DISK INCLUDED INSIDE

AmigoTimes

Issue 1.2
US $8.95
Canada $9.95
Printed in Canada

News and Information Resource for the Commodore AMIGA™

flickerFixer

DELUXE PHOTOLAB

Paint 1500x1500 HAM images and print them as 10 foot posters

AMIGA TRANSPUTER

The Amiga 2000 has the possibility of joining the *SUPERCOMPUTER* league

PAGEFLIPPER PLUS F/X

A powerful and user-friendly animation controller

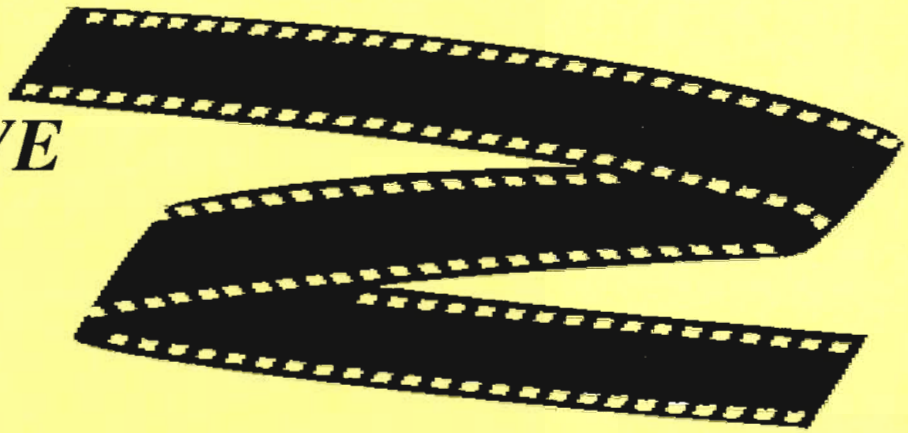
MANX SDB

C and Assembler source level debugger. Demo is included on accompanying AmigoTimes disk.

THE SCREEN WAVE BREAKER

0 64096 00001 6 08

UNLEASH ALL YOUR CREATIVE POWER WITH...



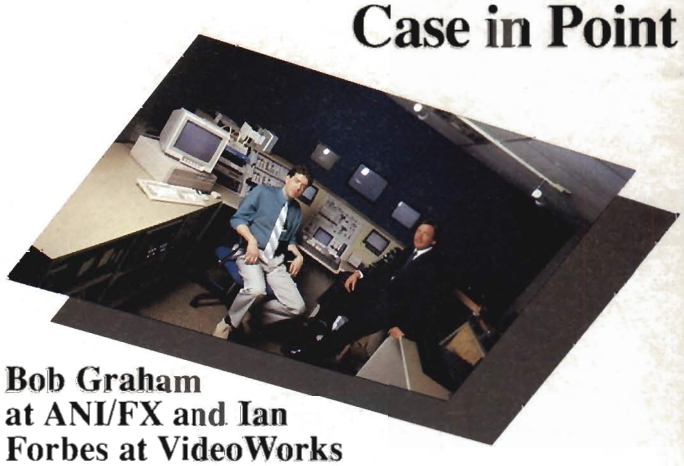
PAGEFLIPPER PLUS! F/X

THE NEW STANDARD IN AMIGA ANIMATION PERFORMANCE

JUST A FEW OF THE FEATURES YOU WILL FIND...

- PageFlipper Plus F/X generates smooth, rapid, full-screen animation in any Amiga resolution mode, including HAM and overscan
- It is capable of extremely powerful compression of Amiga images, in many cases allowing dozens or even hundreds of frames to be manipulated in RAM
- Compiled animations can be chained across more than one disk
- Animations are easily editable, even after compression, using the interactive context-sensitive script editor
- Very simple, well designed, easy to learn user interface
- Supports ANIM format
- Works with NTSC and PAL video standards
- Multiple split-screen animation speeds
- Add backgrounds, foregrounds globally, by segment and frame by frame
- Flip animation segments upside down or left to right
- Program includes a Player program for distributing your animations
- English, French, and German versions available
- Works with any Amiga 500, 1000, or 2000 with 512k
- Full credit for registered PageFlipper owners available directly through Mindware International.

Case in Point



Bob Graham at ANI/FX and Ian Forbes at VideoWorks in Kitchener, Canada, are video professionals. Clients like UNIROYAL and Johnson & Johnson don't settle for anything less than smooth, hi-resolution animation.

That's how they found Mindware International and PageFlipper Plus F/X! It was the only software program that could do the job!

Mindware International
110 Dunlop Street West,
Box 22158
Barrie, Ontario, Canada
L4M 5R3

For more information or the dealer nearest you:
1-705-737-5998
To order direct: **1-800-461-5441**

AmigoTimes

Managing-Editor Eyo Sama

Marketing Director Lisa Sama

Art Director Olusegun Olaniyan

Data Manager Ernest N. Nagy

Assistant Editor Michael Hermann

Music Editor Serge Boucher

Circulation Coordinator Ansa Sama

Circulation Manager Alex Ribeiro

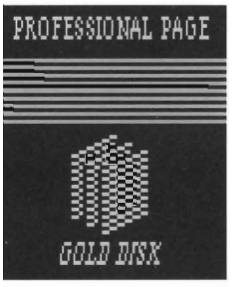
Photography Robert St.Marseilles

Contributing Authors Serge Boucher
John Foust
Michel Giroux
Michael Hermann
Gerald Hull
Harv Laser
Ernest N. Nagy
Olusegun Olaniyan
Eyo Sama
Lisa Sama
Oran Sands
Mike Scalora

AmigoTimes® (ISSN 0836-0588) is published monthly by Sama Software Inc., 5124 St. Laurent, suite 100, Ville St. Catherine, P.O.B. 1228, Quebec J0L 1E0, CANADA. Subscription rates are US $42.00 for 6 issues (in Canada CDN $51.00), and US $72.00 for 12 issues (in Canada CDN $87.00). For Foreign Airmail, please inquire. Phone: (514) 638-6303.

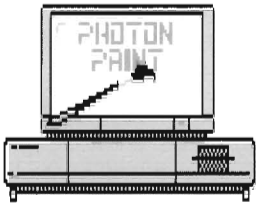
PRINTED IN CANADA

AmigoTimes issue 1.2 was created entirely on Commodore Amiga computers with the aid of the following tools:



Professional Page 1.1

Deluxe Paint II



Photon Paint

Digi-View 3.0

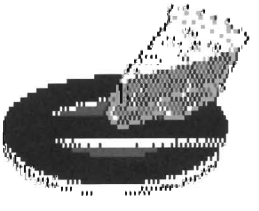
TextCraft Plus

GRABBiT

Deluxe PhotoLab

DrawPlus

GoldSpell 2.0



excellence!

Butcher 2.0

Flow 2.0

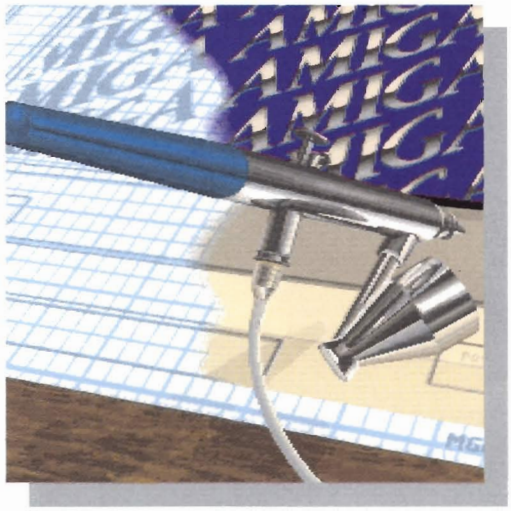
Linotronic 300 Imagesetter

PIXmate

AmigaTimes
News and Information Resource for the Commodore AMIGA™

C O

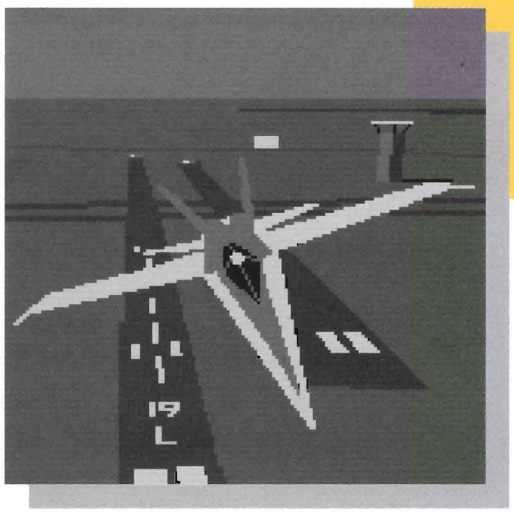
F E A T U R E S



D E P A R T M E N T S

CONTENTS

REVIEWS



PROGRAMMING

The Editor's Corner

Life in the Publishing business.....

Right now, at the AmigoTimes offices we are in a mad panic trying to get this issue out to you. I am writing this note on an Amiga 500 while the 2000 I usually work on is color separating one of our articles in the other office (I keep trying to drag the keyboard onto my lap, which of course is rather difficult with an Amiga 500). The Art Director, swamped with work, is wondering why he doesn't go back to doing Biochemistry. Meanwhile, battling several modem download failures, the Data Manager (who is referred to as "Lieutenant Commander Data") is using language, which until certain censorship laws are lifted, cannot be printed within these pages. Everyone else has gone home, could be because it is 2am monday morning. That's life in the Publishing business.

This issue marks the growth of AmigoTimes. We have now added 16 more full-color pages, and we will continue to try to increase the size without sacrificing quality of content. To ensure that we are going in the right direction, we would greatly appreciate feedback from you. By feedback we mean a small letter, filling in our Reader Survey, or even leaving us a message on any of the BBSs we subscribe to. We are particularly curious about your opinions regarding the overall look and content of this second issue. Because we try to surpass each of our previous issues, you, our readers, can look forward to us trying to make each subsequent issue better than its predecessors.

This issue contains information on products that really push the Amiga into the high-end computer market; imagine an Amiga bursting along at 170 million-instructions-per-second (MIPS), this will soon be possible with the release of the Amiga Transputer board (see interview and feature on page 24). Also, the Flicker Fixer de-interlacing board from Microway gives the Amiga a professional look and allows us to connect to high-quality multi-sync monitors; all this at a flicker-free resolution of 704x470 (see product review on page 12).

This month's AmigoTimes disk is more closely integrated with the magazine. To accompany the review of the MANX Source Level Debugger we have included a demo version of this certain to be popular programming tool. Also, to accompany the review of VideoScape 3D 2.0, you will find a captivating animation created by the award winning Leo Schwab. These are just some of the interesting things we have included for you on AmigoTimes Disk 1.2.

We would like to apologize for the late distribution of the last issue of AmigoTimes. This lateness can be linked to several factors, the largest one being, the time-consuming process of shrink-wrapping thousands of issues (most of us still feel slightly nauseous at the sight of plastic bags). As you can see, we have now solved that problem, the AmigoTimes disk can be found sealed to page 29. To remove the disk, simply cut off page 29, thereby loosening page 51. You will notice that page 51-52, when folded properly, becomes a convenient subscription form envelope.

I would like to thank Mr. Dziewirz for all the help he has given us with the production of AmigoTimes. I would also like to thank all of our readers for the great response you have shown towards AmigoTimes; all we can say is keep reading, and we always look forward to hearing from you.

Eyo Sama
Managing Editor

AMIGOTIMES LETTERS

Q

I own an Amiga 2000 with 5MB of memory, a 40MB hard-disk drive, and a data acquisition system that I use for my research. I would be very interested in seeing articles which look into the use of the Amiga in different fields of application (especially in the scientific world, which is were I use my Amiga). I was quite impressed with your first issue and hope that you continue in its footsteps.

Eric Hoffman, Switzerland.

