied road conditions. It takes great driving skills,

cunning and just plain nerve to finish this one, let alone win.

The course has five legs with three stages each. The stages are typed as road, mountain, or forest and the conditions as normal, night and fog. Even though a stage of a given leg may start and finish at the same place, the routes and conditions always change. The legs are timed and your overall placing is determined by how well you do against the targeted time. There are no points or penalties, so just try to make the best time possible.

Your car is the Ford Sierra RS Cosworth, a proven mount from the stable of the most successful manufacturer ever to enter the Rally. The Cosworth was built just to run the Rally, designed to meet the varied conditions and get the most out of each with superior handling and accelerating capablities.

Accidents happen, and you can seriously damage the Cosworth. Therefore, you also have a workshop to do repairs. The repairs cost time and money out of your pocket. But as a now-famous driver, you can do a TV interview before each leg and get paid. (The interviews are on the history of the Rally.) Another way to get the cash is by winning the races. Either way it's always best to spend as little time in the shop as possible.

Lombard RAC Rally allows as much practice as you want before going for the gold. To get to the big race you must qualify on all the legs, in any order you wish. The final run is made in the order that the Rally has set up and you race against the clock and competion.

So, for a really good time, some excellent graphics, sure background scrolling, accurate response to controls, plus an interesting off-track interview or two, Rally's more than worth the entry fee and great for the ego.

LOMBARD RAC RALLY $39.95.

Top Ten Software/Mandarin, P.O. Box 1450, Oakhurst, CA 93644. (209) 683-7577.

512K, joystick required. ■

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KARA COMPUTER GRAPHICS
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CIRCLE 012 ON READER SERVICE CARD

ON DISK

USING YOUR AMIGA PLUS DISK

Each 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. Then boot your Amiga with your standard Workbench (version 1.2 or higher) and insert your copied AMIGA *Plus* Disk in any drive. Double-click on the AMIGA *Plus* icon to see the Instructions scroll and the "chest of drawers" that contains the directories. Each drawer is actually an independent icon, so double-click on the drawers to open the directories. If you have a printer attached to your Amiga, just double-click on the PrintAllDocs icon to print all the instructions on the disk.

All programs on this issue's disk are Copyright 1989 by AMIGA *Plus* unless specifically referred to as "redistributable."

Sounds Drawer

In the Sounds drawer, you will find a varied library of sampled sounds in IFF format. Double-clicking on a sound's icon will play it. Also in the Sounds drawer are two useful redistributable utilities. Sound is a small 8K player that lets you hear not only IFF samples, but any file at all (although most programs and text files just sound like noise). Full instructions are displayed when you double-click on the Sound.Doc icon. C language source code for Sound is in the Programming drawer.

Also in the Sounds drawer is Filter, which edits the frequency spectrum of an IFF sound. It functions like a graphic equalizer—with 256 sliders! Instructions are are displayed when you double-click on the Filter.Doc icon in this drawer. A script file in the Sounds Drawer, CallMe, rings a bell three minutes after you double-click it. You can use this as an example for your own scripts, or just edit it to change which sound is played and when.

Fractals Drawer

The Fractals drawer contains the fractal drawing demonstrations described in Eric Giguere's article, "Order From Chaos." The C source code is in the Programming drawer. All the demos can be exited by clicking on the "close gadget" at the top left corner of the program window. Two "strange attractor" fractal demos by Arnie Cachelin, described in a sidebar to the main article, are in this drawer too.

Also in the Fractals drawer are three fractal drawing demos programmed in assembler by Daniel Wolf. Polyfrac will draw one of five different "self-similar" fractals which you can select from the menu. Hilbert and Dragon are optimized stand-alone segments of Polyfrac, with assembly language source code in the FractalSource subdirectory of the Programming drawer. Double-click on the Fractals.Doc icon to read additional instructions. PolyFrac appears here by courtesy of COMPUTE! books and was originally published in "COMPUTE's! Amiga Machine Language Programming Guide" by Daniel Wolf and Douglas Leavitt.

Art Drawer

The Art drawer holds the well-known Deluxe Paint Gorilla picture used as a sample high-resolution printer graphic in this issue's Hard-Copy Output column. View the Gorilla by double-clicking its icon. The automatic color-cycling can be turned off by pressing the SPACEBAR. The right mouse button closes the picture.

Word Hunt Drawer

In the Word hunt drawer you'll find Todd Petit's Word Hunt puzzle-maker and its support files. This program requires the ARP (Amiga Replacement Project) file requester, so the file arp.library must be in the LIBS: directory which is usually the libs directory on your Workbench disk. A script to install arp.library in LIBS: is in the Word Hunt drawer. Just double-click on the InstallARPLib icon. In order for this to work, you must have about 17K free on your Workbench disk. After arp.library is installed, you probably need to reboot to make your Amiga recognize the new library. Word Hunt instructions are on the disk—just double-click on the WordHunt.Doc icon. Also in the Word Hunt drawer are four word-lists to get you started.

Fonts Drawer

In the Fonts Drawer are two new symbol fonts, ATali and ACairo. Double-click on these font icons to view the complete font and its keyboard assignments. The symbols can be used for clip-art, logos, etc.—with any software that accepts fonts. However, you will need to read the detailed instructions in this issue's "Symbol Clip-Art" article.

Tank Drawer

The Tank drawer contains a 3-D tank model for use with Aegis VideoScape 3D. (You could also use a converter program to transfer the tank model into Sculpt 3D/4D or Turbo Silver format. You must have one of these programs to use or view the Tank. A short animation of the tank is also included for VideoScape 3D owners. Detailed instructions can be viewed by double-clicking on the Tank.Doc icon.

Programming Drawer

In the Programming drawer, CalcDP is the assembled executable code from Daniel Wolf's article about floating point mathematics. This program creates a calculator that uses Amiga floating point double precision math routines and is small enough to fit on a nearly-full Workbench disk. CalcDP has no icon and can only be run from CLI. Instructions are in this issue's floating point article. The source code is in CalcDP.asm. Other assembly language source code—Dragon.asm and Hilbert.asm—is in the FractalSource sub-directory along with a brief note called ASMRead.me. Clicking on the ReadAsmSource icon will display the source files and notes.

C Language source code for the Sound program (sound.c) is in the Programming drawer. In the FractalSource sub-directory you will find the C files for Eric Giguere's fractal demos. In addition to the actual source modules, there is a makefile and a script (MakeScript) which will compile and link these programs when EXECUTEd from the CLI. Further information is in the file C-Notes. Double-clicking the ReadCSource icon will display all these notes and all the source code. ■

Credits: 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. Chest of Drawers is by Gary Rosenman. Superview 2.1 picture displayer is shareware by David Grothe.

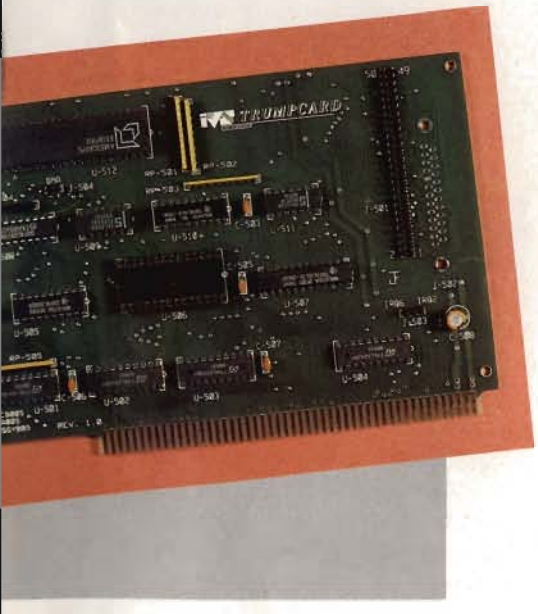
Trumpcard

SCSI HARD DISK CONTROLLER

DOES THE JOB FOR YOUR AMIGA 2000

Reviewed by Morton Kevelson

Mount a standard 3.5-inch hard disk on this half-length board and you've got a self-contained hardcard.



Trumpcard photo by Morton Kevelson.

The $199.95 **Trumpcard** from Interactive Video Systems (IVS) is a SCSI hard disk controller for the Amiga 2000 that's reliable, easy to install and use, and competitively priced. Mount a standard 3.5-inch hard disk on this half-length board and you've got a self-contained hardcard which leaves the Amiga 2000's extra drive bays free for other devices. IVS offers the Trumpcard with a variety of hard drives or with optional brackets for mounting your own.

Since I already had a 48Mb Seagate ST157N drive installed in my system, I choose the basic Trumpcard with the optional autoboot ROM chip. This package includes a standard 50-pin SCSI cable, the Trumpcard boot/utility disk and instruction manual.

Installation took only a moment, since my Seagate drive was already in the 5.25-inch drive bay. I just pushed the Trumpcard into the first available slot and hooked up the SCSI cable. The Trumpcard is a no-frills SCSI controller with only a single 50-pin connector. Since it does not extend the full length of the slot, it lacks the 25-pin modified connector usually provided on full-length cards. However, the Trumpcard does have the mounting holes and printed circuit traces for a 25-pin connector on the board.

Under AmigaDOS 1.3 it is possible to boot directly from a hard drive. For hard drive autobooting to work, the computer must have the version 1.3 Kickstart ROM installed and the Trumpcard must have its Autoboot ROM installed in the empty 28-pin socket on the board. All new Amiga 2000's are sold with the new ROM in place. If you have an older computer you must contact your dealer for the upgrade.

Once the proper ROMs have been installed, the Amiga 2000 will automatically boot from the hard drive. Autobooting can be defeated by simply putting a disk into drive unit df0: when powering up or rebooting. This will work even if the floppy disk is not a boot disk. If the left mouse button is held down while booting, the Trumpcard will only mount the boot partition on the hard drive and will then boot from the floppy.

Setting Up

Configuring a hard drive can be a complex task. It requires a knowledge of the drive's physical arrangement regarding the number of cylinders, heads, sectors per track and so on. This information must be properly entered into the devs/mountlist file on the boot disk. The Trumpcard's custom control program also must be copied into the devs directory of your boot disk. The ▶

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CIRCLE 001 ON READER SERVICE CARD

Speed Tests

I ran some simple checks to benchmark the performance of the Trumpcard. Even though the Trumpcard does not use DMA hardware, it did very well. The first test simply copied all of the Workbench 1.3 C directory files from the hard disk to RAM and back again. This involved a total of 188,744 bytes in 64 files. I then did the same test using a single 722,790 byte file. The results are summarized below:

Test	File System	Time	Bytes/Second
Copy DH1:C to RAM:C all quiet	FFS	11.5	16413
Copy RAM:C to DH1:C all quiet	FFS	16	11797
Copy DH1:bigfile to RAM:	FFS	7	103256
Copy RAM:bigfile to DH1:	FFS	6.5	111198
Copy DH2:C to RAM:C all quiet	OFS	18	10486
Copy RAM:C to DH2:C all quiet	OFS	23.5	8032
Copy DH2:bigfile to RAM:	OFS	32	22587
Copy RAM:bigfile to DH2:	OFS	33.5	21576

Trumpcard Utilities program makes the installation process as painless as possible. Simply work your way through the onscreen checklist sequence and the job will be automatically taken care of. When done, you will have a properly configured boot disk which will transfer control to the hard drive.

The first three steps involve drive selection, low level formatting and drive certification. There are presently 19 drives that are directly supported. About half of these can be automatically selected by the software. The low level format is normally done only when the drive is first set up. Since I was planning to use the new fast file system which requires a different interleave, I decided to reformat my drive at this time. Drive certification checks the disk for hard errors and automatically allocates the bad sectors. No less than eight certification methods, both destructive and non-destructive, are provided by the Trumpcard Utilities. Low level formatting and drive certification are optional.

The Trumpcard Utilities program is very cautious with regard to formatting the drive. It gives you no less than four warnings about impending loss of data, along with options to cancel. The location of the CONTINUE gadget is also changed, so you can't just mindlessly click your way through the requestors.

The next three steps add the drive to the mountlist, mount the drive and perform the AmigaDOS format. If you accept the default values you will end up with a single partition with the full drive capacity. Before proceeding, just make sure to set the menu selection to either the old file system or fast file system. As per Commodore's specifications, Trumpcard reserves cylinder 0 for the autoboot code. A 1Mb partition, using the old file system, is also created to support autobooting. IVS is presently working on code to support autobooting directly from a fast file system partition.

At this point you can manually intervene and set up your own partitions. I chose to arrange my drive with two 20Mb partitions using the fast file system, with the remainder of the space in a third partition using the old file system.

The final step automatically writes the setup information to the hard drive and copies your Workbench disk into the first user partition. When finished, you will be left with a floppy to boot into the hard drive, or with the auto boot ROM installed you can boot directly from the hard drive. ■

IVS TRUMPCARD $199.95

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CIRCLE 268 ON READER SERVICE CARD

Care and feeding of your hard drive

A SURVIVAL GUIDE FOR NEWER "HARD-HEADS"

By Morton Kevelson

You'll learn the painless way to modify the default settings of your hard disk, as needed.