A

The next issue of AmigoTimes will feature an article on the use of the Amiga in a scientific environment, I hope you will enjoy it. We intend to regularly cover special uses of the Amiga. Thank you for your praise, and yes, we do intend to continue to improve the quality and size of the magazine. As you may have noticed there are 16 more color pages in this issue.

Q

First I would like to say that I liked your premiere issue even though I would like to see some more programming articles. I am writing you to find out if there will be a trade-in option for A-2000 owners who want to upgrade to the Amiga 2500UX/AT computers? Also, do you have any idea on when these machines will become available?

Jamie Grayson, Texas.

A

It is not yet known if Commodore will market the Amiga 2500UX or 2500AT in the US or Canada. It is possible that these machines will only be available in Europe where they were announced. Either way, you need not worry because the 2500 machines are just Amiga 2000s that have been upgraded with plug-in 68020 cards (the A2620 card which has a 68020, 68881, 68851, and 4MB of 32-bit memory) and in the case of the 2500AT, also with an AT Bridgecard. There are other options on them, but an Amiga 2000 will be expandable to the same level. ❑

To contact us here at AmigoTimes for questions, comments, or anything else, you can send mail to one of the following addresses:

AmigoTimes
5124 St. Laurent, suite 100
P.O.B. 1228
Ville St. Catherine
Quebec J0L 1E0
CANADA

AmigoTimes
P.O.B. 1158
Champlain, NY 12919-1158
USA

Or you can contact us at the following EMAIL addresses:

American PeopleLink - **AMIGOSTAFF**
BIX - **AMIGOSTAFF**
Delphi - **AMIGOSTAFF**
Amiga Team Canada - **AMIGOTIMES**

How easy is it to digitize a picture? Extremely easy with Digi-View, the popular digitizer for the Amiga. Recently Digi-View has been updated with even more features. For newcomers to the Amiga, Digi-View is a hardware and software combination that allows you to digitize images from your video camera and then store them as IFF files. The stored images can then be imported to any one of the many popular Amiga paint programs (i.e. Digi-Paint, Photon Paint, DeluxePaint II), to be manipulated in a variety of ways.

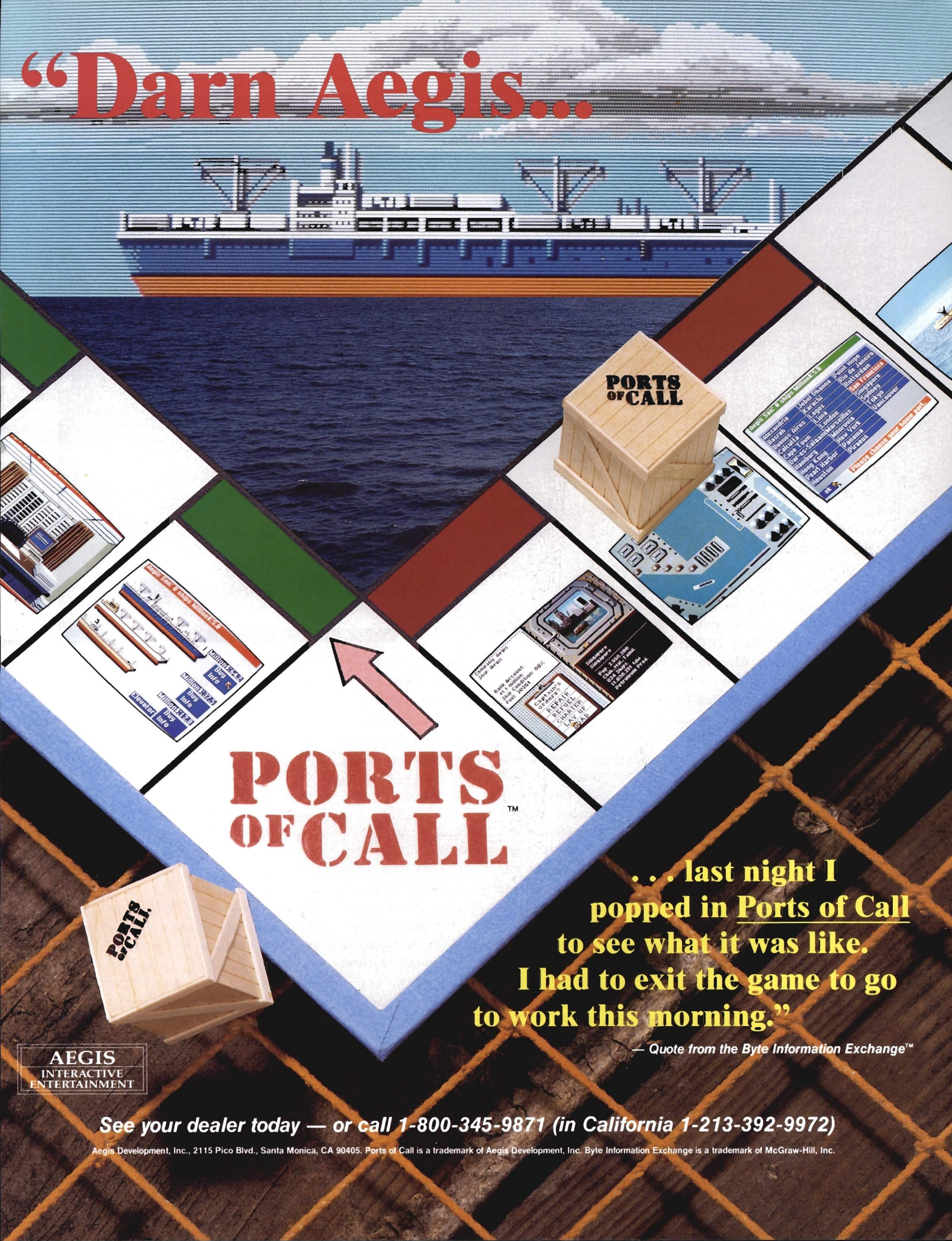
THE PACKAGING

The Digi-View 3.0 manual is well laid out with concise explanations of the menu functions. Extremely helpful was the "Troubleshooting" questions and answers section which addressed some problems which may arise when digitizing images.

The Digi-View package consists of the color filter wheel and mounting bracket, the Digi-View digitizer module, and the "Digi-View 3.0" software. The digitizer module connects to the parallel port of the Amiga 500/1000/2000. Although in the case of the 500 and the 2000 a "gender changer" is required because of the inverse pin alignments of the 1000's. I feel that since the only Amiga models that are being presently sold are 500's and 2000's, the gender changer should not be sold as a separate accessory for the digitizer; after all you absolutely cannot use the digitizer module on a 500 or 2000 without it. The Gender Changer is available from ewTek for $21.95 (US).

Digi-View will work with virtually any source that outputs a Video signal including a VCR. Images from a VCR must be paused in order to capture them, and the digitized image will be in black and white only. For capturing images such as photographs and sketches, NewTek recommends a black and white video camera, but a color camera or camcorder may be used. The best results are obtained from a black and white camera. The camera recommended for use with Digi-View functions exceptionally well, and is very reasonably priced; the Panasonic WV1410 may be purchased from NewTek for $279.95 (US). Optional add-on devices are the "Digi-Droid", a filter wheel that is connected to a computer controlled motor that will synchronize the changing of

By Olusegun Olaniyan


"Darn Aegis...
PORTS OF CALL
PORTS OF CALL™
. . . last night I popped in Ports of Call to see what it was like. I had to exit the game to go to work this morning."
— Quote from the Byte Information Exchange™
AEGIS INTERACTIVE ENTERTAINMENT
See your dealer today — or call 1-800-345-9871 (in California 1-213-392-9972)
Aegis Development, Inc., 2115 Pico Blvd., Santa Monica, CA 90405. Ports of Call is a trademark of Aegis Development, Inc. Byte Information Exchange is a trademark of McGraw-Hill, Inc.

the filters to the program. For truly professional results, it is recommended that the Camera is mounted on a copy stand, the CS-1L Digitizing Stand is also available from NewTek. In order to "preview" images i.e. focus the camera lens, it will be necessary to see what the camera sees. To preview I found that the Amiga 1080, or 1084 monitor can be used. To use the 1080, simply plug the RCA jack of the camera into the "VIDEO" jack of the monitor and set the "VIDEO MODE" to "COMP"; video mode is located on the front panel of the monitor. In the case of the 1084 Monitor, plug the RCA jack of the camera into the "CVBS/L" jack in the back of the monitor and select "CVBS" in the front panel.

Digi-View is not a "real-time" digitizer or "frame-grabber". Objects that are digitized with Digi-View must be fixed or motionless, you can digitize a person but they will have to remain perfectly still for the length of the process. To digitize a color image, Digi-View must separately capture each primary aspect of the color spectrum; the three primary colors that are referred to are Red, Green, and Blue (RGB). This a three step process wherein the image must be digitized, first with the red filter, then the green, and finally the blue. The entire process sounds long and drawn out, but in actuality is really quite simple.

NEW RESOLUTIONS

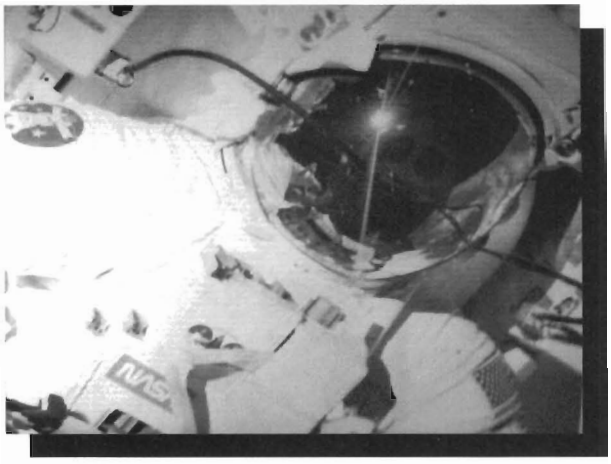
Digi-View operates in all of the Amigas' standard resolutions as indicated in Table I

Resolution	Colors	Overscan
320 x 200	32	352 & 384 x 240
320 x 200	64	352 & 384 x 240
320 x 200	4096	352 & 384 x 240
320 x 400	32	352 & 384 x 480
320 x 400	64	352 & 384 x 480
320 x 400	4096	352 & 384 x 480
640 x 200	16	704 & 768 x 240
640 x 400	16	704 & 768 x 480

Table 1.

To users of previous versions of Digi-View, noticeable are the new vertical and two levels of horizontal overscan modes. The overscan modes are available in lo-res, med-res, and hi-res. With the new overscan modes, Digi-View can now be used for "full video" work without the annoying dark border or "dead-zone" as some refer to it.

It may not look like it, but this image was the most difficult to digitize. The image was digitized in the hi-res black&white mode at a resolution of 768x480 and involved getting an Amiga and Digi-View into space.



A resolution of 768x400 was used to digitize this image in the b&w mode. The crucial part to using Digi-View is to make sure you have enough even lighting.

Before using Digi-View, it is recommended that a back-up copy be made of the program disk so as to avert any disasters. Backing up the program disk does not pose a problem because Digi-View is not copy protected. The first noticeable change with Digi-View 3.0 is the opening screen with the programs toggle selectable options. This menu is a superior set-up to the previous version. Also newly added is the option to exit from this start-up menu without having to load the program first.

WHAT'S ON THE MENU

There are three main menus in Digi-View 3.0: Project, Digitize, and Controls. All menu selections are self explanatory with exception of the "Histogram". When a histogram of an image is requested, two bar graphs of the "Raw Image" data and the "Adjusted Image" data are displayed. The y-axis is a representation of the number of pixels, the x-axis represents brightness (darkest to lightest from left to right); in a properly lit image, the graph should cover 70% or more of the baseline on the "raw data" graph. The "adjusted" graph is a representation of what Digi-View is doing to correct the image. Histograms are typically used by people using video processors with Digi-View to adjust the video signal.

Digitizing with Digi-View is extremely easy, the key to excellent results is lighting. To get the best results you may find that it is necessary to experiment with lighting at various angles. Once the lighting is adjusted, the red filter is placed in front of the camera lens and "Red" is selected from the Digitize menu, this process is repeated for the "Blue" and the "Green" filters. It is at this stage that the "Digi-Droid" can be of great help, all you have to do is make one menu selection, "auto", and the filters are automatically rotated for you for the entire digitizing process.

EXTRA_HALFBRITES

Extra_Halfbrite mode allows 64 colors on the screen at once in lo-res or lo-res interlace, giving even greater detail to lo-res images. Not all Amigas are able to display Extra_Halfbrite colors; all 500/2000 models and late model 1000 can, but earlier model 1000s do not have the proper "Denise" custom chip. One quick way to verify that your 1000 can display extra halfbrites is to select "Color" from the "Controls" menu and then select "Palette". If your 1000 has Extra_Halfbrite capability the color palette to your right will be a shade darker than the palette to your left, if not the two palettes will be identical.

To digitize images in the 64 color Extra_Halfbrite mode, simply select "Halfbrite", one of the options of the "Color" menu and digitize. Other display modes available in lo-res are "4096" or Hold-and-Modify (HAM), this allows you to display all of the 4096 colors of the Amiga all at once. Another display mode that Digi-View is capable of is "4096+" or "Enhanced Hold and Modify" as it is referred to in the manual; this mode allows you to display color detailing using special routines inherent to the Digi-View software.

Apart from the the "32 color" and "black and white" modes is the new "Line Art" mode. With line art you are able to capture high-contrast black and white artwork with no intermediate shades of gray. "Line Art" is especially handy for someone that likes to sketch their work on paper before actually going to a paint program, your work will be digitized in black and white outlines (instant templates). It is in this same menu that you can play with the Brightness, Contrast, Saturation, Sharpness, Level of Dithering, and Red-Green-Blue intensities.

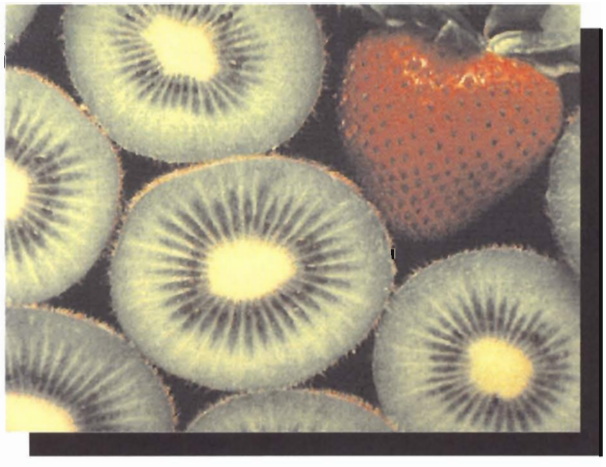
In hi-res the display modes that are functional are "Line Art", "Black and White", and "16 Colors". Now available in hi-res is a quick scan mode which functions in the same manner as the lo-res mode, however, because there is a noticeable loss of picture quality, this mode is only recommended for previewing images. Absent are the "Halfbrites", "4096", and "4096+", since these are modes that the Amiga is not able to display in hi-res (640 x 200, 640 x 400), they are ghosted-out and not available for selection.

POSSIBLE ENHANCEMENTS

It would be very useful if you could digitize into a BitMap which is much larger than the screen resolution. For example, a mode which would open a 32 color 320x200 screen but with a 640x400 page size (BitMap), or a BitMap size of 1000x800 on a 640x400 screen would give incredible results. These images would easily import into DeskTop Publishing software, if you are reading this NewTek, this would very well be the ultimate enhancement to your product.

In closing, I will take a quote from the "Forward by Tim Jenison" in the manual, "With the introduction of Digi-View 3.0, NewTek has achieved the goal we set over two years ago: to deliver the ultimate low cost image capture system for the Amiga." After experimenting with Digi-View 3.0, it can be safely said that Tim Jenison, the designer of the Digi-View hardware and the original software has achieved his goal. Digi-View is a straight-forward, no nonsense digitizer that is capable of high quality output at a relatively inexpensive price. Digi-View was the first digitizer for the Amiga and over the years it has been improved upon; the hardware remains the same, but the software has been updated by taking into account what the Digi-View users would like to see in the updates. ❑

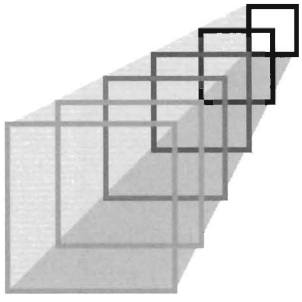
Digi-View 3.0
New-Tek Incorporated
115 W. Crane St.
Topeka, KS 66603
(800) 843-8934
$149.95
Not copy-protected
Requires 512K

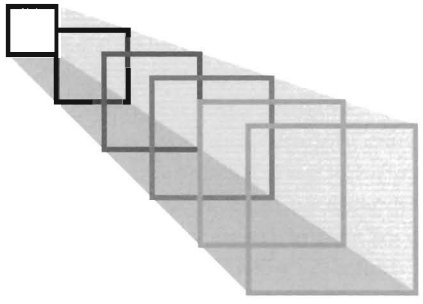


This image was digitized from the beautiful original photograph taken by Colin Ericsson (thanks for letting us use it). The image is in HAM mode using overscan and at a resolution of 384x480.

These Japaneese dolls were also digitized using the overscan HAM mode at a resolution of 384x480. As you can see the results are quite spectacular.

TRICKS n' TIPS





Your corner with helpful hints shortcuts and tips.

Fat PostScript

If you work with DeskTop publishing software you will have noticed the massive file sizes of postscript files. Also, if you do not own a laser printer then you must be using some kind of output service to print your files. The problem is, some postscript files are so large that they do not even fit on a single 880K disk (especially if you use several images in your file). There is one way around this, Arcing. There are several public domain Arcing (file compression) programs available for the Amiga, they can be found on just about every bulletin board. I usually use ARC (by Raymond S. Brand) to compress the postscript files and PKAX (from PKWARE Inc., it is several times faster than ARC) to decompress them. I had a postscript file which consisted of a single page color separation (done on ProPage); it was 2.7MB in size but ARC compressed it down to 279K, about 10% of its original size. You must be thinking "Doesn't it have to be de-arced to be printed?", yes it does, but there is a trick to it. If you type **PKAX -p filename** it will de-arc the file directly to whatever device is set to PRT: without using any extra memory (make sure that whoever prints your file has their preferences set to either serial or parallel, depending on where the postscript printer is hooked-up). To make it even easier, you could create a batch file and an icon. You can then link them using the PD program XIcon (it allows you to use CLI based programs from the Workbench). Whoever is printing your file will just have to double-click on your icon and it will automatically be sent to the postscript printer. Try it!

One disk drive system

Here is a little tip that will help those Amigans with single drives who would like to do a bit less disk swapping. First of all before you go any further make a copy of your original workbench, because this solution will alter your startup sequence.

1. Load your favorite Text editor.
2. From your text editor enter the S directory of the disk and call up the Start-up-sequence file.
3. Type in the following lines exactly. Make sure you put them before the Loadwb command.

```
makedir RAM:C
copy sys:C/Assign to Ram:C
copy sys:C/Cd to Ram:C
copy sys:C/Dir to Ram:C
copy sys:C/Copy to Ram:C
copy sys:C/Delete to Ram:C
copy sys:C/Makedir to Ram:C
copy sys:C/Run to Ram:C
copy sys:C/Endcli to Ram:C
copy sys:C/Type to Ram:C
Path Add Ram:C
```

4. Now save the file

If you add all this to your startup sequence then it will take a bit longer to boot with your personal Workbench, but your disk swapping will be minimized. You can further lessen disk swapping by including more commands in RAM:, only the most frequently used commands are included here.

Using RAM: Disk

If you use Workbench v1.2 then after booting with it you will find a disk icon labeled RAM:, its empty if you are using an original Workbench. So why don't you put it to good use. You see, programs in RAM: load much faster than they do from a disk drive. If your systems memory is low then you can still put a couple of your most used tools into RAM:. Some tools that might be ideal are the CLI and your favorite directory utility program. Simply click on their icons (keep your finger depressed) and just drag them to the opened RAM: window and then let go and the program gets copied into RAM:. Mind you if you have the memory to blow, Frankie says Relax and go for it.

Mouse Wash

Are you having problems moving your cursor on the screen, it may be that the tracking ball mechanisms are dirty. You don't need to spend a fortune on buying a kit to clean it, just follow these directions.

1. Turn your mouse upside down.
2. Pop off the tracking ball cover and take out the ball.
3. With a cotton swab dipped in rubbing alcohol gently rub the 3 silver tracking devices until they are clean.
4. Place the ball and cover back.

Speed up Professional Page...

For users of professional Page from Gold Disk Inc., when editing strictly text, you can speed up the program by selecting Black and White from the Preferences Menu. In the "Black and White" mode, the program is effectively sped up, and as an added feature you can experience desktop publishing from the Macintosh point of view; in living black and white.

Bring new life to an old disk

If you have noticed that your old data disks are taking longer to display the icons in their windows, there is a simple reason for this. As you copy and delete files from a disk, you scatter data to different parts of the disk; the more often you copy onto and delete files from that disk, the more scattering of data occurs. After a while you will find that the disk drive takes longer to access a disk, this is because the drive heads now have to jump to several locations on the disk in order to access your file. A simple solution to this is to:

1. Copy all of your files to RAM if you have memory to burn, or onto another disk.
2. Now reinitialize the old disk and recopy the files back onto it by typing:

copy df0: to df1: all
or
copy RAM: to df1: all
if the files are in RAM:

Now when you access this disk, you will find that it is accessed a lot faster.

Low cost Video Titler

Heres a little trick for those who have Amiga 1000s; this also works with the 2000 and the 500, but the results are in Black and White. Your Amiga can be used as a low cost videotitler if you're not too fussy about effects. Intro screens, or credit screens for home videos can be made by using any of the many Amiga Paint programs. Once you have created these screens, make sure you hide their title bars and menus, you can now record them onto videotape by using dubbing cables with RCA jacks. You can record the signals coming from the Amiga by plugging one end of the cables into the "Video Out" jack of the computer and the other end into the "Video In" jack on your VCR. As stated earlier, the signals that you will capture from the 1000 is in color; the 500 and 2000 only output monochrome black and white signals. ❑