Some Amiga hard drive interface manufacturers make initial set-up of their products as painless as possible. The Interactive Video Systems' Trumpcard (reviewed in this issue of AMIGA *Plus*) is a good example of a user-friendly, automated set-up procedure which requires very little knowledge from the user. Yet although such a procedure is quick and easy, there may come a time when the default set-up no longer meets your needs. Or you might wish to modify some other software for direct access to your hard drive without going through the default startup sequence.

When it comes to adding peripherals, AmigaDOS was designed to be open-ended and flexible. Facilities for adding and configuring just about any kind of peripheral are part of the system. For end users, only two or three files must be reckoned with. All but one of these files are simple text files which can be modified with any text editor—or with any word processor that can save a clean ASCII file. The AmigaDOS ED that comes on the c directory of your Workbench disk is ideally suited to this task. It's simple to use and your Amiga manual contains instructions that will get you started. MEMACS on the Workbench Extras disk is also an easy editing program. For the remainder of this article I will assume that you know how to read and modify text files on the Amiga.

Device Drivers

The key to any third party peripheral is the device driver. The device driver is a control program which tells AmigaDOS just how the peripheral works. The information is presented in a standard way which has been defined by Commodore. This means no matter how unique the peripheral is, its manufacturer should be able to define it in a way that AmigaDOS can understand. Some peripherals, such as printers, memory boards or floppy drives have their device drivers built into AmigaDOS. For example, the trackdisk.device handles the Amiga's floppy drives. Other peripherals, ▶

Always Back Up

The most important step that all users can take to protect their programs and data files is to keep back-up copies of everything on their hard drives. Obviously files such as those from your Workbench disk or commercial programs will be automatically backed up, because they were copied from floppy disks in the first place. However, your own data files do not enjoy the benefit of this security. Although you can manually maintain back-ups, the inconvenience of doing so is likely to result in a tendency to put off the chore. All too often, this can be a fatal tendency, for your data at least.

I strongly recommend the use of a good hard disk back-up program. My personal favorite is Quarterback. This program is fast, easy to use, resistant to both user and media errors, has the option to document its activities and is well supported by the manufacturer. Quarterback ($69.55) is made by Central Coast Software, 424 Vista Avenue, Golden, Colorado 80401. (303) 526-1030.

I have yet to see a single developer place their device driver in the Expansion directory.

such as hard drive controllers, must have their device drivers provided by the manufacturer.

There are two places that device drivers can be installed. If you examine your original Workbench disk you will find an Expansion directory on it. On the Workbench disk provided by Commodore, this directory is empty. If the peripheral manufacturer places a device driver in this directory, it can be automatically linked to the system by using the AmigaDOS binddrivers command. Interestingly enough, I have yet to see a single developer place their device driver in the Expansion directory. The lack of enthusiasm for this approach may be due to problems with the binddrivers command in earlier releases of AmigaDOS.

The other place for the device driver, the location that everyone does use, is the devs directory on the Workbench disk. In fact the devs directory is a very busy place. In it you will find the device drivers for every single input/output device on the system, including all of your available printer drivers. If you examine the boot disk provided with your drive controller card you will probably find its device driver is in the devs directory on that disk. For example, on the Trumpcard's boot disk you will find a file called IVS_SCSI. device in the devs directory. For autobooting hard drives, the file would be found in the devs directory on the boot partition.

The exact name for this file is unimportant, although a nice descriptive title will always be appreciated. In fact you can call this file anything you want as long as it is not the same as another device and as long as you remember to call it the same thing in the mountlist file. Note that the standard system device names, such as the printer.device, should not be changed as they may be referenced directly by the device drivers for some peripherals.

Mountlist

The mountlist file mentioned in the last paragraph is also a plain text file found in the devs directory. This is the companion file to the various device drivers on your system. It contains a detailed description of the hardware characteristics of the device which will be controlled by your interface card. Although there is only one mountlist file, it can contain the description for any number of devices. These descriptions are simply listed one after the other. The last line of each description, which separates it from the rest, contains just the pound (#) symbol.

The actual contents of a particular mountlist will depend on the device it is for. I will go through a typical mountlist for a hard drive using the following one from the Trumpcard as an example:

```
DH0:  Device = IVS_SCSI.device
      Unit = 1
      Flags = 9
      Surfaces = 6
      BlocksPerTrack = 26
      Reserved = 2
      Interleave = 0
      LowCyl = 13
      HighCyl = 265
      Mount = 1
      Buffers = 32
      Stacksize = 0x8000
      GlobVec = -1
      FileSystem = l:FastFileSystem
      DosType = 0x444F5301
#
```

It's useful to go through this file line-by-line. The first line has two pieces of information. DH0: is the name by which the system will know this particular hard drive partition. You can call it practically anything you want, for example REALLYBIGHARDDRIVE: would work just fine, but it is a good idea to keep the name short because this is what will appear in the file requestors used by many programs. For consistency you should stick to three character designators. The second item on this line is the name of the file that is the device driver for this peripheral's interface card. Remember that the device driver file should also be in the devs directory.

Note that other than the device name, every line consists of two parts separated by an equal sign. At left of the equal sign is the AmigaDOS keyword whose meaning is understood by the operating system. These keywords are like the commands in a high level programming language. On the right side of the equal sign is the parameter which is assigned to the keyword for this device.

The next line is the Unit number. Systems using the SCSI format, such as the Trumpcard controller, can daisy-chain up to eight hard drives

on one card. If you add additional SCSI drives to the same controller, just increment this value accordingly. The value assigned to the Flags keyword is determined by the developer of the interface card. This can be an eight-bit or sixteen-bit number which is interpreted by the device driver. The next two lines contain information specific to the organization of your hard drive. The Surfaces keyword corresponds to the number of heads on the disk drive. For example a floppy disk has two heads, one on each side of the disk. The Seagate ST157N has a total of 3 platters and 6 read-write heads. For a hard drive controller, the developer will usually provide parameters for a variety of hard drives. However, if you should change your hard drive, you may need to refer to the hard drive manufacturer's data sheet for this information.

Systems using the SCSI format can daisy-chain up to eight hard drives on one card.

BlocksPerTrack is another drive-specific parameter, in this case 26. Since each block contains 512 bytes we can easily calculate the capacity of each track as 26 x 512 = 13,312 bytes. The capacity of a cylinder is 6 x 13,312 = 79,872 bytes. The Reserved keyword, which is next on the list, tells us that AmigaDOS keeps two blocks for its own use. These blocks are the boot sectors used by AmigaDOS when it formats the disk. The boot sectors are also the place that most viruses like to hide their nefarious code. The Interleave keyword is another device specific value.

Cylinder Partitions

The LowCyl and HighCyl keywords define the size of the disk partition. The LowCyl value can be 0, however, the autobooting feature provided with AmigaDOS version 1.3 reserves this cylinder for its own code. Therefore, LowCyl should not be less than 1. The maximum value for HighCyl depends on the physical layout of the hard drive. According to the Seagate data sheet, the ST157N has 615 cylinders. When I tried to format this many cylinders I was unable to do so. In fact I was only able to get 607 cylinders to work on my drive. Interactive Video Systems recommends a maximum value of 599 for the HighCyl keyword with the ST157N. It has been their experience that hard drives do not always format out to the maximum number of cylinders shown in their spec sheet.

This particular partition contains 265 - 13 + 1 = 253 cylinders for a total of 253 × 79,872 = 20,207,616 ▶

Hard Disk Viruses

Unlike the human variety, there is no vaccine against computer viruses. In this case the best defense is a good offense, which means having some idea of what a virus does and what you do to avoid or eliminate it. Viruses are simply computer programs which reproduce themselves by placing copies on every disk they can find. The most common kind of Amiga virus gets into memory and proceeds to copy itself into the two boot block sectors of every floppy disk that it sees. The consequences of this activity could be just a minor nuisance—or it could result in the destruction of some copy-protected software.

The best way to avoid infection of your hard drive is to keep your floppy disks write-protected whenever possible. This is a good practice anyhow, because it can help prevent accidental data loss by conventional accidents. Copy-protected software should always be write-protected. My own practice is to always set the write-protect tab on any new software and whenever possible make a backup copy before using it.

A good virus detection program is the second line of defense against floppy disks infecting your hard drive. One of the most popular programs is the public domain VirusX by Steve Tibbett. Version 3.2 of VirusX was included on AMIGA *Plus* Disk #2, as a public service. I strongly recommend that you get an up-to-date copy of this program and run it every time you boot up. VirusX will automatically monitor every floppy disk, as you use it, for all known viruses as well as non-standard boot blocks. Once again, exercise caution—I have heard one rumor about a virus that masquerades as the VirusX program itself.

Note that avoiding all non-commercial software is no guarantee your drive won't be infected. I have already seen several commercial programs that arrived with a virus infection.

Hard drives are particularly vulnerable to viruses because they have no hardware write-protection. This would be a simple addition to a hard drive, yet I do not know of any manufacturer who provides one. The latest Amiga viruses infect the system by attaching themselves to existing program files. In particular, they go after often-used AmigaDOS command files in the c directory. Every time the infected command is used, the virus reinfects the computer. Of course, this provides a direct entry to the hard drive.

Extreme Measures

The only surefire way to deny viral access to your hard drive is avoid booting up the device when you insert a suspicious floppy disk into your system. If you do not mount the drive (as explained in the main article) your computer has no way of knowing it is there. If you do not have an autobooting hard drive system, you could use a version of your boot disk with a special startup-sequence file whenever you are strongly concerned about viral infection.

Advent of the autoboot system makes it even more difficult to protect your Amiga hard drive. Your autoboot ROM chip on the hard drive controller can always be detected by a clever virus program—even if you do not use the autoboot feature. The only way to effectively hide the hard drive is to remove its autoboot ROM. Not only would this be a major inconvenience, it's also a hazard to your equipment. Again, manufacturers could easily provide a simple low-cost hardware modification that allows the autoboot ROM to be manually switched out.

Hard drives do not always format out to the maximum number of cylinders shown in their spec sheets.

bytes of storage capacity. As long as you stay within the limits of your hard drive, you can choose LowCyl and HighCyl values to suit your needs. All that has to be done to create a new partition is to copy the mountlist file, change its name (for example DF1:), and re-specify LowCyl and HighCyl. Just make sure that the new LowCyl value is not less than the old HighCyl value. To finish the job, each hard drive partition has to be formatted like any other floppy disk.

The Mount keyword is a useful item. If you set its value to 1, the icon for this partition will automatically appear when you issue the mount command in the Startup-Sequence. If Mount is set to 0, the partition's icon will not appear until it is accessed. Leaving this keyword out is the same as setting it to 0. The Buffers keyword tells AmigaDOS how much memory to allocate to this partition which is used as a data cache whenever the partition is accessed. As a rule, the more buffers, the faster the drive. However, there is a point of diminishing returns. Stacksize is the amount of memory the operating system has to allocate for the device driver. The GlobVec identifies the type of program the device driver is. In this case a −1 indicates a C or assembler program.

The last two entries, FileSystem and DosType, are both specified by Commodore. These indicate that the new fast file system will be used with this partition.

The last step in setting up this disk drive is to issue the AmigaDOS mount command. This can be done either manually from the CLI—as Mount DH0:—or it can be included in the startup-sequence file in the s directory. Note that a separate mount command must be issued for each device in the mountlist, even though there is only a single mountlist which contains many devices. Devices which have not been mounted will not be recognized by the operating system.

SUMMING UP: First copy the device driver to the devs directory in your boot disk, then create or copy the mountlist file to the same directory and finally mount the device by adding the command to the startup-sequence file in the s directory or by issuing it in direct mode from the CLI. ■

Morton Kevelson is an electrical engineer from Brooklyn, New York. He is a widely published writer and reviewer on the Amiga and related products.

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Digi-Tricks

Quick and easy tips to enhance your digitizing technique

BY JULIE PETERSEN

A computer artist shares some inside secrets on enhancing the quality of your digitized images. Also explained is a way to greatly improve digitized line art for black and white reproduction.

Almost everyone who buys a digitizer wants to save time. After all, capturing an image is much faster than drawing it from scratch, isn't it?

Unfortunately that's not always true. Uneven lighting, dull colors or loss of detail can spoil the image. Trying to retouch the file with a paint program usually results in hours of frustration because the colors in a digitized palette are so closely interknit. Changing one, even a little bit, makes the whole picture look "wrong."

So I looked for ways to improve the digitizing process. My experiments were done with **Digi-View** from NewTek, but the general principles should relate to all digitizers—whether using still cameras or video cameras. This is what I discovered:

Lighting

Lighting is the single most crucial factor in capturing a good image. The direction, distance and type of light can dramatically influence the quality of the picture. I experimented with sunlight, incandescent light and fluorescent tubes in different combinations and from different distances.