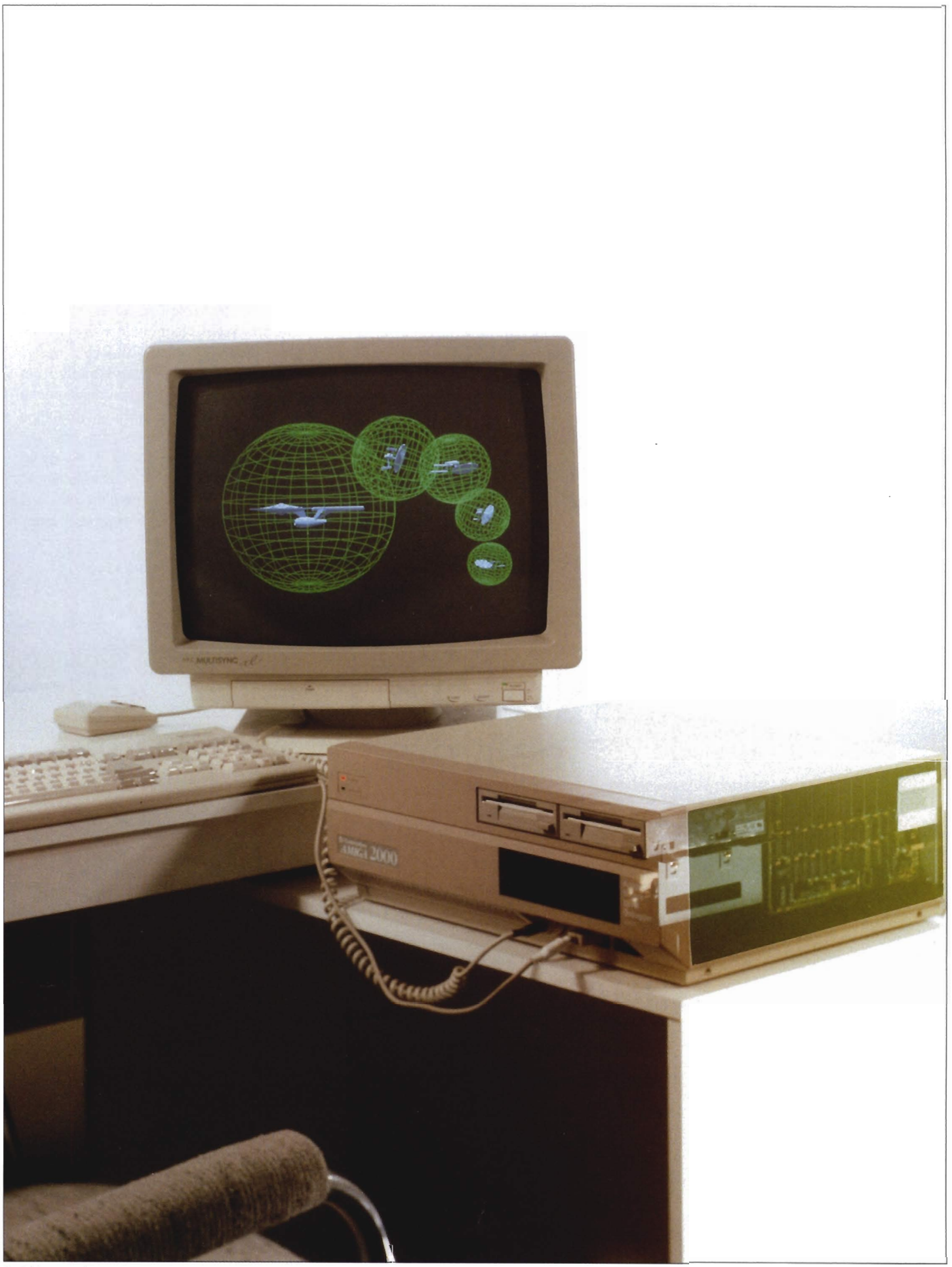


PHOTO BY ROBERT ST. MARSEILLES

THE PROFESSIONAL LOOK,

With The Flicker Fixer

The Advanced Graphics Adaptor (AGA-2000) from Microway, totally eliminates interlaced flicker on an Amiga 2000.

THE PROBLEM

One of the features that has continuously plagued Amiga users is its interlaced display mode. On monitors that use phosphors with normal persistence you tend to see your screen flicker, sometimes at intolerable levels depending on the colors used. What is it that causes this flickering? To achieve vertical resolutions of 400 lines or greater the Amiga directs the raster beam, within the monitor, to scan down the screen and first draw all the odd lines of your display and then return to the top and draw all the even ones. The problem is that by the time the beam starts drawing the even lines the odd ones are already starting to fade ie. your screen flickers. This phenomenon is most prominent in programs which use highly contrasting colors.

You will probably be asking yourself why Commodore opted for such a system and not for one which generates a non-interlaced high resolution display. Well there are several answers to that question the most obvious one being "Money". Monitors capable of displaying 400 or more vertical lines are considerably more expensive than the standard Amiga monitors, they easily cost over $500 US dollars. One of the other reasons is that normal TV is also interlaced, but there the flicker is not always noticeable because of the millions of colors. Therefore to be useful within the video market it is essential for the Amiga to have an interlaced mode to make it compatible with the equipment used in that industry. I guess no matter how many reasons there are, we still end up with flickering eyes after a few hours in front of a 640x400 screen. So what can we do about this problem?

THE SOLUTIONS

The cheapest and quickest way to at least partially alleviate the flicker, is to turn down the contrast and brightness of the monitor. This often helps but the colors on the screen become very dull and dark. You can also purchase plexiglas screens which mount over the face of the monitor, these also alleviate some of the flickering but you have the same problem as when you play with the contrast ie. a poor quality image in front of you. Another such solution is wearing polarizing sunglasses; yes I know it sounds strange, it looks even stranger actually seeing someone wearing mirrored sun-glasses in a dark room in front of an Amiga.

With the purchase of a monitor with high-persistence phosphors you can finally expect a good quality picture and no interlace flicker. Commodore recently released a high-persistence monitor the A2080. With such a monitor, working on CAD and DeskTop Publishing (DTP) software becomes bearable again. With high-persistence monitors there are several drawbacks such as ghosting. For example, if you pull down a screen or move the mouse too quickly you will end up with a trail of ghosted images. For CAD or DTP this is not very critical but in fast animations or games it becomes very noticeable. Even though the image quality is quite good, I find that the colors on the A2080 do not appear as bright and alive as I would like them to be.

There is also the new chip set which we are all eagerly awaiting from Commodore. The new chip set gives us 1MB of CHIP RAM and sports a non-interlaced resolution of 640x400. The sad thing is this mode only allows us to use 4 colors out of 64. I am well aware

By Eyo Sama

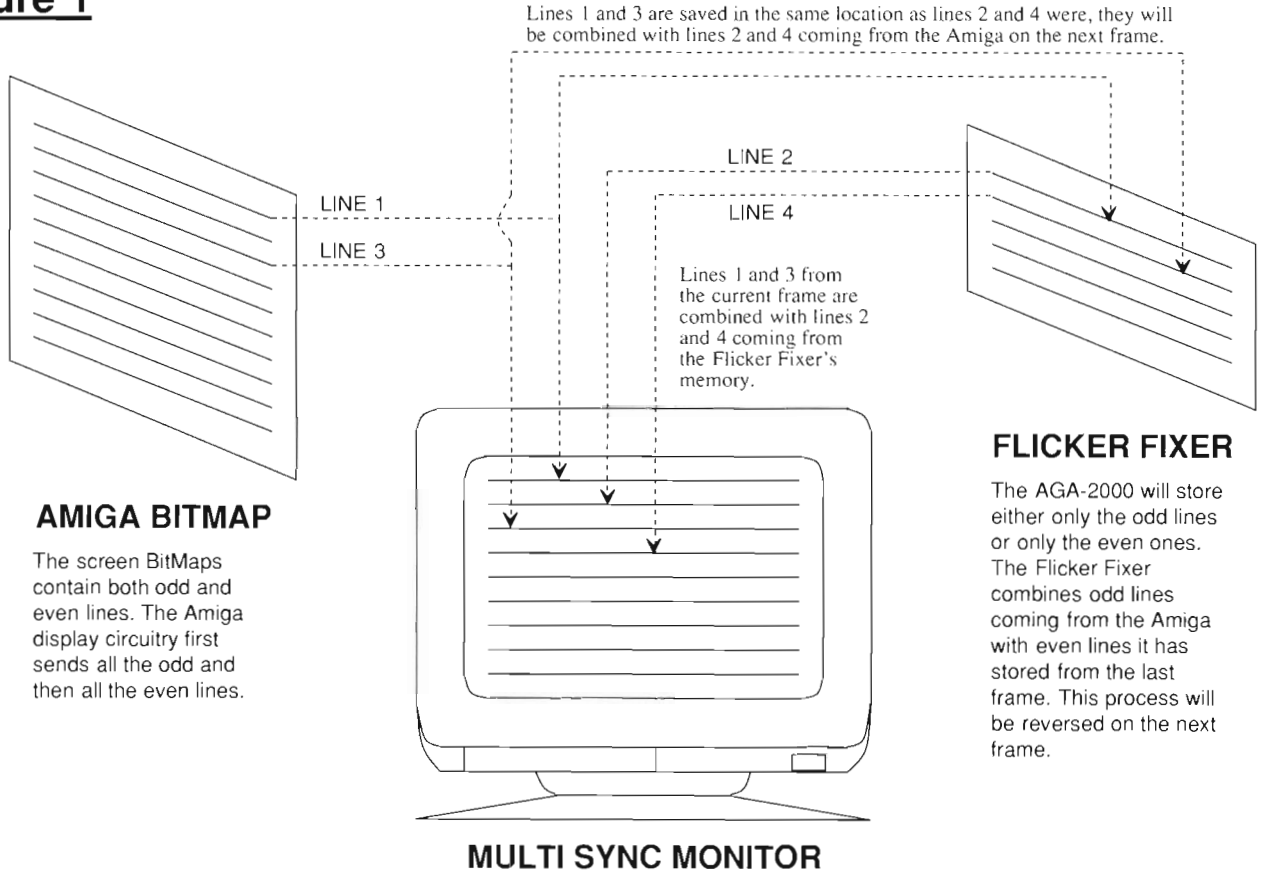
of the architectural constraints that are present within the Amiga. These make it difficult to create a multi-colored non-interlaced hi-res display because the custom chips end up stealing nearly all the DMA cycles, but I am rather alarmed that instead of getting more colors on the Amiga we are getting fewer. When the Amiga was first released we were able to turn up our noses at IBM and Apple because we had a beautiful multi-colored display, but now the PS/2 series and the Mac II both have more colors than we have. I hope something will be done about this; we want more color.

I guess that brings us to what in my opinion is the most effective and professional solution to the interlace flicker problem.

THE FLICKER FIXER!

The Flicker Fixer, from Microway, is a hardware board which plugs directly into the video slot inside the Amiga 2000. It comes in a professional and padded packaging and is accompanied by a disk (which contains sample pictures to test the image quality), a tool which adjusts for the different timing coming out of the Denise chips, and a manual which explains about monitor hook-ups. The board is very easy to install, it's just a matter of unscrewing the cover of the 2000 and sliding the board in (carefully of course). The Flicker Fixer must be used with a multi sync monitor such as the NEC MultiSync, SONY MultiScan, or any of the many others. These monitors plug directly into the back of the board therefore you can still leave your Commodore monitor hooked up and have a two monitor system if you so desire. Using these high quality monitors (and a Flicker Fixer) will change your whole perspective of the display quality of your Amiga computer. The images you see on your screen are now totally free of any flicker whatsoever, very sharp and clear, and the colors are bright and accurate (if you put the 1084, 1080, and the 2002 monitors beside each other you will notice that they do not show exactly the same colors). An Amiga equipped with the Flicker Fixer and a NEC MultiSync color monitor displays a higher quality image than the highly acclaimed Mac II and its monitor. I find this a very important point because Commodore is also aiming the Amiga 2000 towards the DTP and CAD markets, meaning it will be going head to head with Apple's Mac II and the IBM PS/2 series, and frankly, I do not think the new high-persistence monitor (the 2080) comes close to competing with the displays on these other machines. I have demonstrated the Amiga as a DeskTop Publishing machine and always with a Flicker Fixer and a 19 inch NEC MultiSync XL, people who see the machine always believe they are observing a totally new system that has a very professional look and feel. Besides the clear flicker-free display you can also change the resolution of your Workbench screen to a maximum of 704x470 using a public domain program called MoreRows, it is included on the disk which comes with the board and has also been included on the accompanying

figure 1



AmigoTimes v1.2 disk. This higher resolution is automatically supported by most new software such as Professional Page, ProWrite, Excellence, and others, by that I mean they will open their screens to the size your Workbench is set too. For example, when I run Professional Page, to typeset AmigoTimes, the screen resolution is 704x470 meaning that when you set the magnification (within ProPage) to 100% you can edit the full 8 1/2 inch width of your page. The Flicker Fixer also fills in those black scan lines, which appear at non-interlaced resolutions, giving more readable and clean images at these display modes. Unlike what we get on a normal system there is no visible difference, apart from the resolution itself, when you move from a lower resolution to a higher one.