Standard incandescent lightbulbs did not work well. The beam was too direct and bright in the center, too weak at the outer edges. The result was "hot spots"—bright patches of washed-out color fading too quickly into murky edges. (See *Figure 1.*) If the picture involves a reflective material, the unappealing blotches will be even more pronounced. I quickly moved on to other combinations.

FIGURE 1. Incandescent light.

Direct sunlight was a little better, but the glare was hard to tone down and many people don't have windows near their digitizers. (See *Figure 2.*) Indirect sunlight was satisfactory, but the colors were a bit dull and I was looking for quality that ranged from good to excellent.

Next I tried combinations of indirect sunlight and fluorescent tubes. The results were good. The hot spots disappeared, colors brightened and glare on the photographs was minimized. If you only have one fluorescent light, you can use a white piece of cardboard or other paper to reflect light on the opposite side. If you don't have natural light, I would recommend that you get two fluorescents.

FIGURE 2. Direct Sun glare.

I now wanted to find an optimum placement for the lights. I have an old black & white enlarger that I converted into a copy stand. The vertical bar holding the camera is at the back, so I placed a tube along each side. Depending on the type of fluorescents you buy, you might wish to rig an adjustable stand.

I discovered that even fluorescents, with their cool, diffuse light can be placed too close to the picture being captured. I did test shots at several distances. Six inches was too close. (*See Figure 3.*) Ten to 14 inches was good. Distances over 14 inches caused

FIGURE 3. Flourescent too close.

the edges to melt into darkness.

Better lighting resulted in better pictures. The colors were richer, the contrast was more natural and I spent less time tweaking the Digi-View software settings. My digitized pictures looked great, except for one thing—I didn't like the way some of the pleasing hues got lost when the image was digitized in 16 or 32 colors.

Fixing the Palette

Most of us are able to perceive thousands or millions of colors, but Amigas typically display only a total of 4,096. Obviously, something is lost. When programmers reduce the number of colors so they can be displayed, it's called palette reduction. There are many ways to achieve palette reduction, but usually the common colors are the ones which are retained. This isn't always what you want, however.

Suppose you have a picture of a red-haired, brown-eyed girl standing in a field of tulips on a sunny day. The picture has a lot of red and blue in it. In fact, the only brown is in the girl's eyes. By the time the picture is digitized in 32 or 16 colors, the brown has disappeared and been replaced by a reddish color. You're not pleased and neither is the girl! If you try to fix the image after it has been digitized, you discover that changing the color of the eyes to brown causes the tulips to wither. How can you control the palette to bring out the colors that are important to you?

I dug into my stash of construction paper and came up with an answer. Using the example of the photo described above, imagine placing it on the copy stand. Along one of the four sides, place a half-inch brown-colored strip along the edge of the area being digitized. Now capture the image again. The color scheme will change and, with luck, the brown in the palette will increase enough to turn the eyes the desired color. If the area to be emphasized is very small and doesn't change, you will at least have more shades of brown in the overall picture to pick up with a "brush" and transfer to the eyes, creating the effect you want. You may also wish to touch up or paint in the area where the strip was inserted.

This technique can be used for creative effects too! You can alter the palette dramatically, or a little at a time. It's handy to prepare a handful of colored strips of paper or card stock and clip them together at one end. (See *Figures 4 and 5*.)

FIGURE 4. Green strip added.

FIGURE 5. Red strip added.

Line Art

Now that I was pleased with the quality of my images and had more control over the colors, I also wanted to print in black and white on my dot-matrix printer. Digi-View has a "Line-Art" mode which reduces all the darks to black and all the lights to white, but so much detail is lost that I find the effect unappealing. (See *Figure 6*.)

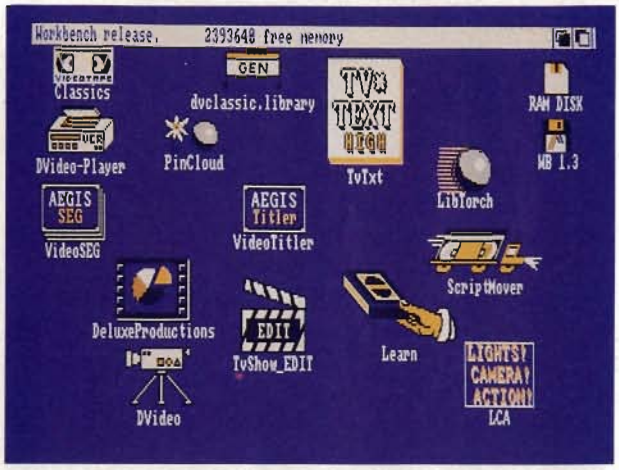
FIGURE 6. Line Art conversion.

Selecting Digi-View's "Black and White" mode doesn't solve the problem, because it isn't really black and white, it's a grayscale (a common misnomer in computer applications). Grayscale images look quite good on the monitor, but generally don't print well. I thought if there were a way to re-create that effect with dots instead of intensities of light, then the printouts would have the advantage of be-

FIGURE 7. DPaint grayscale conversion.

FIGURE 8. Starting to simulate a halftone.

Continued page 80



AMIGA GRAPHICS UNIVERSE

Part 2: The Video Show

Second in a series by Lion Kuntz

In this issue I'll discuss the Amiga graphics software for slideshows, desktop presentations and video titling. These programs use output from the paint programs and image generators discussed in the last issue. Some Amiga software does several things well, so a few of the programs discussed last time also work well for making video shows.

Broadly defined, a slideshow is a program which loads a picture, displays it, loads the next picture, changes the display and repeats this process until it gets to the end of your picture list. Slideshows might just pop up each picture suddenly, or they could have fancy transitions between pictures—such as one scrolling up over the other. Slideshows let you show off the pretty pictures you created with the image generator programs discussed last month.

Video titling programs let you create text screens. Not just ordinary text, of course—nobody could sell them if that was all they did. They create beautiful text, all nicely centered or positioned, with "drop shadows," outlines, or other fancy decorations.

Desktop presentation programs combine pictures, animations and sound. The result is a fully-automated presentation, created from the pieces you provide.

These programs have a variety of uses. School video systems or small cable TV operations can use them to put up messages and announcements, credits and program titles. Home video makers can create their own spiffy title screens, or overlay computer graphics onto their local garage-band music video. Teachers can use them to illustrate some lesson, or spice up a lecture with graphics popping up to keep the audience from falling asleep.

A lot of nice programs are available

free from your local user group public domain library, or from a BBS or network service. Other graphics programs can be pressed into service, even though they were not originally created for presentation purposes. Considering these low-cost options, it's easy to get mighty critical of commercial programs that don't do a whole lot more than the free ones. For this reason, the following survey will skip a few of the low-end programs out in the market.

The first video-titling and slideshow program was Aegis Animator. You could load a picture, set the display period from the time menu, add the next "tween" and load another picture. When you played back the script, you had a slideshow. By typing words in a paint program and then saving the words as brushes, you could load them into Animator and move them around with the mouse to create scrolling text for video titles. You could also add moving objects and color cycling for flashy effects. Eventually, Aegis released products that were more specialized in this field . . .

How to Use A *Modern* Paint Program for Video Titling!

Suppose you don't have a special video titling program handy, and you need to produce some flashy onscreen text right now! In an emergency, you can use one of the modern paint/animate programs to generate video titles that can be incorporated into your videotape productions. I will use **Zoetrope** for the following example, since it was the first product in this category of modern paint programs combined with animation, and the first to make font use easy.

Zoetrope lets you easily create a lot of screens to hold your successive images. A couple of mouse zaps gives you 20 blank frames. On the first frame you load a nice font, type your text and color it. Press the TAB key to copy the text into buffer memory, press the ESC key to clear the current frame, press the A key for the Animation control panel. Zap, zap, zap with the mouse to set rotation and lateral movements. And one final check to see that the control panel is set to "a" in the upper right hand corner for "all frames." Just zap the "render" gadget box and sit back while Zoe creates the 20 frames with separate animation images. As easy as that, you have made an animated title to fly around which you can genlock over your other imagery anytime.

Hmmmm, the rotated text looks a little jagged. Okay, press the SPACEBAR to remove the animation panel, hold down the SHIFT key while pressing the TILDE key (the one under ESC) to pop up the pixel F/X panel and zap the anti-alias gadget button with the mouse. In less than 10 minutes you are in and out of Zoetrope with a nice anti-aliased flying title saved to disk.

You can do similar things with Photon Paint 2.0, Deluxe Paint III, or if you really need to get fancy you can render 3-D flying text in Videoscape, Sculpt-4D, Turbo Silver or others. Later on, you can apply creative imagination and add texture-mapped images over your text. Before you know it, TV executives' limos are double-parked outside your door because you are the only one who can do the job on time and under budget. Well, maybe not, but at least your home videos of Gramps' 50th anniversary look better then ever before.—LION KUNTZ

Aegis VideoTitler

Aegis **VideoTitler** introduced the first version of the ANIM format for storing a sequence of images in one file. This format evolved into a full-blown animation format adopted by many other programs. The VideoTitler package consists of two programs—Titler and VideoSeg. The Titler makes IFF pictures using sophisticated font modifications. It's been said you can make 1,000 changes in a font with Titler. I never counted, but there certainly are a lot of exotic effects—some unreadable.

Titler includes a special kind of font called "polyfonts." Polyfonts are polygonal definitions of characters which can be stretched, squished, skewed and sloped without the jaggie effects you get from regular bitmap diskfonts. Titler was one of the first programs to support colorfonts as well, giving it more options than most other programs. Titler has a very limited ability to create ANIM format animation files. It requires at least 1.5 megs of RAM and has essentially been made obsolete by newer programs.

VideoSeg is a script maker which both creates and plays scripts of pictures created with Titler. It not only loads and shows pictures, but can intersperse ANIM segments among pictures. VideoSeg includes a few special transitions between pictures—like wipe, fade, diamonds, diagonals, flip, and block. With these effects, one picture overwrites the next in decorative and visually interesting ways. Titler and VideoSeg support low and high resolutions, either of which can be interlaced. Overscan and halfbrite mode are supported, but not HAM mode.

The VideoTitler package also includes two redistributable "player" utilities so you can share your slideshows and animations without giving away the main programs.

Lights! Camera! Action!

Aegis' newer **Lights! Camera! Action!** is designed to create more elaborate desktop presentations with synchronized sounds and animation. This program is a complement to Titler, not an upgrade. It adds 4,096-color HAM mode and allows import of IFF SMUS sounds from two Aegis products—Soundscape and AudioMaster. SMUS sounds and songs from other companies or sound digitizers can also be used. Lights! Camera! Action! provides a redistributable player utility which may be passed around freely on disk with your scripts and datafiles. However, Lights! Camera! Action! has major problems mixing slide pictures of differing formats and dimensions in the scripts.

*TV*Text & TV*Show*

TV*Text from Zuma Group was a very early title screen maker that works in only 640 × 200 or 640 × ▶

	VideoTitler		Lights! Camera! Action!	Deluxe Video	Deluxe Productions	TV * Text	TV * Show	ProVideo Gold	The Director
	Titler	VideoSeg							
Program Type	Title & Slide Maker	Slideshow Presentation	Slideshow Presentation	Presentation	Slideshow	Titler & Slidemaker	Slideshow	Character Generator	Presentation
Major Strengths	Many Font Effects	Mix Slides/ Animations	Mix Sound Animations & Slides	Mix Sound Animation	Advanced Color Cycling	Movable Light Source Shadows Effects	Powerful Art Low cost	Professional Broadcast Quality	Incredible Possibilities
Fonts Effects	The most! Hundreds	none	none	Very Few	none	Couple dozen	none	Anti-Alias, Others	Program Your Own
Transitions	Few	Approx. 40	Approx. 40	Few	40	none	Over 50	99	Many stock, Plus Make Your Own
Object Animation	none	Yes	Yes	Yes	Yes	none	Yes	none	Yes
Overscan	Yes		Yes	No	Yes	Yes	Yes	Yes	Yes
Formats Supported	IFF Picture Brush Animation		IFF Picture Brush Animation SMUS	IFF Picture Brush 8 SVX	IFF Picture Brush	IFF Picture	IFF Picture Brush	Custom IFF Pictures	IFF Picture Brush Animation SMUS
Recommended RAM	1 Meg +		1 Meg	512K	1 Meg	512K	1 Meg	1.5 Meg +	512K+
Price	$149.95		$79.95	$129.95	$199.95	$99.95	$99.95	$225	$69.95

400 modes. It uses a better method of locating fonts from various disks than most other titlers. TV * Text can re-list the inventory of fonts from any disk, as long as the fonts are stored in a drawer called fonts in the root directory. That means you may use additional fonts purchased separately and stored in library collections on floppies.

TV * Text adds pretty effects to fonts, like cast shadows or a 3-D extruded look. There are nine variations on the angles of the "light source" which positions the shadows, three types of shadows, six angles of text rotation, and multi-colored rainbow shadows. There are a few more effects, but not nearly the range of Aegis Titler.

Zuma's newer **TV * Show** makes slideshow scripts, using a mouse to select text-input boxes. Unlike VideoSeg, TV * Show allows you to load an assortment of pictures with different resolutions into one script, including HAM and halfbrite. Overscan is supported, and the program includes an assortment of exotic wipes and transitions.

Deluxe Video & Deluxe Productions

The original desktop presentation software was **Deluxe Video** 1.0 from Electronic Arts, which combined animated objects, text, syncronized sound, and slideshow background pictures. Deluxe Video is limited to low-resolution mode in only eight colors. It combines text, brushes (movable graphics clips) and various transitions. It also accepts soundtracks from Electronic Arts' Deluxe Music.

Electronic Arts' **Deluxe Productions** ($199.95) is the high-end slideshow. Designed for professional television use, where anything cheap is automatically suspicious, this program uses a storyboard metaphor to put together scripts. There are 40 different transitions between screens—such as wipe, fade, spiral, pop, and scatter. The storyboard has a limit of 12 slides per show, but each frame can have as many as five animated objects. Three clip-art disks are included—full of fonts, maps and background pictures. From my experience, Deluxe Productions is unique in its ability to do color-cycling with non-sequential color registers. While not difficult to implement, in theory, no other program has ever adopted this particular feature.

ProVideo Gold

JDK's **ProVideo Gold** is also designed for professional use, with no concessions to the computer hobbyist. Every sentence in the documentation, every command, every feature assumes professional video equipment and knowledge. ProVideo should be given major credit for legitimizing Amiga use in many video studios. However, nothing much you learn from other Amiga products applies here, and nothing you learn using this product applies to any other program—they do things strictly their own way.

ProVideo offers many transition effects, which you can use on individual lines of text as well as on a whole screen. The program is mainly line oriented, and can script as many as 100 pages of screens in a job.

ProVideo has always done a nice job displaying their own special fonts. Some of the unique-format fonts are provided in their basic package, and four more disks of fonts are available separately. Each font may be used in four sizes only, but these are sizes you normally need for video character generation. Another distinguishing feature of this program is its ability to anti-alias fonts. Anti-aliasing smooths images by blurring their edges, placing pixels of an intermediate color between the two boundary colors. This process diminishes the jagged stair-step look of diagonal and curved edges.

The Director

One of the most difficult programs to pigeon-hole is **The Director** from Right Answers Group. All slideshows, presentations, and titler programs need to create and maintain a script to control their sequences, timing and effects. Other programs normally do this by using the mouse to select functions and files, then storing the user's choice in a file on disk for later replay. The Director uses a word processor or text editor to make scripts in a programming language very similar to BASIC. These scripts are automatically compiled into a compact form. Director has more possibilities than most of the other programs, but its text-based script approach makes it too much like "programming" to be palatable to the computer novice.

I personally like Director best of all the presentation programs, for animations and slideshows. It has the most flexibility, with precise control over every aspect of the video show. Director has been used to make many award-winning animations. Since it has so many similarities to BASIC, I keep wishing that this program could be merged with AmigaBASIC to make one complete programming language with lots of graphics and animation commands.

With Director you make your own transitions, so options are virtually infinite. Built-in commands allow wipes from four sides, fades, color-cycling, or palette swapping. With no inherent limits, your slideshows, clip-art archives and fonts collection can be as large as the biggest hard drive. You can start programs from within a Director script, running multiple tasks to further expand your options. You could even run one of the other programs previously discussed here, to do things Director itself can't do. You can use all your RAM to buffer your pictures, and swap them from fast RAM to chip RAM at will, speeding and smoothing your display. Interactive commands and IF-THEN-ELSE branching decisions can be made from keyboard or from mouse input. Sounds can be integrated with the video show. A $20 **Toolkit** is also available, offering a variety of ready-to-use routines you can merge into your own scripts. ■

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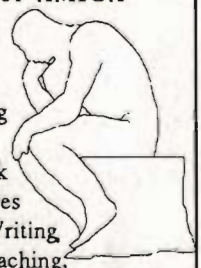

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FONTS, CLIP-ART & STOCK ANIMATIONS

The variety of Amiga graphics software available has spawned a group of add-on products. Colorfonts packages, color clip-art, and even short animations can be purchased for use in other programs.

Calligrapher, the professional-level font editor from InterActive Softworks, introduced the first multi-colored fonts with attractive patterns created by commercial artists. I made a package of four disks of fonts, including one disk of color fonts designed specifically for video titling. These are Lion's Fonts, marketed by InterActive Softworks. InterActive also markets other sets, such as Studio Fonts by Marlin Greene of Chrysalis Studios, Novelty Fonts by John Malette of South Coast Graphics, and Asha's Fonts by Asha Develder.

Kara Fonts by Kara's Computer Graphics is an especially beautiful set of colored fonts sold by an artist self-publisher. Zuma Group makes a series of monochrome diskfonts designed specifically to go with their TV * Text and TV * Show.

Clip-art packages offer images and backgrounds for the busy studio to use behind titles or in presentations. Free Spirit Software sells a very attractive series of Media Line Animation Backgrounds. Artist Charles Voner offers a potpourri of backgrounds, short animations and color brush clips in a series of disks called Video Visions.

KARA FONTS $79.95

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CIRCLE 155 ON READER SERVICE CARD

Lion Kuntz is a well-known Amiga graphics professional and the organizer of this June's San Francisco Amiga Festival.

DIGI-TRICKS *Continued from page 75*

ing reproducible, while still retaining the subtle details. I digitized the image in black and white (grayscale) and saved it to disk. (See *Figure 7.*)

Using EA's Deluxe Paint II, I opened a screen with a palette of four colors. Then I loaded in my digitized image, thus reducing the colors to black, dark gray, light gray and white. The effect was pleasing, but it still wasn't line art.

DPaint allows you to paint an area with a custom brush. I created a brush with a dense pattern (3:1 ratio of black to white), then swapped to the alternate screen (with the J command) and painted the whole screen with a dense pattern of dots. The effect simulates a dark gray. (See *Figure 8.*)

I now swapped back to the digitized picture, used the right button to change the dark gray into the background color, and picked up the entire image (if you have limited memory, you may have to pick it up in strips). Again I swapped the screen which was painted in the pattern of dots. And now I stamped the brush of the digitized picture right on top. The gray pattern which was simulated with white and black dots replaced everything that used to be dark gray.

Back to the original screen. I cleared the screen to black and created a new brush with more white than black and repainted the whole screen with this pattern. It appeared light gray. I swapped to the modified picture, clicked the right button on the palette and this time I set the light gray as the background color. Picking up this entire new image left the light gray behind. I swapped one last time to the light gray patterned screen and dropped the image right over the pattern. Dots showed through all the areas that were previously light gray. The image was now drawn entirely in black and white dots. Line art!

When you use these techniques, you should finish by reducing the palette to two colors to save disk space. This can be done with the Screen Format option. Don't use the same name as your original file, in case you make a mistake while converting the image. It takes a couple of tries to get used to setting the background and overlaying the brushes in the right order.

Printouts from these line art images are similar to halftone reproductions and they photocopy quite well. I've found that taking a little extra time at the beginning of the process can save a lot of time at the end, and I'm much happier with the final images. ■

DIGI-VIEW GOLD $199.95

NewTek, Inc., 115 W. Crane Street, Topeka, KS 66603. (913) 354-1146, (800) 843-8394.

CIRCLE 274 ON READER SERVICE CARD

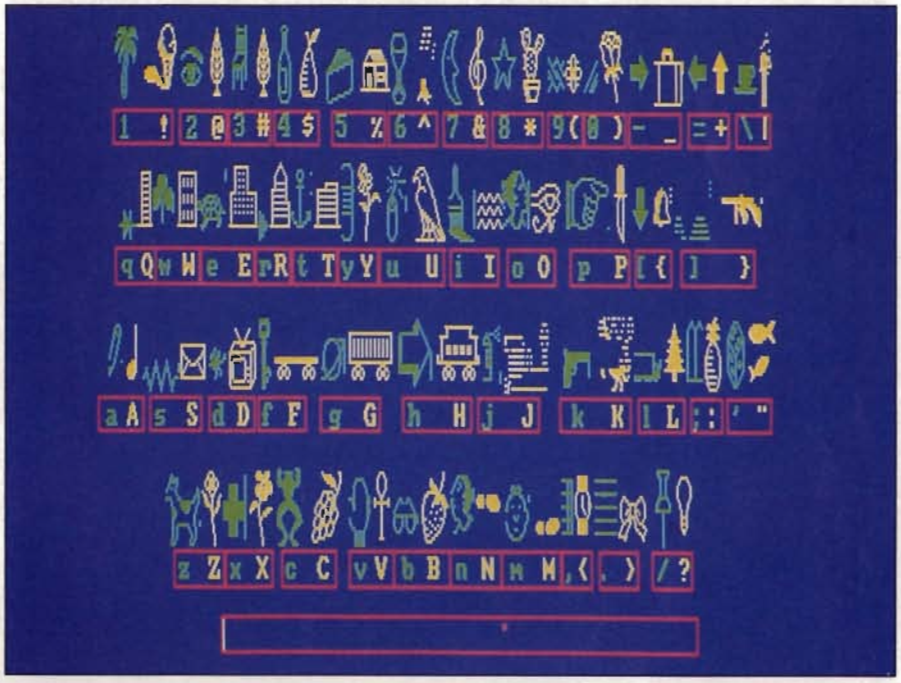
*Julie Petersen of Bellingham, Washington is a recognized fine artist, computer artist and avid Amigaphile. She can be reached on the uucp network at LadyHawke * cup.portal.com.*

ON DISK

Symbol Clip-Art

AMIGA Plus *Special Disk Bonus*

In the Fonts drawer on this issue's AMIGA Plus *Disk you will find two graphics collections that give you a total of some 120 inch-high symbols just great for flashy logos or clip art.*



ATali font

ACairo font

These fonts originated on the Macintosh and have been converted for the Amiga. To see complete pictures of the symbol fonts (along with their keyboard assignments), simply double-click on a font icon—ACairo 24 and ATali 28.

Any program that accepts Amiga fonts can use these symbols. However, many programs require font files to be in the directory assigned as FONTS: (which is generally on the disk you boot with). To reassign FONTS: to the directory of your choice, you could use the ASSIGN command from CLI. But you might find it easier to click on the AssignFONTSHere script icon in the Fonts drawer on the AMIGA *Plus* disk. Then just by dragging the icon with your mouse, you can copy this script onto any disk—where it will assign FONTS: automatically to the directory called "fonts" on that disk. (You should copy AssignFONTSHere to your Workbench disk to restore the original FONTS: assignment, after you're done using the AMIGA *Plus* symbols.)

A second script icon in this issue's Fonts drawer, CopyToFONTS, will copy both fonts from the AMIGA *Plus* Disk into whatever directory currently has your FONTS: assignment. If—as usual—FONTS: is assigned to the "fonts" directory on your Workbench disk, make sure there is 14K available on that disk and it is not write-protected. For more information about font transfers, see "Understanding Amiga Fonts" in AMIGA *Plus* #2. ■

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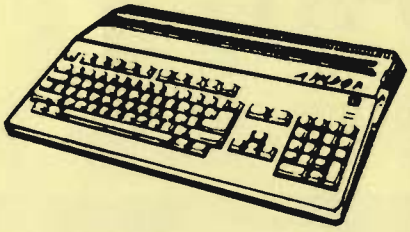

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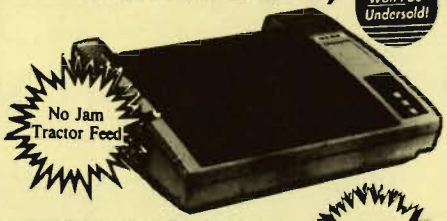

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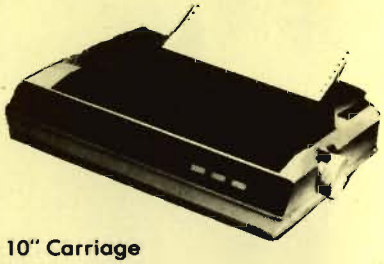

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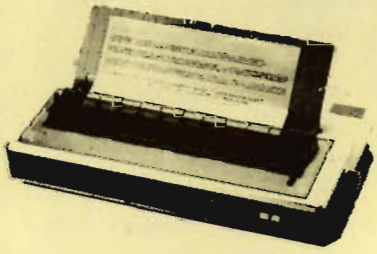

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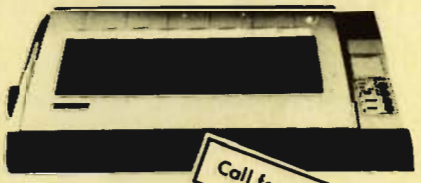