HOW DOES IT WORK

The Flicker Fixer board is totally transparent to the Amiga because it is interfaced after the display circuitry, so all software will work as it did before. At interlaced resolutions the Amiga displays 30 frames per second. Each frame consists of two fields, one contains the odd numbered lines and the other the even numbered lines of the frame. The board has a buffer with enough memory to store half a frame, which is a field. This field buffer is 12 bitplanes deep to enable it to display HAM images. HAM images are stored as 6 bitplane deep BitMaps in the Amigas memory, but when they are displayed, each pixel is converted to be 12 bitplanes deep therefore the board had to have enough RAM to handle that. When the Flicker Fixer displays a frame, it uses the current field plus the last saved field from its memory and outputs one non-interlaced high resolution frame. That was the short explanation, this is what happens underneath. While the Amiga video circuitry sends out each odd line of the current frame, the Flicker Fixer adds each successive even line from the previous frame (which it has stored in its RAM). As the Flicker Fixer is adding the even lines from the previous frame it is also storing, back into its RAM, the odd lines of the current frame so that it can display those next time the Amiga sends even lines. Figure 1 graphically shows what is happening.

DRAWBACKS

A common complaint about the Flicker Fixer is that it displays a large black border around the displayed screen, this is a monitor dependant occurrence, some show more and some show less border than others. If there wasn't as much border then you would not be able to see a full overscan screen as you can now. On a NEC MultiSync II I get about a 1/3 inch border on the sides and about a 1/4 inch on the top and bottom, this is at a resolution of 704x470 so I have no complaints at all. Apparently the Taxxan 770 displays your screen all the way to the edge.

There is a motion artifact; you see a double-image of the mouse pointer when you move it around too quickly, this could be annoying in programs that rapidly move sprites around the screen. This problem could have been made less apparent if the Flicker Fixer board had been designed to have more memory, but it would have cost several hundred dollars more.

The Flicker Fixer uses the video slot, therefore, those of you interested in using genlocking boards that plug into the same port are in trouble.

I guess the largest complaint I have heard is about the price, at $595 US the Flicker Fixer is not exactly cheap and a multi sync monitor is also more expensive than the regular Commodore monitors. Look at it this way; the Mac II color monitor costs about $999 US and its color video card costs another $648 US. The price some are complaining about is standard for the purchase of a high quality display system.

CONCLUSION

The classification of the Flicker Fixer has been approved and changed from FCC A to FCC B, therefore it can now be used in the home as well as at the office. The Flicker Fixer is the first Amiga product from Microway, a well known hardware developer in the IBM world, so I am looking forward to more products from them.

We all want the user base of the Amiga to grow, to do that we have to give it a professional image so as to attract the professional who expects the best. Do not get me wrong, the Amiga to me is the best, I would not trade it for a hundred units of any other computer (wait, maybe I would, I could sell them and buy more Amigas), but for those who do not know the Amiga, it is only as good as what they see. I highly recommend the Flicker Fixer to anyone who finds themselves spending several hours in front of their Amiga 2000 doing DeskTop Publishing, CAD, word processing, animation, painting, or using any programs that use interlaced screens. ❑

Flicker Fixer (AGA-2000)
Microway
P.O.Box 79
Kingston, MA 02364
USA
(617) 746-7341
US $595

32 High St.
Kingston-Upon-Thames
U.K.
01-541-5466

58 Atchinson St.
St. Leonards, NSW
Australia
02-439-8400

The following monitors were used to test the Flicker Fixer board:

MultiSync XL
MultiSync II
NEC Canada Inc.
6711 Mississauga Road, Suite 200
Mississauga, Ontario
L5N 2W3
Canada
(416) 858-3500

excellence

DOES IT LIVE UP TO ITS NAME?

I spend a great deal of time writing. At work I write television scripts, memos, reports, budgets and the like. At home I write grocery lists, newsletter articles for the local sports car club and Amiga user group, online reviews for PeopleLink's Amiga Zone, apology notes to my creditors and articles for esteemed publications such as the one you're reading now. You can well imagine that when a better word processor comes along, I'll want to try it out.

WHAT CAN IT DO?

MMS describes EXCELLENCE! as a word processor, but it's quite a bit more than that. EXCELLENCE! is a window-based program. If you open a text file it fills its own full-screen sized window. Open a second text file and you'll have two windows between which you may copy, delete, cut and paste any amount of text. The method of selecting text to move or manipulate, is to highlight the sections of text in which you're interested. This can be done in many ways, by moving the mouse pointer across the text while holding down the left button, or by using a combination of keys pressed simultaneously as the cursor keys. The former is quite intuitive and simple but the latter preferable for serious typists who don't wish to remove their hands from the keyboard for any reason (except to reach for a cigarette or in my case an Oreo).

All functions that are accessed frequently have "hot key" alternatives to using the mouse and pull-down menus. At the top of each text window is a ruler that shows your margins and indents. You'll also find some small gadgets that allow you to select right, left, or flush justification or centering, and gadgets that create tabstops. Next to those gadgets are others that can affect the amount of spacing between lines of text.

There are other more advanced word processing features in EXCELLENCE! Features such as search/replace, a spelling checker, and a thesaurus, are standard these days but several features deserve attention. The grammar checker is something no aspiring writer should be without. It performs many analyses of your text and reports back to you such tasty items as the grade-level of readability, use of passive tense, prepositions, number of words per sentence, syllables per word and more. These are calculated after you pass the text through a phrase dictionary which points out poor usage of words, improp-

By Oran Sands

New!
Version 3.0
includes overscan,
half-brite support and more!

DIGI VIEW

DELIVERS ULTIMATE GRAPHICS POWER

Bring the world into your Amiga with Digi-View, the 4096 color video digitizer. In seconds you can capture any photograph or object your video camera can see in full color and with clarity never before available on a home computer. Digi-View's advanced features include:

- Dithering routines give up to 100,000 apparent colors on screen
- NewTek's exclusive Enhanced Hold-and-Modify mode allows for exceptionally detailed images
- Digitize images in any number of colors from 2 to 4096
- Print, animate, transmit, store, or manipulate images with available IFF compatible programs
- Digitize in all Amiga resolution modes (320x200, 320x400, 640x200, 640x400)

"Digi-View sets new standards for graphics hardware"-*InfoWorld*

Digi-View is available now at your loca Amiga dealer or call

1-913-354-1146 o
1-800-843-8934

ONLY $199.95

NEWTEK
INCORPORATED

All photos actual unretouched Digi-View pictures shot directly off the 1080 Amiga monitor

er usage, cliched phrases, use of the passive tense etc. Suggestions are made that may help you correct the possible problems. I'm not going to suggest that the grammar checker will make you another Hemingway, but it will go a long way towards helping you get your ideas across.

Another clever and useful item is the ability to generate an index or a table of contents page for your reports. A glossary of often used words can be created allowing you to use "hot keys" to call up entire words or phrases that are commonly used. Or, you could save "hot key" combinations that control functions of the software. How about automatically inserting the date or time into the text? Just select it from the menu. Footnotes are easily handled the same way. Rulers and margin markers are also switched on and off from the menus.

Since every time you need to alter the text the entire screen must be redrawn, things tend to happen slowly. This gets to be a little frustrating. But as a by-product of that the program was designed to capture your input and hold it until it can be used. If you're a quick typist you'll love the fact that it's next to impossible to overflow the typing buffer.

Should you wish to use newspaper style columns you'll find that its incredibly easy to format your text in that manner. Simply type out all your text then ask for columns (maximum of four). The text will automatically reformat itself, word-wrapping as necessary, text flowing from one column to the next.

The screen can be operated in hi-res or lo-res. Hi-res lets you see more of your document but chews up chip RAM rather quickly. Opening more than two documents at a time may not be possible. If memory is a problem the program warns you. The manual also has a section on memory management. This is the price you pay for a graphics-based program.

EXCELLENCE! also features a page preview option which will display two pages of your document in much the way it'll look once printed. The open/save requestors have only one button for selecting file sources. Clicking the gadget will toggle the requestor through all mounted volumes and it's not necessary to wait for each directory to load before moving to the next. The requestors also display the file space available on each volume. A very simple but worthwhile item.

IFF images can be loaded into your document and displayed in either 2, 4, or 8 colors. If you have text on the same line as your image then they must both share the same baseline; this limits the different ways you can integrate text and graphics.

GRAPHICS WORD PROCESSOR

I mentioned earlier that EXCELLENCE! is more than just a word processor. Examine it a little closer and you'll find it is part of a new generation of Amiga word processors that we'll call graphic word processors (or GWP's for short). The WYSIWYG (What You See Is What You Get) ability of EXCELLENCE! will show you precisely what you see because it uses its own screen.

Instead of looking at the standard TOPAZ font used by most word processors, EXCELLENCE! allows you to substitute your own Workbench screen fonts letter by letter, word by word, etc. Workbench fonts are simply selected from a pull-down menu. You may select a separate font for each letter you type! The size of the font is also selected from the same menu. You may also modify each character to be bold, italic, underlined, or all three. Subscripts and superscripts are also selections. Of course, every change is visible on your screen.

Among these fonts are PostScript fonts. These fonts are the basis of laser-printing desktop publishing setups. EXCELLENCE! portrays these fonts with a screen font that resembles it, but wait until you go to print! At 300 dots per inch, it's truly beautiful.

POSTSCRIPT COMPATIBILITY

Printing with EXCELLENCE! can be a very rewarding experience. EXCELLENCE! ships with a Workbench 1.3 disk complete with the new printer drivers and devices (and a large selection of screen and PostScript fonts). Using a dot-matrix printer you may dump your document much the same as you would do a screen dump. The printing requestor gives you several choices for printing; Normal, NLQ, Draft and PostScript.

In Normal mode, the program prints all text as if it were a bitmap graphic (which, coincidentally, it is!). Even with the new 1.3 drivers this means it's a little slow in printing your document, but if you want to see your document as it appears on the screen, it's worth it!

In NLQ mode, your printer will use its usual typeface to print your document and will also reproduce any portions of your text that you set up as bold, italics, etc. If your printer has a Near-Letter-Quality mode, selecting NLQ won't automatically select that

typestyle. Your preference settings will still determine your printer's print mode.

In Draft mode your printer uses its draft typeface but will not reproduce any style attributes.

In PostScript mode you must be connected to a PostScript compatible printer. If you're lucky enough to have access to one, you will be able to print out your document at the full resolution possible with such a printer. PostScript fonts render perfectly while screen fonts are treated as bitmap graphics and are printed as well as the printer will allow. The PostScript compatibility is one of the strong points of EXCELLENCE!. You can easily setup a document, contract etc. with the ease of a word processor but the result will appear to be of typeset quality. Unfortunately almost all us do not have a PS laser printer handy. But the program can create a PostScript file that can be used by a professional print shop that features Linotype typesetting equipment. Now combine the PostScript compatibility with the mail merge feature and you have the ability to churn out laser-quality form letters.

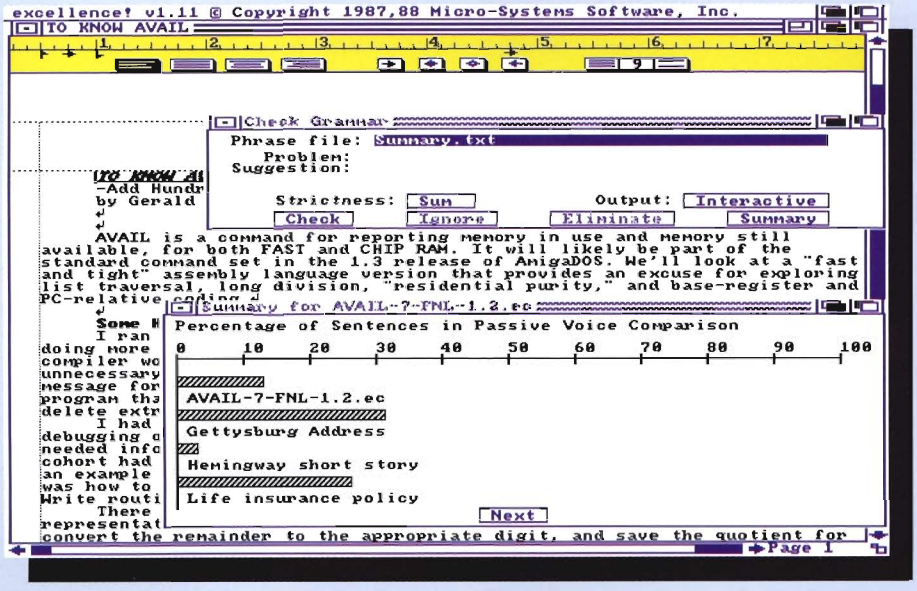
The frustrating part of printing with EXCELLENCE! is that it is always trying to emulate what is on the screen even when you would rather it didn't. Most writers like to proof their work in progress by doing a simple draft quality printout. Try this with EXCELLENCE! and you'll find yourself with a document that's double-spaced. A call to MSS didn't clear things up but it did cause me to think to vary a couple of the settings. First, if you select a screen font larger than 12 lines in height you'll force double-spacing. Second, if the spacing between the lines is set at more than 12 you'll have the same problem. EXCELLENCE! configures itself with the line spacing (leading) set at 13 upon start-up. Unfortunately, this isn't alluded to in any way in the manual.

Although fonts can be mixed on a line, be aware that the line will take the height of the largest font and all other (and smaller) letters will sit on the same baseline. Color fonts can be used but will take on the color palette of EXCELLENCE! not the font.

GRAPHICS

The second graphics feature of EXCELLENCE! is its ability to import pictures from other graphics programs such as Deluxe Paint. Simply load your IFF file using the INSERT selection. Your graphic will appear wherever you last left your cursor. If you misplace the picture you can cut-and-paste it just as easily as text. Two other operations allow you to resize the picture and to crop it as necessary. EXCELLENCE! has one drawback in that the picture is treated like a letter of text. It takes up one space on that line and since it will often be much larger than your presently selected font, any text preceding or following it will sit on the same baseline as the picture. Wrapping text around a picture, a popular desktop publishing feature isn't possible with EXCELLENCE!. The biggest problem with using pictures in EXCELLENCE! is that you can't just import any picture. They must be standard IFF files, not HAM pictures and since the program offers only eight colors to use, you'll have to settle for the way that EXCELLENCE! remaps the palette.

EXCELLENCE! allows you to use an 8 color palette in rendering your text. Any letter, word or phrase can be given a color from the palette of eight (which is selected from 4096). You can assign a background color as easily, allowing many different combinations. While this is looks great on the screen, it's of little value if you don't have a color printer. Of course, the PostScript features are no good if you don't have a laser printer either, so let's just say there's a lot here if you can use it. Printing out your color text and pictures using a standard dot-matrix or a PostScript laser printer will render the colors by their gray scale values which will make some color combinations unreadable. You will probably want to change your color settings if you know you'll be outputting your color document to any type of black and white printer.



Excellence has a built-in grammar checker, it will not substitute for proof-reading but it does a very good job of finding common grammatical mistakes. At the end of the grammar check, it gives you a summary of the results

DOCUMENTATION

If you think I like EXCELLENCE!, you're right. However, be forewarned that using it at first is a little tedious, particularly if you wish to access any of it's more powerful features. This is mostly due to its manual. The manual is a lay-flat 3-ring binder that comes in a box that's about 50% bigger than any program you could name. It contains 300+ pages of tutorial and instructions but while the manual appears to be well laid out at first, you'll soon learn that it falls short in several areas.

Although you are directed to follow the tutorial, it fails to fully explain the operation of the requestors you will need to use. All the requestors have small gadgets that select between types of files and other items. But that fact is

buried well within the manual as are other items. The use of pictures in the program is very briefly mentioned. There's no mention of what type of pictures do or don't work or if brushes can be used (they can).

CONCLUSION

As a word processor, EXCELLENCE! has much to recommend it. It's very easy to use with many powerful word processing features. For those of you that use Scribble! (an earlier word processor from MSS), you'll find switching over to EXCELLENCE! will be quite simple.

At $299, EXCELLENCE! is positioned as a heavy-duty professional word processor. I'm not sure if I can recommend it as a worthy opponent to the likes of WordPerfect based on its word processing power alone. It takes chutzpah to name a product EXCELLENCE!, but given the features it does have combined with the ease of use, the PostScript compatibility, varied font use and picture file usage, it was justified.

EXCELLENCE!
Micro-Systems Software, Inc.
12798 W. Forest Hill Blvd.
Suite 202
West Palm Beach, FL 33414
$299 (US)
Shipped on one disk with a second disk containing the Workbench 1.3 printer drivers and preferences.

AMIGOTIMES PRE-VIEW

Page Flipper Plus FX

Page Flipper Plus FX from Mindware International is a new professional animation program. It does not actually render the individual frames of an animation, but instead it uses the IFF output from ray-tracing, painting, and other animation programs. Since it was designed specifically to edit, create, and control animations as opposed to rendering them, it has a full set of tools to do so. Page Flipper Plus FX has the ability to chain lengthy animations across several disks and is therefore only limited by the amount of RAM on the system it is running on, and not by the capacity of a disk. It comes with an interactive built-in programming language, allowing the user full control of the animation. The animation files that are created are much smaller in size, and run faster, than those of other popular programs.

MAIN FEATURES

There are two different types of animations that can be created. The "Intermezzo" type of animation involves using several chained animations which may all be in different resolutions. For example, in an Intermezzo animation you could run your animation starting from a HAM screen to lo-res to hi-res and then back to HAM. Since Page Flipper Plus FX animations can be made to run interactively, you can set the numeric keys to trigger different animations. The other type of animation is called a "Slave" animation. In a Slave animation you can have several animations running in parallel in different planes of the BitMap. Using this method it becomes easy adding wipes, fades and other special effects. All these effects and parallel animations can be set to trigger from the function keys. Some pre-made effects will come with the main package, others will also be available to registered users and will be obtainable from the Mindware BBS. Also you can create the effects yourself using Page Flipper Plus FX. All the animations created with Page Flipper Plus FX can be run independently from the main program with the use of a public domain player, called PlayPFX. This player comes with the Page Flipper Plus FX package and will also be available on the next AmigoTimes disk.

THE LANGUAGE

The in-built interactive programming language is very easy to learn and gives you full control over the running of your animation. The animation scripts can be written on any text editor or from within Page Flipper Plus. When creating your script from within the program there is no need to actually type commands, the appropriate commands can be selected with the mouse while the program takes care of syntax and structuring. The language has commands to do looping, setting the palette, slowing/speeding the animation, opening screens, running effects, and many more. While an animation is running you can program it to undergo several palette changes, also the palette can be independent from the palette of the IFF frames you are using (this helps working with output coming from rendering programs that have fixed palettes).

CONCLUSION

A fascinating feature of this program is that you can program your animation to single-step through certain sections. For example, you could set up a simple slideshow where you single-step through several images and for some slides you can trigger animations which will run for a while and then return you to the single-step mode. A presentation done in this fashion should be quite impressive. I have heard that Mindware is working on a future version of Page Flipper Plus FX that will work with the Mimetics framebuffer (it shows millions of colors on a hi-res screen). By the time you read this Page Flipper Plus FX will be available. This definitely looks like a very hot new animation package, so expect to see a full-blown review of it in the next issue of AmigoTimes (we will also include a demo animation on the AmigoTimes disk, so as to give you a taste of what this program can do). ❑

Page Flipper Plus FX
Mindware International
110 Dunlop St. West
Box 22158
Barrie, Ontario
CANADA L4M 5R3
(705) 737-5998
(800) 461-5441 (to order direct)

By Eyo Sama

MANX
SOURCE LEVEL DEBUGGER

If you program often, in C or Assembler, you will know how frustrating and difficult it can be debugging programs. Several times, while working on a program, I have come to the point where I would be totally convinced that the reason why it was not working was due to either the computer, the compiler, the operating system, or the temperature of the room. As you may have found out for yourself, it is almost always the fault of the programmer. The problem with debugging programs written in C or Assembler is that the final executable file bears no resemblance to the source code file.

Programs used to be (and often still are) debugged by using printf() statements to print the values of variables. Some more skilled programmers use memory monitors to see what is going on in memory; MANX has such a memory debugger included with their C compiler package, it is called DB. This program allows you to dissassemble memory and read your registers (amongst other things). To use such a program you have to be well versed in Assembler, but even then it is still a tedious and arduous task debugging your code.

It seems like MANX has come up with a solution to this dilemma: their Source Level Debugger (called SDB) allows you to interactively debug your programs using both the executable and the source code files. The SDB allows you to debug C and Assembly language programs, including libraries and device drivers, which have bean created with the MANX Aztec C development system (version 3.6 or higher, earlier versions will not work).

REQUIREMENTS AND FEATURES

MANX suggests you have a minimum of 256K of memory, but I would suggest having at least 512K or more, depending on the program you are trying to debug. The SDB, and Aztec C 3.6, will work with the 68000, 68010, and the 68020 processors; and also with the 68881 math co-processor. The SDB program can be copied into the directory you usually use for compiling, or even better, into the c: directory if you have a hard-disk drive. To debug a program it has to have been compiled with the -n option (cc -n filename.c) and linked with the -g option (ln -g filename.o -lc), this creates the necessary information the Source Level Debugger needs.

The Source Level Debugger opens a window on your Workbench screen. There are three parts to the window; the top section displays your source code file, the bottom section will output the results of typed commands, and the middle section is a single input line used to interact with the SDB. You can trace through your whole program as it is running. The SDB will highlight each source line as it is being executed, understandably the execution of your program is much slower while you are using this trace mode. To avoid spending

By Eyo Sama

several minutes tracing through previously debugged routines or program sections, you have the ability to set breakpoints within the source code, or there is a trace mode which will call functions and display their return values instead of tracing through them. This becomes very useful when your program has file input routines, these usually use loops to read data with the I/O routines and therefore will slow down your tracing. If you are confident that your routine works then you need not trace through it.

As you run, or trace, through a program with the Source Level Debugger, breakpoints can be set within your code. Upon reaching a breakpoint, the SDB transfers control back to the user, thereby enabling him to examine the values of variables, registers, and structures. If necessary, you can associate several SDB commands to the breakpoint. For example, you could set a breakpoint to stop at a certain location within your program and have the SDB dump a section of memory (print its contents) and then continue execution of the program.

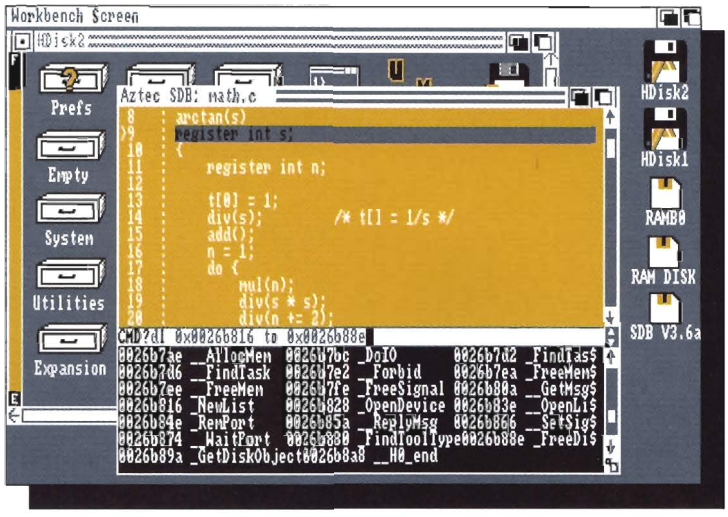
There is a command you can use to evaluate C expressions, and the values of variables, arrays, and structures can be displayed by using their actual source code names. To find out the value of a variable you defined as being "int counter;" you simply type "p counter" and SDB will print its value. You don't even have to worry about the data type of your variable or structure because SDB will work that out by itself and will print in the appropriate format.

SDB also features reusable macros that can be written to a file; these macros consist of a sequence of SDB commands.