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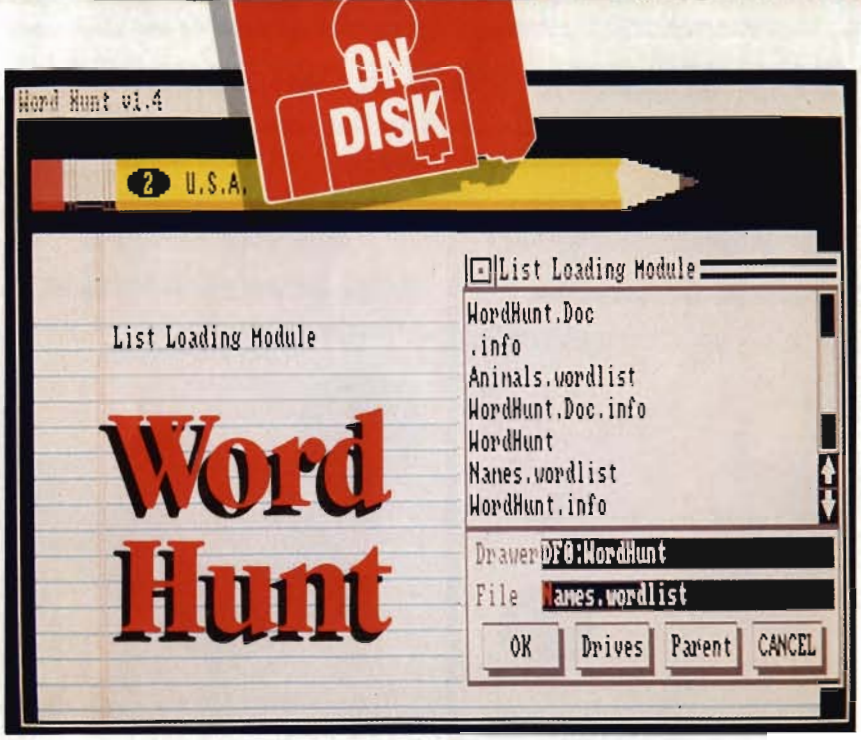


Word Search Puzzle-Maker

BY TODD PETIT

Challenge your family and friends with personalized Amiga-made word search puzzles just as professional as the puzzles you see in the newspaper.

Word search puzzles are among the most popular features of the family entertainment pages in newspapers and magazines. These puzzles consist of a large block of letters hiding a list of words. The object is to find all the words hidden in the puzzle. Depending on the difficulty level, these words could be written in any direction—left-right, right-left, up-down, down-up, or diagonally.

My first experience with a computerized implementation of this type of puzzle generator was Matthew Ratcliff's 8-bit Atari "WordFind" in the January 1984 Antic Magazine. When I sold my Atari and bought the Amiga I decided to implement a similar program, greatly expanded to utilize the Amiga's unique features. Word Hunt is the result.

Your personal lists of as many as 100 words can be created on any subject. The game can be used to reinforce childrens' knowledge of the names of the 50 states, U.S. Presidents, or their vocabulary and spelling word lists. My brother has used them in his office to remind his coworkers about safety. These puzzles go over great in club newsletters. Be creative! That's what computers, and especially the Amiga computer, are all about.

I have included a few sample word lists on the AMIGA *Plus* Disk. Just Load one using the Open option on Word Hunt's Project menu, then Generate and Print a puzzle to see how easy it can be to create your own puzzles.

Word Hunt and all related files, including a useful documentation text, can be accessed by double-clicking on the AMIGA *Plus* Disk's Workbench Word Hunt Drawer and then selecting from the icons inside.

Making Your Own

Pull-down menus make it easy to run Word Hunt. The Project menu contains options to Open or Save word list files and Print puzzles. The ever-useful Help option will present you with a step-by-step guide to creating a puzzle, and it lists the key functions recognized by the word list editor.

Go to the Actions menu to Edit your own list, Alphabetize it, then Generate the puzzle. The Size menu lets you choose the dimensions of the puzzle (from 10 x 10 characters to 35 x 35). You can choose from three levels of difficulty, each one adding more directions in which words can be placed. Under the Options menu, you can also choose to have an Answer Sheet printed out along with the puzzle, showing where the words are hidden.

If your word list is too long for the puzzle, some words may not fit. The program will attempt to place a word several hundred times before giving up. Any word that cannot be placed is displayed in red. If too many words are rejected, press the ESC key to abort the generation process and enlarge the puzzle size (or shorten the list).

Word Hunt doesn't show you the completed puzzle onscreen. So after your puzzle has been generated, it's time to print. If you wish, you can choose the Options for Answer Sheet, Bold or Large Title, then select Print from the Project menu. That's all there is to it!

Running the Program

Word Hunt 1.4 will run on any Amiga with at least 512K memory and a Preferences-supported printer. The file ARP.library (supplied on the disk with Word Hunt 1.4) must be placed in the LIBS: directory of your boot disk. The 20-pt diamond font that came on your original Workbench disk should also be available (though the program will still run if it is not). The program can be run by clicking on its icon or from the CLI. Word Hunt 1.4 was written in AmigaBASIC and compiled for speed with the A/C BASIC compiler by Absoft. ■

Todd Petit is 28 years old, married, and has a 3-year-old daughter. He supports them and his Amiga by programming in COBOL on IBM mainframe computers at a large New Orleans hospital.

Amiga Floating Point Math: Part 2

Double Precision Numbers

BY DANIEL WOLF Ph.D.

Our AMIGA* Plus *assembly language expert concludes his two-part series about how to handle floating point mathematics on the Amiga. Packed with valuable information for experienced programmers using any Amiga language, this article also includes a useful programming tool on the AMIGA Plus Disk -- a 64-bit hexadecimal calculator which you can use even if you don't own an assembler. For ML programmers, the source code is also included on Disk. This series began in the previous issue.

In this column I'll conclude the floating point explanation begun in AMIGA *Plus* #2. As noted in the previous issue, we use floating point numbers to represent and handle numbers that may need a decimal point. Scientific notation is a handy way to represent numbers which might have a wide range of sizes in a compact format with a known (and unchanging) size. Here are two examples which summarize the convenience of decimal scientific notation:

9000.1 = .90001 * 10^04
900010000000 = .90001 * 10^12

The two numbers at left have quite different amounts of digits, but can be expressed in scientific notation using exactly the same format. The only difference between these numbers is really in the power of ten (exponent). Scientific notation also provides a way to write down both numbers using a fixed format with the same number of digits (characters). Very large numbers as well as small ones can be expressed in the same format with no ambiguity, but with lots of convenience. The only problem arises when we limit the number of digits in the fraction part of the scientific notation and there are too many digits to fit in.

We also looked at one way to apply the principle of scientific notation to binary numbers. Here are a couple of examples:

9.00 = 1001.00 = .100100 * 2^4

9.75 = 1001.11 = .100011 * 2^4

Remember that binary digits to the right of the binary point also are fractions (as they are in decimal) but they represent *negative* powers of 2 instead of 10. The first digit to the right of the binary point in the second ex- ▶

This Month's Program:
64-Bit Hexadecimal Calculator

In order to follow up the FFP 4-function calculator from the last issue, I made a similar calculator program using the IEEE 64-bit numbers and mathieeedoubbas.library. The executable program (which runs by itself) and its assembly language source code are in the Programming directory on this month's AMIGA Plus Disk.

This new program isn't quite so short and sweet, and I made another change you might find useful. The program last time had ASCII conversion routines for both input and output. This time I wrote only the ASCII conversion routine for input (it's necessary to begin with) and I've provided hexadecimal output. Who among you will respond to my challenge and send in some code for a good ASCII output routine for IEEE DP number results? The code for a Hex conversion routine is provided. It will output the contents of the D0 register in Hex to an AmigaDOS file, in our case a CLI window.

Just for fun I also wrote a routine to convert a FFP number to IEEE DP. I thought readers might like to learn how to do it. It may prove useful since no such routine is found in the math libraries.

One thing you should notice about the ASCIITODPsubroutine for converting ASCII string decimal numbers (e.g. 123.55) to IEEE DP format is that I've addressed the problem mentioned above. The library routines are only capable of converting a 32-bit integer to IEEE DP format. The FFP routine (SPFlt) will take an integer in D0 and convert it to a FFP 32-bit number. I used it in the last calculator program. There is also a IEEEDPFlt routine, but it also will take only a 32-bit integer from D0 and return a IEEE 64-bit number in D0/D1. Limiting ourselves to 32-bit numbers on input (like I did in the last program) sort of defeats the high precision capability of 64-bit numbers. We'd be limited to about 8 digits (e.g. 1234.5678) on input, while IEEE DP format could easily handle 15 digits. The input routine from the FFP calculator program took all digits in and converted the resulting integer to FFP format via SPFlt. If there were digits to the right of the decimal point, that program just divided the FFP number by ten (using SPDiv) once for each position to the right of the decimal point.

This issue's new calculator program is found in the Programming drawer on the AMIGA Plus Disk. It takes in a total of up to 15 digits, then generates the correct IEEE DP exponent "by hand." It finishes off the result (already an IEEE DP number spread over two registers) by dividing by 10 (using IEEEDPDiv) an appropriate number of times. The final result is returned in D0/D1 as an IEEE DP format number. It doesn't use IEEEDPFlt at all, as that would ruin the 64-bit fun. To run the calculator program, simply type CalcDP into the CLI followed by the equation you wish to calculate. For Example, type: CalcDP 5.02*365.25. To read the source code, double-click the CalcSource icon in the Programming drawer.

ample here represents 1/2 = (2^-1). The second digit right of the binary point represents 1/4 = (2^-2).

The latest Amiga operating system software has four libraries for handling floating point binary numbers. Two libraries use numbers expressed in the 32-bit FFP (Motorola Fast Floating Point) format. (See *Figure 1.*)

My prior column's accompanying source code on the AMIGA *Plus* #2 Disk has a neat little (under 600 bytes executable) 4-function calculator based on the mathffp.library functions. For a final bit of review, look at the format used for 32-bit FFP floating point numbers. (See *Figure 2.*)

There are 32 bits here, with 24 bits dedicated to the Fraction, 1 bit to the Sign (plus is denoted by 0 and minus is denoted by 1), and 7 bits for the Exponent. Making it easy to have negative exponents without a separate sign bit just for the exponent, all FFP exponents are offset by $3F (Hex). That means a exponent of 1 is written as $40, and an exponent of -1 is written $3E. $3F is the zero value for exponents in the FFP format. The leftmost fraction bit is the most significant bit of the 32-bit FFP number. All FFP numbers have a 1 bit in that most significant bit position. They are said to be normalized. You won't find a FFP number with this form:

0011 1111 0101 0101 1010 1010
0100 0010 (exponent = $42)

It must be 'normalized' to this form (if you happen to be making it by hand):

1111 1101 0101 0110 1010 1000
0100 0000 (exponent = $40)

The fraction part must be shifted left twice so the left (most significant) bit is a 1. That means the exponent must be reduced by 2. FFP numbers are convenient because they can fit into a register in the 68xxx processor. Using them is easy with the usual OPENLIBRARY and JSR-LVO.SPxxx(A6) calls to the mathffp.library offsets like any other library.

The mathtrans functions also work with FFP numbers. They are also easy to use and you might try them in your own code for a scientific calculator program. Be sure you have the mathtrans.library available in whatever directory you are using for a LIBS: directory. On the Workbench 1.3 disk, it is in the LIBS directory. When your program opens that library it must be pulled in from disk or RAM or hard-disk. The mathffp.library is built into the ROM memory of all Amigas, but the other three libraries all come supplied on the Workbench disk.

Double Precision Number

In the first column I mentioned the other two libraries, but we put off working with them. (See *Figure 1.*)

mathffp.library - simple arithmetic (add, subtract, etc.)
mathtrans.library - transcendental functions (sin, cos, etc.)
mathieeedoubbas.library - IEEE double precision arithmetic
mathieeedoubtrans.library - IEEE double precision transcendental

Figure 1 - Amiga floating point libraries

The IEEE format for double precision (DP) numbers specifies a way to use 64 bits to represent a floating point binary number. Hence the meaning of double precision -- twice the number of bits can let us handle more significant bits before we run out of space. The problem mentioned earlier is partially resolved by just using more bits for the fraction. When limited to 24-bit fractions, numbers needing more bits are simply cut off at 24 bits for FFP format.

IEEE format has 52 bits for the fraction part, so the cutoff problem is

Scientific notation can represent a wide range of numbers compactly and with a known, unchanging size.

much less likely to occur and the arithmetic results with IEEE DP numbers are more likely to remain precise. Another benefit of IEEE format numbers is that 68881 math co-processors know how to use them automatically.