COMMANDS

The input line which separates the source code and output sections of the window is full-featured; it supports command line editing, insert and overstrike modes, and command line history (the up and down arrow keys let you move around a 512 byte buffer).

There are a multitude of commands available to aid the debugging process. As mentioned before there are commands that allow you to display the values of variables, the values of a range of memory locations, values or addresses in registers etc. Typing "u" or "U", followed by a starting address, will disassemble memory starting from the given address. If you come to sections of your program that require more careful attention, you can single step through them using several commands which allow you to specify how many steps you wish to take. Memory can be displayed in bytes, words, or long words. There are also commands to manipulate, copy, compare, and move memory.



The top section of the Source Level Debugger (SDB) window displays your source file. Each line is highlighted as it executes under the trace mode. The middle line works as an input command line whose output is seen in the bottom section.

THE MANUAL

The manual consists of about 70 loose-leaf sheets ready to be inserted into the binder that comes with the Aztec C compiler. I would have preferred a bound manual, separate from the compiler package. After all, loose-leaf binders are difficult to keep intact, and though you may often need your SDB manual (because of the one or two letter commands) you will not always need your compiler manual. There is an index and a very detailed table of contents which make it easy to find your way around the manual. The manual does a fair job at explaining the use of the SDB, but the page-layout makes it rather difficult to find and read sections.

EASE OF USE

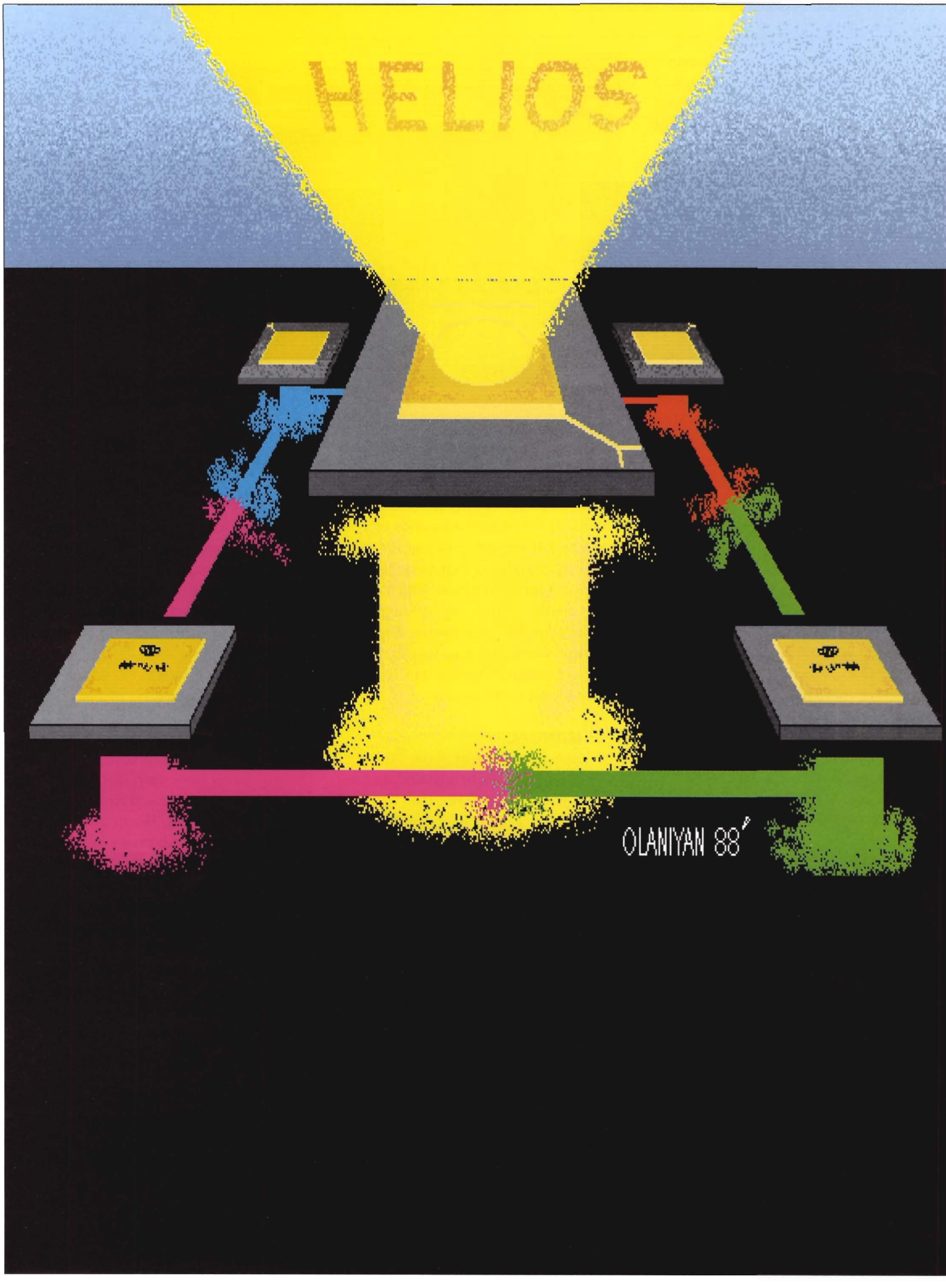
The window interface is really well made, scrolling through a source code file or changing the relative sizes of the three window sections is simplicity in itself. It is quite remarkable seeing every line of your program highlighted as it is being executed.

It would have been more convenient to have command names that are more self-explanatory as opposed to them just being one or two character codes. I know having short command names makes the interaction with the program faster once you get used to it, but until one does you are stuck with continuously looking back into your manual.

CONCLUSION

If I were to explain all the possible commands and the ways of using them, this article would turn into a manual which of course would be pointless. There are no other programs like the Source Level Debugger, it is a programming tool which no software developer should live without. Hours and hours of work can be saved, and you will find bugs which had previously eluded you. For the beginner I see SDB as a very powerful, easy, and interesting tool to interactively learn C programming. At a price of $75 US you can't go wrong. Remember, we have included a demo version of the Source Level Debugger program on the accompanying AmigoTimes v1.2 disk, try it out and judge for yourself. ❑

Source Level Debugger
Manx Software Systems
One Industrial Way
Eatontown, NJ 07724
(800) 221-0440
(201) 542-2121
US $75
not copy-protected


HELIOS
OLANIYAN 88'

The Amiga Supercomputer

By
Ernest N.
Nagy

WHO NEEDS A TRANSPUTER?

There are quite a few computer applications where raw CPU power is still needed: high performance graphics processing, digital signal processing, system simulations, molecular modelling, scientific and mathematical applications, fault tolerant systems, pattern recognitions, and networking workstations. You could try using a CPU using RISC (Reduced Instruction Set Chips) technology; however, you'll have to wait for Motorola to release their 68040 CPU (which will incorporate some RISC technology in the chip design), or you can start using transputers.

The transputer board being designed for the Amiga will open up new avenues for low cost computers. It will provide Amiga users with access to computing power only previously available to high end computer users working on such varied fields as: robotics, neural architectures, associative memory structures, artificial intelligence and supercomputers. As networking workstations become more prominent in the business and scientific communities, an Amiga installed with transputers would be an ideal choice.

WHAT CAN TRANSPUTERS BE USED FOR?

Most computers functioning as workstations, often perform functions that are floating point intensive. Currently, workstation clusters are arranged as a number of different subgroups, each functioning as a terminal that accesses a central core of processors, memory and I/O devices. They function as many individual little machines rather than one big connected machine.

The separate processing nodes (a workstation containing "X" transputers) can be used as a high speed LAN (Local Area Network) to link individual workstations into a large, totally integrated computer system. This would form a large, distributed processing system, where each workstation would act as a point of access into a much larger machine. Unlike present networking workstations, this new kind of workstation will allow the resources (including processor power as well as peripherals) of each individual workstation to be shared by all other users of the same network. All application tasks could run on more than one processor (as the need arises) and gain incredible speed improvements from parallel processing techniques.

In parallel or multiprocessing systems, the processors share a common, redundant communication bus, thus creating a much more effective large processor. The only major problem with multiprocessors sharing the same communication bus is that there must be some sort of mechanism (hardware or software) that provides multiprocessor scheduling. These execution timing requirements serve as scheduling constraints and require special resource management algorithms that will control data flow on the bus. The good news is that multicomputer nodal architectures are viewed as a real-time distributed design problem, for which solutions already exist. The characteristic problem of a real-time distributed system is that it must respond to a changing environment (frequent input) within a minimal time span providing the desired effect on the environment. Algorithm scheduling needs are classified as, an independent job stream (batch processing) or an interdependent job net-

work (task networks with predecessor-successor relationships). In most cases, job networks can be described as an acyclic directed graph, with the nodes representing the jobs/tasks and the arcs representing the predecessor-successor constraints. The jobs are characterized in terms of performance and resource oriented parameters (task execution times, storage requirements and special resource requirements).

Conventional computers are based on the Von Neumann principle, whereby all instructions must be fed through one at a time. The flip side of the coin is the problem associated with multiprocessor bus time scheduling, where many processors have to be controlled as to when they are to send the results back. The two main algorithms that handle this problem are equal and unequal task times. With this problem in hand, Amigas acting as supercomputers will be feasible, so look out Mr. Cray, here comes the Amiga supercomputer generation.

The present factor separating supercomputers from other ordinary high end computers is their capacity to easily manipulate functions involving vectors. A vector is a one dimensional arrangement of numbers, either in a single row or column, having both magnitude and directional alignment in space (x, y, and z coordinates). It's these directional coordinates that tax ordinary scaler ALU (Arithmetic Logic Unit) processors, which can execute only one instruction at a time. But, most supercomputers have a built-in vector ALU processor that takes in at least four values at a time (magnitude, x, y and z coordinates) to complement their scaler ALU processors. Then the best supercomputer designs strive to balance the use of their scaler ALU and vector ALUs, since typical computation-intensive application programs need both types of calculations. The problem with contemporary supercomputers is the fact that they must employ sophisticated compiler algorithms to ensure an optimal use of their internal resources; including parallel processors and other special function units, such as vector multiplication or matrix operations.

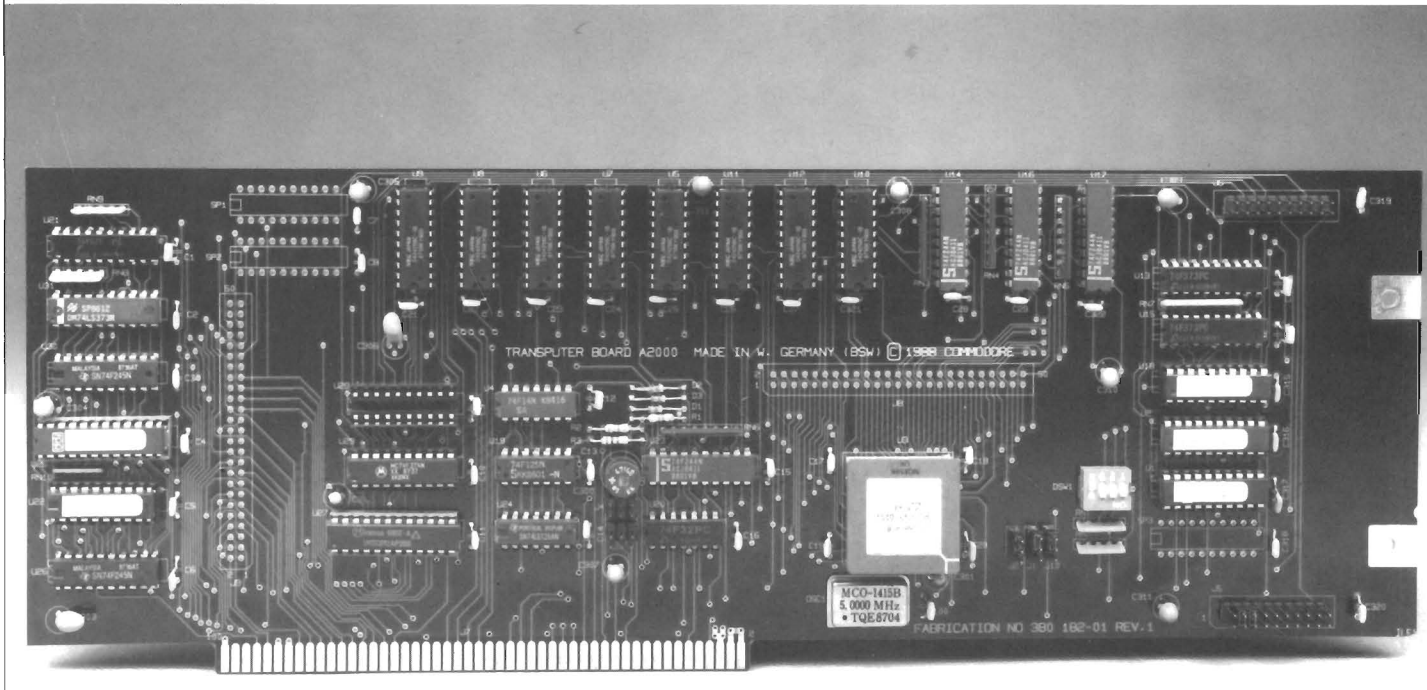
So a networked Amiga transputer system can act as a "super" supercomputer - imagine 500 transputers working simultaneously on the same problem! Then imagine the complexity of the operating system controlling all those (or even more) transputers!