The wise folks who continuously upgrade Amiga system software made a major change in the two IEEE math libraries with the Amiga 1.3 Enhancer upgrade package. The routines in each of these libraries have been changed. They can sense the presence of a 68881 math co-processor and use it to do the calculations. If your Amiga doesn't have a 68881, no problem. The same calculations will result, but they are done using software (just like the old IEEE libraries). The v1.3 IEEE math libraries are upward-compatible with 68881 (and the newer 68882) co-processors. They have also been improved for faster operation regardless of which processor you're using. Many programmers avoided using double precision math in the past because the IEEE routines were SLOW! Now they are not only faster software-wise, but can take advantage of a popular hardware upgrade.

F F F F F F F F F F F F F F F F F F F F F F F F S E E E E E E E

Figure 2 - 32-bit FFP format

S E E E E E E E E E E E E F F F F F F F F F F F F F F F F F F F

Offset	FFP Name	IEEE Name	Use
$FFE2	SPFix (D0)	IEEEDPFix (D0/D1)	Convert FP to Integer
$FFDC	SPFlt (D0)	IEEEDPFlt (D0/D1)	Convert Integer to FP
$FFBE	SPAdd (D0,D1)	IEEEDPAdd (D0/D1,D2/D3)	Add two floating point #'s
$FFB8	SPSub (D0,D1)	IEEEDPSub (D0/D1,D2/D3)	Subtract floating point #'s
$FFB2	SPMul (D0,D1)	IEEEDPMul (D0/D1,D2/D3)	Multiply floating point
$FFAC	SPDiv (D0,D1)	IEEEDPDiv (D0/D1,D2/D3)	Divide floating point #'s

Figure 4 - Some IEEE and FFP functions

Offset	FFP Name	IEEE Name	Use
$FF9A	SPTieee (D0)	IEEEDPTieee (D0/D1)	Make IEEE SP into IEEE DP
$FF94	SPFieee (D0)	IEEEDPFieee (D0/D1)	Make IEEE DP into IEEE SP

Figure 5 - IEEE single and double precision conversion routines

is substantially more complicated than the FFP format. But there's one more issue. Since the IEEE DP number always uses 64 bits there is no way to get the whole thing into one 68xxx processor register. It must be split into two 32-bit sections and all Amiga IEEE math routines assume that the split works the following way. Most of the IEEE math routines require you place one IEEE number into registers D0/D1 (if you are adding, subtracting, multiplying or dividing, you need a second one in D2/D3). Here's how you must do it:

The left 32 bits (including sign, exponent and part of fraction) go in D0, the remaining right 32 bits (least significant bits of the fraction) go into D1. For the D2 D3 combination (the second IEEE number for simple arithmetic functions) the split is similar. D2 holds the leftmost 32 bits and D3 the rightmost 32 bits. If you are going to store IEEE DP numbers in memory, you need to have room for two longwords (32 bits each). The double-precision calculator program on the disk for this issue of AMIGA *Plus* shows several examples using the registers and memory for manipulating IEEE DP numbers.

What's In Those Libraries

Addison-Wesley's new "Amiga ROM Kernel Reference Manual: Includes and Autodocs Revised and Updated" arrived at my local software dealer a few weeks ago. It contains a tremendous amount of information and covers the new v1.3 software system released as the Enhancer Software package by Commodore about six months ago. Pages H-4 and H-5 contain complete lists of all the functions and their offset values for the four math libraries we've been using. Pages A-179 through A-210 give specific register usage details for each library routine in the math libraries.

The mathffp.library and mathieeedoubbas.library have the same routines and luckily the offset values are identical. For a complete list see the code accompanying this article on the AMIGA *Plus* disk. A few examples are given here. (See *Figure 4.*)

Note that the IEEEDPFlt only takes a 32-bit integer in D0 and converts it to a IEEE DP floating point number occupying both D0 and D1 (in the split described above). A similar limit of the IEEEDPFix is that it takes a IEEE DP number and returns only a 32-bit integer in D0. There is no easy way to convert a 64-bit floating point number to a 64-bit integer and vice versa. But we can rise to the programming challenge!

The two MathTrans libraries also conveniently have identical functions with identical offset values. Here we find not only the expected transcendental functions (SPSin, IEEEDPSin, etc.) but a couple of conversion functions which foreshadow future developments. (See *Figure 5.*)

These routines may play a useful role in the upcoming v1.4 Amiga system software. Some of us expect Commodore to provide some new math libraries for handling the single precision IEEE format. That is a 32-bit format which is similar (at least more similar than FFP is) to the IEEE 64-bit format and is directly compatible with 68881/68882 math co-processors. If you're interested in preparing for the future, you can check out the IEEE single precision (32-bit) format in the Motorola manual mentioned above.

Floating Point Trick

When an algorithm calls for doubling or halving a floating point number, always remember you can simply add 1 to or subtract 1 from (respectively) the exponent. If the exponent is near either end of its range, this may be unwise unless your code watches for the limits. This is especially easy with FFP numbers, since the exponent is easy to access in the low order byte of a register. If the FFP number is already in D0.Doubling a FFP number could be done like this: ADDQ.B #1,D0

For IEEE DP numbers it's a little harder since the exponent is not so easily isolated with a convenient 68xxx instruction. There are lots of instances which call for doubling or halving a number. If you watch for them and use this little trick it can save substantial computation time. The ADDQ instruction is faster than an ordinary ASL (Shift Left) instruction operating on an integer. We usually think of floating point math as slow in comparison with integer math with its built-in 68xxx instructions. Here's an instance where manipulating a floating point number could be a surprisingly fast operation without even making a call to a library routine.

This completes the two-part series on floating point math using Amiga FFP and IEEE numbers. Next time I'll carry on with the topic introduced in my first article in AMIGA *Plus* #1— we'll get a look at more EXEC level programming with Messages and Message Ports. ■

Daniel Wolf, Ph.D., is a regular contributor to AMIGA* Plus. *He is an independent Amiga software developer from Santa Maria, on the central California coast.

◆ AMIGA ◆ NEW PRODUCTS

BY CAROLYN CUSHMAN,
AMIGA *Plus* ASSISTANT EDITOR

◆ GRAPHICS

Access Technologies' new **DigiWorks 3D** ($129.95) bridges the incompatibility gap separating 2-D paint programs, digitizers and fonts from the world of 3-D modeling. This program converts digitized images or other 2-D Amiga art into detailed 2-D and 3-D objects that can be processed in powerful 3-D rendering and animation software. DigiWorks 3D combines sophisticated edge detection routines and an interactive editor into a powerful package for tracing 2-D images and manipulating the resulting 2-D and 3-D objects. The program features 2-D extrusions into 3-D, freehand drawing, adjustable tracing accuracy, absolute and relative coordinates and output sizing controls. DigiWorks 3D will output objects in either Sculpt-Animate or Turbo Silver format. Access' related product, **ACAD Translator** ($179.95), will convert the myriad of AutoCAD DXF format objects available on IBM-PCs into Sculpt-Animate format.

DigiWorks 3D creates objects from paintings.

◆ Now create animations with the style and expression of hand-drawn cells, with **LightBox** ($189, 1Mb required) from R & DL Productions. By letting you see "through" the page you're currently working on, to examine the pages that come before and after in the page-flipping animation, LightBox makes it easy to create smooth action and control speed. Files are saved in standard IFF format, for compatibility with other paint and animation programs. Two animation lessons, with examples, are included.

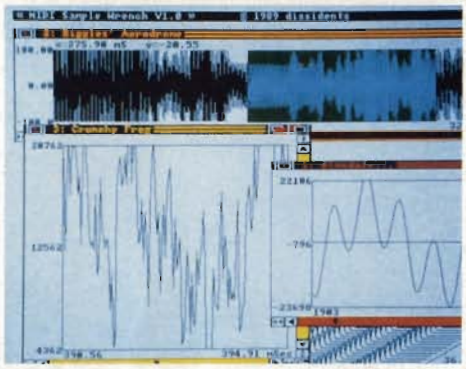
Optimize your color printing with **Palette Printer** ($29.95) from Ontological Survey. An Amiga IFF file device, Palette Printer forms color charts that, when printed, display the complete color range of the printer used. These charts can be used as a color match system, letting designers pick the precise colors to be printed.

PURE COLOR ($22.95) is a collection of printer palettes designed to let artists and designers know exactly what color will be printed on a particular printer. Each IFF screen holds 32 different colors or shades, each clearly labeled with a numeric R G B setting. In total, there are over 500 different color settings as well as numerous dot pattern settings.

New additions to Hash Enterprises' ANIMATION: line of graphics and animation software include **ANIMATION:Editor** ($59.95), which lets you combine and edit animations from different vendors. Also on the program disk is Ken Baer's public domain animation capturing program, Capture. **ANIMATION:Soundtrack** ($119.95) synchronizes and edits your soundtrack, and **ANIMATION:Title** ($79.95) provides a professional video titler.

Kara Computer Graphics has added two new packages ($69.95 for 2 disks each) to their line of Kara Fonts. **Subheads** offers 72 and 55-point versions of the Chrome, Marble, Brick, Granite, Wood, Cast, Column, Chisel and Bevel colorfonts found in the original Headlines package. **Headlines 2** offers four new dimensional 8-color fonts in two and three sizes each: ChiselSCRIPT, a flowing, uppercase and lowercase italic script; GLASS, a transparent, uppercase gothic; ENGRAVED, a shiny, two-plane gothic typestyle; and EMBOSSED, a font of raised letters on a surface.

CV Designs has added Volumes 6 and 7 to their **Video Visions** series of pre-made video images. Volume 6 is **THE EDUCATOR**, with images relating to history and geography, while Volume 7, **THE ADVERTISER**, contains products and symbols. Individual Volumes consisting of two disks each are sold for $24.95 each, but discount sets are available. Beyond selling images on disk, CV Designs offers custom video services, and to provide video designers with more options and integrated graphics tools the company is currently working on **Video Visions—The Program**. ▶



MIDI Sample Wrench

MIDI

Offering full-featured professional sound editing for the Amiga, dissidents has released **MIDI Sample Wrench** ($279, 1Mb recommended, supported sampler with interface required). The Wrench works with 16-bit CD quality sounds, which can be loaded from MIDI-based samplers or disk files and extensively modified. Present support includes MIDI standard dump devices such as the Sequential Prophet 2000/2002 and Yamaha TX 16W.

From MIDImouse Music, the **WAVE Professional Digital Synthesis System** ($249.95) has massive sample generating capabilities, with unlimited flexibility in sound synthesis. Sounds may be combined, generated, cut, clipped or pasted, and otherwise modified through a wide variety of techniques, including Granular Synthesis. Requires 1Mb RAM, standard Amiga MIDI interface and 12-bit sampler with Standard MIDI Sample Dump Format support.

Music Mouse, originally published by OpCode Systems, is now available from Aesthetic Engineering. Music Mouse Version 1.03 ($84.95) is now available, with updates that include the ability to handle European keyboard maps, and make it possible to run Music Mouse with Mimetics' SoundScape.

ENTERTAINMENT

Shogun -- Interactive graphic fiction from Infocom.

Infocom (the storytelling and role-playing division of Mediagenic) has several new adventures for the Amiga. **Journey** ($49.95) is the first "Role-Play Chronicle" for the Amiga, mixing the best features of interactive fiction, role-playing games and traditional fiction for an exciting quest adventure in a world of dwarves, elves and wizards. **Zork Zero** ($59.95) is the exciting prequel to Infocom's classic Zork trilogy. Experience the last days of the empire, discover the origin of the grues, and play Double Fanucci, all presented with the latest technology in interactive storytelling. For an adventure in 16th Century Japan, try **James Clavell's Shogun** ($59.95), a historical adventure based on the novel and television mini-series. **BattleTech: The Crescent Hawk's Inception** ($49.95) takes you to the far future, where warriors operate the BattleMechs, 30-foot-tall combat robots. Standard role-playing features are combined with "emotive outtakes", animated graphics in the style of Japanese comics used to illustrate the action.

Gold Disk Inc. has launched a new subsidiary entertainment software company, *HardWired*. Their first two releases are **Denaris**, a fast-paced shoot'em-up, and **Jinks**, a new twist on a classic, arcade-style breakout game.

Smash tanks, climb skyscrapers and eat innocent bystanders in Activision's **Rampage** ($39.95), the Amiga version of the popular arcade game. You control a giant gorilla, lizard or wolf, in a desperate struggle for survival that includes up to 132 different cities for you to destroy.

Search for the Titanic ($49.95) in Capstone's new oceanographic adventure simulation, which includes digitized photos of the actual Titanic shipwreck. In this highly detailed simulation, you must organize your expedition, then chart your course and battle the elements as you explore the dozens of wrecks included on disk, gaining the experience you need to reach the Titanic.

Cinemaware Corporation's new Spotlight Software line features critically acclaimed games from around the world. The first games to be spotlighted include **Deathbringer** ($39.95), a fantasy role-playing game that sends you on a quest for five magical gems. **Federation** ($49.95) sends you to outer space for an adventure in space trading and combat adventure with a built-in space-flight simulator. In **Total Eclipse** ($39.95) you travel through a giant pyramid to destroy a cursed secret shrine. This game features FREESCAPE, a fast, smooth-scrolling solid 3-D system that makes the pyramid seem massively real. **Dark Side** ($39.95) adds strategy and puzzle solving to a 3-D arcade-style space adventure that sends you on a mission to infiltrate a lunar military zone.

Six world leaders have been kidnapped, and the only man who can save them is **Joe Blade** ($29.95). You'll fight your way through the 127 rooms of Crax Bloodfinger's fortress in this new action adventure from DigiTek. Also from DigiTek, the new **Extra Course Disk #3** ($19.95) for Hole-In-One Miniature Golf adds 54 holes on three courses. Two of the new courses are extensions of the original Menagerie and Classic courses, while the third, Out of This World, ignores the rules of physics for "anything goes" fun.

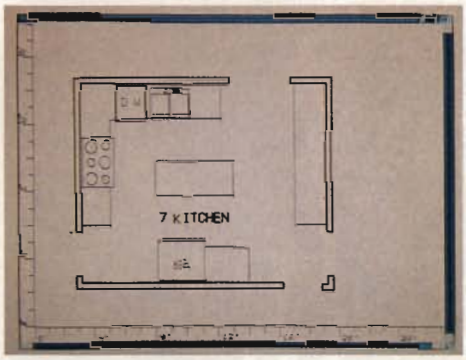
Battle a deadly virus within the planet Spireaus in **JUG** ($39.95), an exciting new arcade game from MicroDeal. As JUG, you transform yourself into various shapes to battle opposing forces as you seek out the trapdoors that will lead you down to the planet's infected core.

Medalist International, a division of MicroProse, has several games in the works. Coming soon is **Spiderman and Captain America in Doctor Doom's Revenge**, an interactive comic book adventure in which players take on the roles of Spiderman and Captain America, trying to stop Doctor Doom from destroying New York City.

Spectrum Holobyte, who brought you FALCON, now brings you **VETTE!** ($49.95) the new street racing simulation. Test your racing skills against sexy European sports cars through the streets of San Francisco past famous landmarks, dodging traffic and pedestrians. Choose from three models of Corvette, on various courses, then enjoy the thrill of real maneuverability as you fly up and down those steep San Francisco hills.

◆ APPLICATIONS

From Madrigal Residential Designs comes a comprehensive set of architectural libraries, including three CAD libraries in Aegis CAD format, and two in IFF format for use with paint and desktop publishing programs. The **Floor Plan Library** (CAD version $69.95, IFF $39.95) contains over 200 parts for walls, windows, doors, tower, fireplace, kitchen, bathroom and stairs. The **Interior Design Library** (CAD $69.95, IFF $39.95) contains over 275 furniture parts representing tables, sofas, chairs, book cases, beds, desks, and more. The **Framing and Foundation Detail Library** (CAD only, $49.95) contains 45 complete detail drawings, plus components for showing foundation construction and the framing of walls, eaves, rafters, and other common construction conditions.



Madrigal Designs' Kitchen

◆ **TSSnet** ($250) from Syndesis provides full access to DECnet networks for Amiga computers. The first release is designed to support the X-Window System from GfxBase, with asynchronous DECnet communications, a Network Control Program, Network Virtual Terminal support, and a programming interface at the Amiga device level. A subsequent release, planned for the end of 1989, will include such features as Network File Copy and Listener, Electronic Mail for access to VMS Mail and Ethernet support.

From Free Spirit Software comes **Ami . . . Alignment System** ($49.95), a precision drive evaluation and head alignment system. The system includes a program disk, a specially prepared calibration disk and an operations manual that includes instructions and diagrams for drive disassembly and adjustment.

A different sort of database, **FINDEX V** ($49.95) from the E. Arthur Brown Company lets you type in your data in any order, much like typing on a word processor. Records are like 60-line pages in a notebook—and records in a particular file don't have to be of the same size or type. And, however disorganized your information, you can find whatever you're looking for in two to six seconds, simply by typing an identifying string of characters. A unique report/mail merge capability gives users a number of ways to access data, or even re-arrange it for merging into other systems.

From Poor Person Software, **Thinker** ($80) is one of the first products to bring Hypertext to the Amiga. Combining word processing with database concepts, Thinker adds hypermedia and outline processing to produce a powerful planning and organizing tool. The latest version is 1.03. Version 2, due out at the end of summer, will be a major revision, containing an ARexx interface and using the AmigaDOS clipboard for Cut and Paste operations.

For beginning users of AmigaDOS 1.3, **DOS LAB** ($25) from Jumpdisk provides a two-disk course on AmigaDOS 1.3 commands. A two-window environment lets the user scroll through a chapter on one window while typing and testing DOS commands on the other. A $2 demo disk is also available.

KFS Software has released **THE ACCOUNTANT** Version 1.3 ($299.50, 1Mb required). This new version has been expanded to cover new types of business, including manufacturing concerns which need Process Costing, and for businesses needing up to nine Departmentalized Income Statements. Other improvements include User Selectable Aging for Accounts Receivable and Payable, Optional Invoice Detail Saving, and Unit Sales Tracking in Inventory. The documentation is completely new, covering the entire program in more simplified detail.

Help your children learn to read ▶

with the **The Three Bears** ($29.95), the latest in the talking Robot Reader series from Hilton Android. The computer reads the story of Goldilocks at adjustable speed, highlighting each word as it is read. Other options include a "Find the Word" game and audio-visual identification of the characters and objects in the illustrations.

Keep your file data safe with **LuCypher I** and **II**, the premier packages for Amiga file encryption, now available in updated versions from MegageM. LuCypher I, available separately for $49.95, consists of a high speed, character-based file ciphering package. LuCypher II ($199.95) includes LuCypher I, and provides a complete RSA Public Key crypto-system, including a means of authenticating message origins. Special algorithms sense and use a 68020 processor to achieve a speed improvement of 20%.

◆ HARDWARE

Add the ease of pencil and paper to your graphics and CAD programs with the new **Amiga Light Pen and Driver** ($129.95) from Inkwell Systems. The 184A light pen is lightweight, with a two-touch switch. Operational in interlace or non-interlace modes, as a stand-alone or with mouse, the pen and its transparent driver software are fully compatible with a host of current Amiga software, including Deluxe Paint II.

Speed up your computing with **FASTKEYS** ($39.95) from SoundSight Corporation. These quick-stick extension keys fasten to mouse, trackball or pad, and can be programmed with macros to make one-hand operation a reality. ■

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CIRCLE 222 ON READER SERVICE CARD

Aesthetic Engineering. Upgrades and technical support: 175 Duane Street, New York, NY 10013. (212) 925-7049. New product orders: Aesthetic Engineering/Intensive Care, 2022 Taraval Street, Suite 5408, San Francisco, CA 94116. (415) 589-2191.
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Spotlight Software, dist. by Cinemaware
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Syndesis, 20 West Street, Wilmington, MA 01887. (508) 657-5585.
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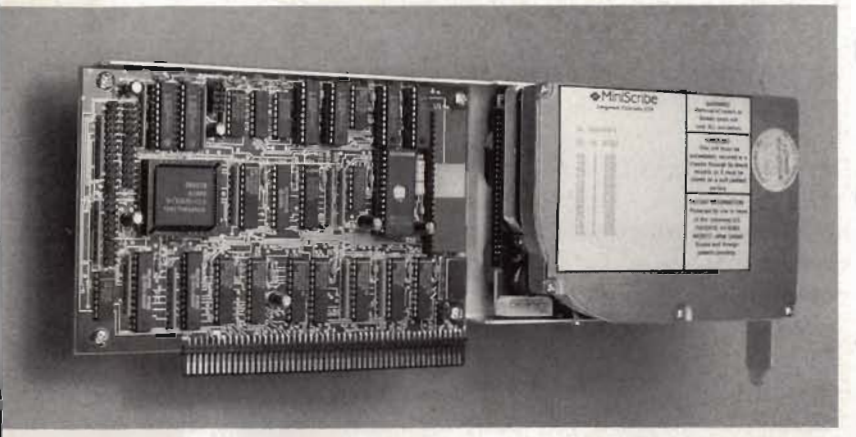

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Available NOW! Suggested list price, $329 (hard disk not included)
Frameless version: $299.00. See your Amiga Dealer.

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.

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.

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 Continued from page 54

effects, and particularly the music score, made full use of the Amiga's power.

However, from the aspect of program execution, too much time was wasted in disk access. Each time you move to or from the animation level, a disk swap is necessary if you have but one drive. Also, early in the game, play progresses too slowly, even at the highest speed setting. It takes forever to move from one town to another. And while the effect of this delay is lessened when you have a number of bands of men to command, it's annoying in early play when you only have a few bands.

The manual, on the other hand, is quite well done. In addition to supplying a condensed background on Middle Earth, its nearly 50 parchment-like pages tell you just enough about program operation and control to get you started, without giving away too much in the way of clues. A large map is included and will be well worn if you have any hope of completing this game.

Overall, I felt War in Middle Earth would be enjoyed by Amiga users who are familiar with, and enjoy, the tales of Tolkien. However, be prepared to find deficiencies when compared to other adventures you may have played.—STEVE PANAK

WAR IN MIDDLE EARTH $49.95

Melbourne House, 711 West 17 Street, Unit G9, Costa Mesa, CA 92627. (714) 631-1001. ■

CIRCLE 263 ON READER SERVICE CARD

Evil Garden

In **Evil Garden**, you use your mouse to control a small "shooter" which moves across the bottom of the screen. It can also move up and down in the bottom quarter of the screen. The right third of the screen shows the score and other information, while the game itself is played on the left two-thirds of the screen.

Centipede-like creatures emerge from the top of the screen and begin to crawl across the obstacle-strewn playing field. These creatures have many segments and are animated convincingly. The object of the game is to blast away segments of centipedes and prevent them from reaching the bottom of the screen. Of course, any contact between the shooter and the centipedes costs you one of your five lives. Eliminating all the centipedes on one level lets you move to the next level.

Your goal is complicated by a variety of things. Many mushrooms and other objects block your shots at the centipedes and take four hits to destroy. They are situated near the bottom of the screen and can block your shooter when you attempt to move it. It is best to eliminate these objects early.

When a centipede meets a mushroom, it reverses direction and drops down one row on the screen. This means certain arrangements of mushrooms can cause the centipede to descend to the bottom of the screen very quickly. You will quickly learn to recognize these patterns and destroy them.

When you shoot a centipede's head, it simply shortens up and keeps coming. But hitting the body breaks the centipede in two—now you have twice as many small centipedes to contend with! Either way, a new mushroom grows at the location of the destroyed segment, causing the balance of the centipede to change direction.

A spider periodically emerges onto the playfield—its touch is fatal to your shooter, but it can be destroyed by shooting. Its motions tend to be pretty unpredictable, so watch out. Another hazard is mushroom layers. These drop from the top of the screen whenever there are only a few mushrooms left. They not only leave a trail of mushrooms behind, but they fall fast and will destroy your shooter if they collide with it. They can be shot, but you have to be very quick or very lucky to hit one.

Your shooter starts out firing a single stream of bullets. Starting with level 3, however, bonus faces come bouncing onto the screen. Hitting one and catching the resulting bonus object provides your shooter with extra capabilities: shields, a follower that fires when you do, super bullets that destroy mushrooms with a single shot, and some awesome firepower. These capabilities are very helpful in the higher levels, where everything speeds up, the spiders lay fatal eggs, and the background gets very busy, making it hard to see what is going on.

Evil Garden is excellent graphically and smoothly animated, with a pretty good music track. It is a lot of fun to play. Unfortunately, one of its flaws is that you don't get to spend enough time playing. Not only does it take a very long time to load initially, but you must sit through an interminable loading process at the end of every game while several screens are loaded and displayed. The names of the authors are loaded and displayed after every single game.

Any extra memory in your Amiga is not utilized, so this loading process occured even with my 2Mb computer. The Evil Garden disk is not exactly "copy protected," but no instructions are given for installing it in your RAMdisk or hard disk. You must also answer questions about the manual or the box, which means you must keep both handy. Keeping the box around seems kind of silly. There is also a glitch with the keyboard—the Y key prints a Z on the screen and the Z key prints a Y. Thus, when asked to specify the color of the box (it's gray), you end up with GRAZ, which is not accepted, forcing you to reboot (you only get one try). Since a lot of the manual is in German (which uses a lot more Zs than English) this is a fairly major flaw.

Overall, Evil Garden is lot more fun to play than Centipede, especially with the increased firepower available at the upper levels. This is partially spoiled by the long wait between games, if you are the impatient type.—DAVID PLOTKIN

EVIL GARDEN $39.95

Demonware, American Software Distributors, R.R. 1, Box 290, Urbana, IL 61801. (800) 225-7941. ■

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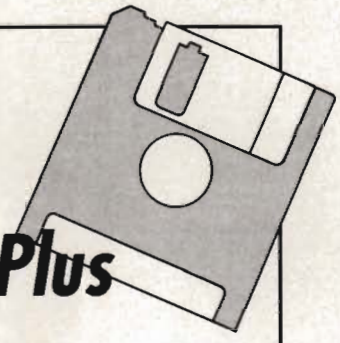

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ANTIC'S AMIGA *plus* MAGAZINE

Public Domain Library

The Amiga Plus Public Domain Library presents DevDisks by DevWare. DevDisks are the public domain library of choice for the serious Amigaphiles. Each disk contains 7 - 10 of the best public domain programs available. The first two letters on each indicate the orientation of the disk; DD# intermediate to advanced user - often contains source code, WB# general interest - all programs can be run from the workbench, and FD# generel entertainment and games.

DD17: DBWRender - Ray tracing, RayTracedPics, C source.
DD23: AddShortCut-Add Amiga-key shortcuts to any program, BlitLab - lets you experiment with the blitter, Comm1.34 - The best public domain communications program available, ConMan - A replacement console handler which adds command-line editing and command history to the CLI, DuX7 - Latest and greatest version of the DirUtil program, HP-10C- Calculator program, MakeMake -Create "make" files from a directory, And more.
DD30: JournalEdit - records mouse movements and keystrokes for later Playback, MRBackup - Hard Disk backup program that can perform full, incremtal, partial and date sensitive backups onto floppy media. Excellent!, LOGO - LOGO implementation, WindowKeys - lets you manipulate windows through the use of keyboard function keys rather than by using the mouse.
DD35: Backgammon -This graphic backgammon player was written by an undergraduate for a class in Artificial Intelligence,Iconify -These routines allow your program to shrink a window to the size of an icon, then to open back up when the user selects the icon, IFF2Pcs - IFF2Pcs (IFF to Pieces) is an interactive puzzle that scrambles any IFF picture file (up to 16 colors), Labels - Reference lists of the constants defined in the Amiga header files, VirusX - A virus-checking program, And more.
DD42: ExecLib - Set of tools and examples in Lattice C for creating disk resident libraries such as Translator.Lib, Pilot - A specialized language used to create Computer Assisted Instruction (CAI) software. SlideShow - slide show program that has a variety of creative wipes and features, Surveyor - gives the x and y mouse coordinates of the mouse pointer, And others.
DD44: ArpRel3.0 - This is the official AmigaDOS Resource Project (ARP) release 1.3. This release is 99.99% compatible with AmigaDOS release 1.3.
DD44 continued: BindNames- This program provides a faster and more structured way to do all your logical name assignments, DiskSalv - A disk recovery program KeyMapED - Modify the KeyMaps distributed by Commodore-Amiga with AmigaDOS, And more.
WB1: BlackBox - Challenging one-player game. The object is to find the stones hidden in the black boxes, Browser - set up a complete operating environment that will, to a large extent,replace both Workbench and the CLI, CircuitWar-Enemy CPU's occupy a common grid, but only one can ultimately survive, JRComm-XMODEM, XMODEM-1k, WXMODEM, YMODEM, YMODEM-g, ZMODEM, CIS B+ and ASCII file transfer protocols are included. Many options, Plot - A three dimesional mathematical function plotter, Scenery - generates great fractal landscapes, And others
WB3: ARP Release Version 1.3 and ASH, FastDisk - Optimizes the disk structure of an Amiga Disk, Plans - an excelent high speed, versatile drafting program, Zerg - Zerg is an Ultima type clone, And more.
FD5: BattleForce 3.0 - A game that simulates combat between two or more giant, robot-like machines. Simple words can't begin to give you the feel of piloting a 30 - 40 foot tall, fire breathing, earth shaking colossus that obeys your every whim, BullRun - A tatical simulation of a Civil war battle. The object of the game is to capture one of the enemy cities. Average play time is one to two hours, Metro -You play the role of a city planner. Using limited funds, you must construct a mass-transit subway system capable of meeting the needs of your city. Build wisely and your system will be a success, but poor planning will lead to disaster and financial ruin. Metro is a very good Amiga version of Kingdom, Golden Empire, Etc. Metro is habit forming. Average play time of 60 to 90 minutes.

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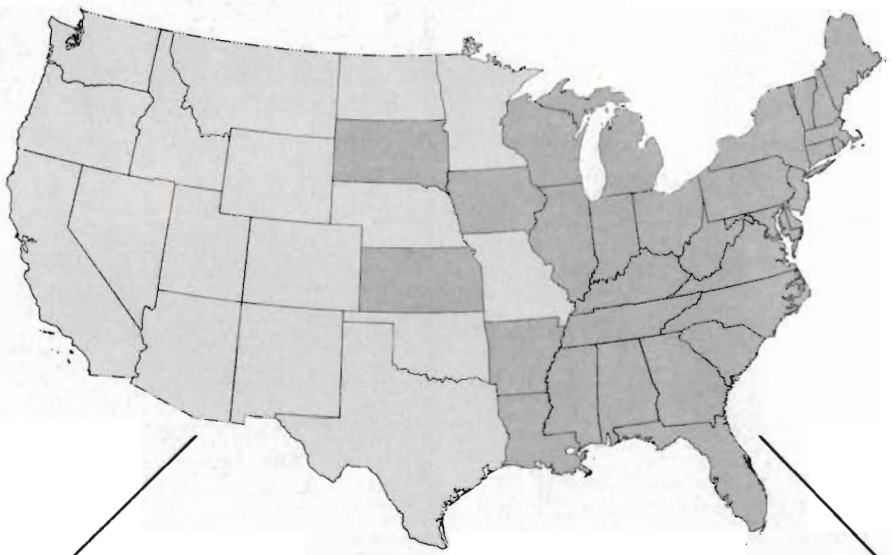

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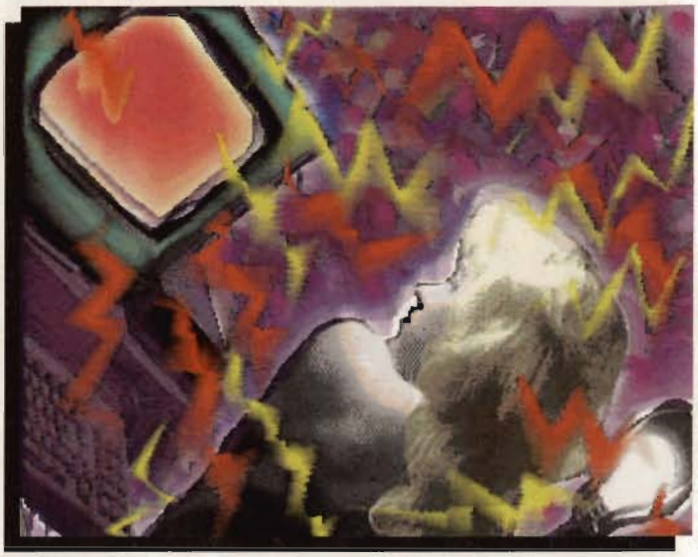
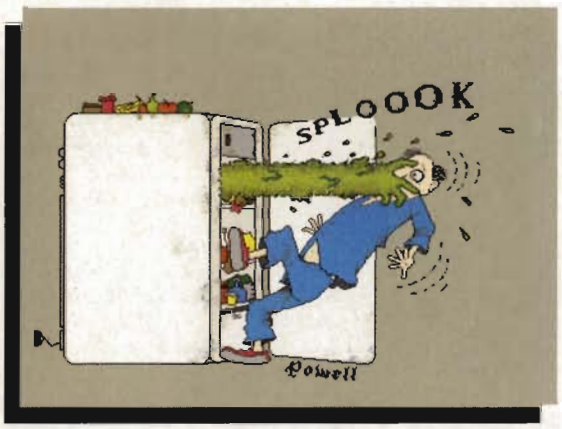
Reader Art Gallery

Editorial/Art staff's choice of the many fine graphics sent to AMIGA Plus.



Computer-Age was made with Digi-View and Digi-Paint by Khyal Braun, a professional artist based in New Haven, Connecticut. She has produced a large body of work on the Amiga and uses it to publish an arts newsletter titled "Squid Florentine At Large."

Love and Jealousy was created with a combination of Deluxe PhotoLab, Photon Paint and PIXmate. The artist of this richly textured image is Robert Anderson of Bloomfield, New Jersey.



Sploook! is a funny and technically adept cartoon drawn with Deluxe Paint II by Bruce Powell of Hillsboro, Oregon

Rules (Some New)

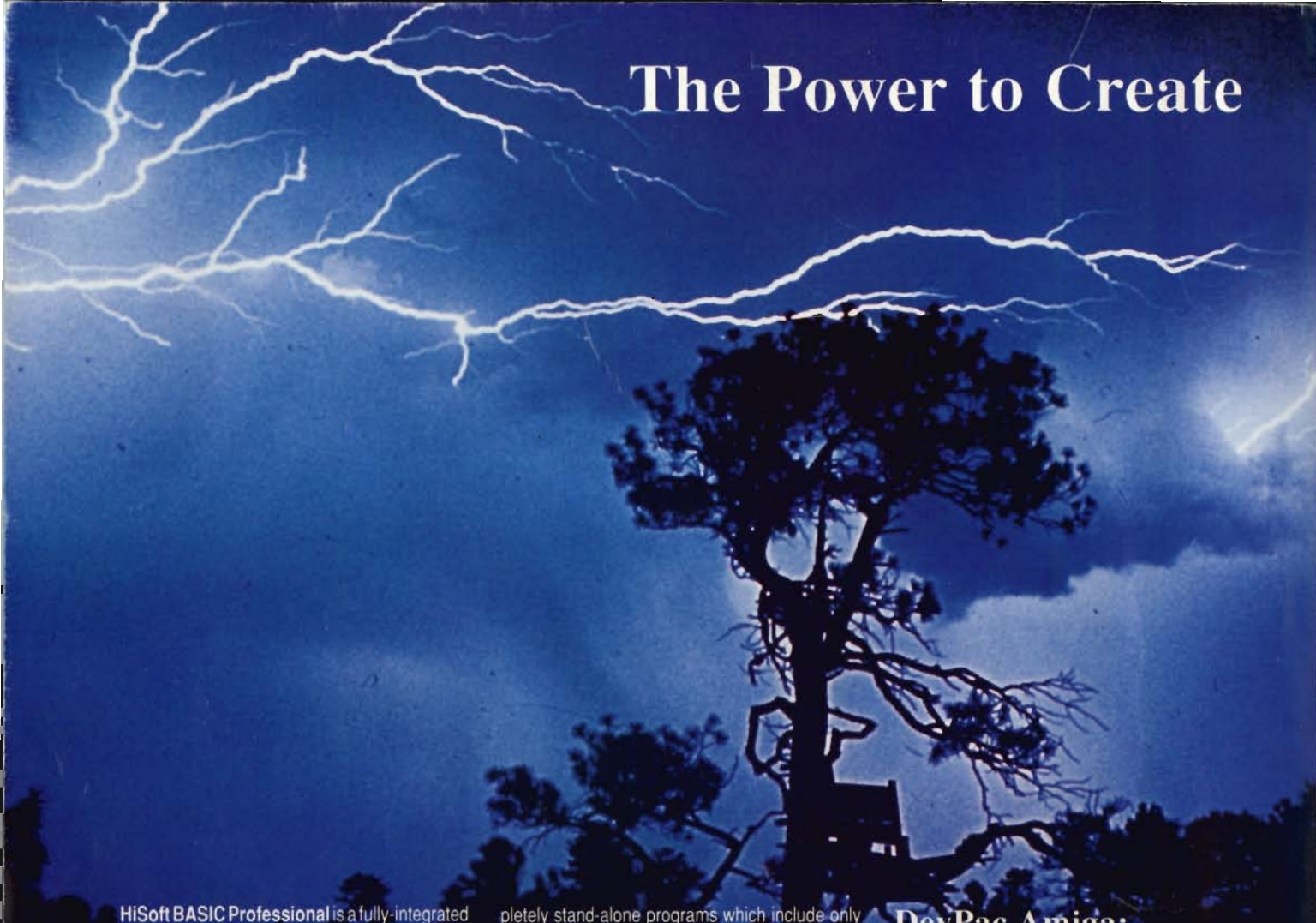
AMIGA *Plus* pays $50 for each picture published in this section. Images must be the original creations of the artist, produced on an Amiga computer. Graphics files may be included on the AMIGA *Plus* Disk as space permits.

Send your entries to: Reader Art Gallery, AMIGA *Plus*, 544 Second Street, San Francisco, CA 94107. We regret that due to the large number of submissions, your Gallery entries cannot be individually acknowledged and the 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 products you uses -- plus approximately 100 words describing the technical steps required to create your pictures.

You are now allowed to include some digitized elements in your pictures, if the total graphic effect is primarily your own original work.

(This entire page was designed, typeset and color-separated on an Amiga 2000 with Gold Disk's Professional Page 1.2 software. -- + EDITORS)



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