THE TRANSPUTER'S OPERATING SYSTEM

The operating system that will control the transputer chips, is called HELIOS. HELIOS is being written in "C" by Perry Helion, specifically for use with the transputer and should be available by the fall of 1988. Special "C" and Fortran compilers are also being written for the transputer to take advantage of the multiprocessor power.

HELIOS will manage memory and CPU allocation by recognizing load sharing to see which machine is not busy and which memory blocks are free. This will provide to multiple users the capability of accessing multiple processors (to load programs into multiple processors and/or provide support for parallel programs), while simultaneously allowing server tasks (print servers, file servers) to be distributed over an entire network (should the individual workstation user decide so) allowing multiple I/O at 50 Mbits/sec.

For example, your df0:, df1: and



printer are presently in use, but you want to save some file from RAM to disk and print it out. Solution: Search through the network for a workstation with an available disk drive and printer that you could use for your I/O.

HELIOS will have access to a variety of different objects linked to the Amiga, so long as it conforms to its protocol (using a fixed length block header followed by a variable length data block). All objects (consoles, shells, application programs, file servers) will be able to run on a host system with a single or multiple transputer that is linked logically. If no physical connections exist, message parsers will be used.

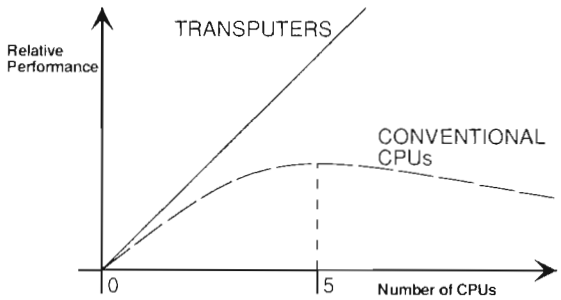
To comply with existing Amiga graphics standards, Xwindows will be used as the graphics interface. The Xwindow environment will be running through a shell command interpreter very similar to the UNIX shell.

AMIGA TRANSPUTER PROJECT

These transputer cards being designed for the Amiga will lead to a new generation of workstations. Its modular architecture will allow an Amiga owner to create a workstation (capable of connecting to an existing transputer network or more workstations, or both) with just the root transputer installed in its expansion slot. The root transputer acts as the interface link to the workstation's bus system.

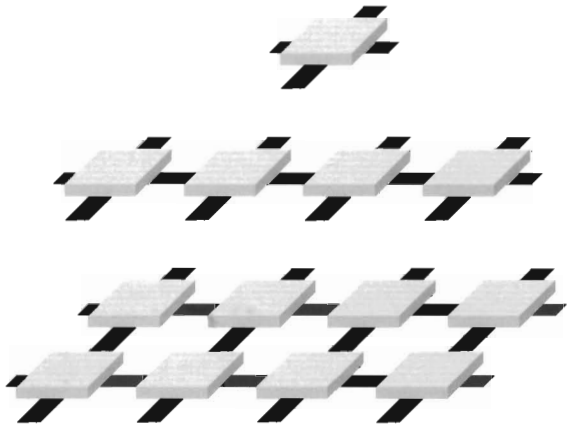
The advantage of a transputer outweighs its disadvantages. Each transputer has local RAM, the T-800 has an on-chip floating point processor working at 1.2 Mflops (million floating point operations per second) and each chip (T-800) is rated at 10 mips (million instructions per second). Each transputer communicates on an independent hardware level via four inter-processor communication links (figure 1). Because transputers are self-contained and work in parallel, they have no bus bandwidth limitations, therefore "n" transputers means "n" times the performance. Unlike conventional CPUs linked together, transputers have linear growth potential (figure 2).

Each Amiga can be further expanded by up to four independent multitransputer cards. Each multitransputer card will contain four transputers (either the TMS414 or TMS800) with up to 4MB of on-board memory. These multitransputer cards will fit into the AT slot (figure 3) and an Amiga 2000 will be capable of supporting up to 17 transputers; providing a total of 170 mips in processing speed and 20 Mflops. The AT slots just provide the power to the board. An Amiga with a root transputer and one transputer board forms a parallel pipe configuration and two or more transputer boards allows two-dimensional movement capabilities from chip to chip (figure 4). If 17 transputers is not enough power, then workstation superclusters can be implemented for very high performance application needs. To allow for full speed server code transfers, the workstation must be able to transfer data to and from the transputer in DMA mode. This will require a new device driver in the Amiga OS which will be optimized for HELIOS type data transfers. Presently link techniques are being developed that will allow data transfers between stations, at a rate of 20 Mbit/s. There is a theoretical limit to the amount of transputers that can be controlled by HELIOS; it stands untested at about 30 workstations (or 500 transputers), but it may be more.



RELATIVE PERFORMANCE

Conventional parallel processing systems show a decrease in performance when more than 5 CPUs are used; this is due to the overhead. Transputer systems show a directly proportional increase in performance as more transputers are added to the system.



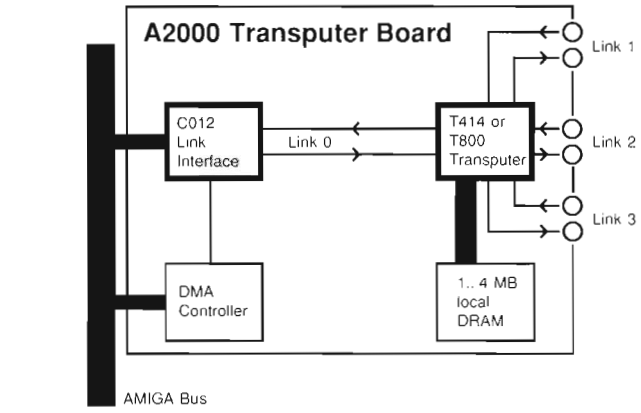
ARRANGING TRANSPUTERS

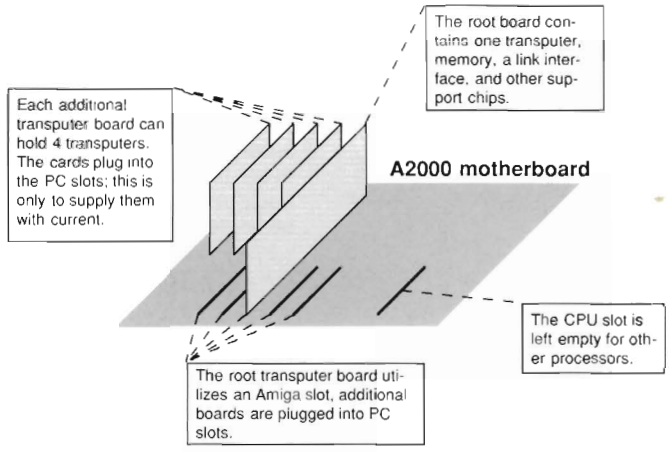
There are several possible configurations (arrangements) for transputer boards. The choices range from using a single element, to a pipe of transputers, to a 2-Dimensional array. Even 3-Dimensional arrangements are theoretically possible. Each transputer can either be an INMOS T414 or aT800.

CHIP SPECIFICATIONS

The 15 MHz version of TMS414 can perform 3500 Dhrystones/sec. The Dhrystone/sec rating takes into account the efficiency of the instruction sets; which is a much better measure of CPU performance than sheer speed measurement alone.

- 64 bit floating point unit
- ANSI-IEE 745-1985 floating point representation
- Sustained 1.5 (2.25 for 30 MHz design) Mflops
- 32 bit architecture with 15 MIPS (30 MHz design) performance
- Hardware and pin compatible with IMS T414-20
- 4 Kbytes on-chip RAM for 120 Mbytes/sec data rate (30 MHz design)
- 2 bit configurable memory interface
- Directly addresses 4 Gbytes at 40 Mbytes/sec (30 MHz design)
- Sub-microsecond context switch and interrupt latency
- Four 5/10/20 Mbits/sec INMOS serial links
- Hardware scheduler for concurrent programs
- Internal timers for real-time processing
- External event interrupt
- Support for run-time error diagnostics
- Boots from communication link or ROM
- On-chip DRAM controller
- Internal program continues during DMA
- Optional external memory wait states
- Single 5 MHz clock input
- Single +5V, +/- 10% power supply





THE AMIGA INTERFACE

The root transputer board can link with 3 other transputers who in turn can link with 3 others. There are 4 links, one is used to interface with the Amiga bus. With 17 transputers the Amiga is running at 170 MIPS (Million Instructions Per Second).

UNDER THE HOOD OF THE SUPER-AMIGA

As you can see from the sketch, the Amiga Transputer concept makes efficient use of the motherboard. Instead of sitting idle the PC slots are used to power the add-on transputer boards.

INTERVIEW

This exclusive interview with Dieter Preiss, the General Manager of Engineering at Braunschweig, was conducted by Eyo Sama and Ernest Nagy at the fourth Amiga Developers Conference in Washington, D.C. Mr. Preiss provided some straightforward answers and insights into this hot new hardware board being developed at Commodore's Braunschweig European headquarters in West Germany. We would like to thank Mr. Preiss for taking time out from his busy schedule to talk with us.

AMIGOTIMES: What is Commodore West Germany's present direction with the Amiga?

PREISS: We are presently looking at transputers, AT cards and things like that and we might eventually be doing work on 68030 boards.

AMIGOTIMES: We have heard about transputers before, but never with regards to the Amiga. The first we really heard of it, after INMOS brought it out, was after Jack Tramiel (Atari) announced that he is going to bring out a transputer based computer to compete with the success of the Amiga. When we got wind about a possible Amiga transputer expansion board, it was great news.

PREISS: He is using the same operating system (HELIOS) as we are, so nobody is actually ahead of the timeframe, or behind. Except that we have some more plans with HELIOS than I have seen in his announcement at the moment.
His machine has a closed architecture, and I think it contains 12 transputers. He thinks this is the kind of workstation that the future may need. We've found that limiting a computer to a given number of transputers is a violation of the transputer concept itself. Our policy has been, in the past, to keep machines as flexible and as open as possible. I really think this concept has to be applied to each expansion that we create for the Amiga. So both HELIOS, as well as the hardware, have to be open enough to support everything that is required by the demand of the user and not by our offer.

AMIGOTIMES: Will the transputer board contain four transputers on the main board?

PREISS: No, there are four transputers on the expansion boards that go into the PC slots; since we want to keep the Amiga slots free. The PC slots just supply the power for those boards, they do not use any bus signals. This means if you have four free PC slots in the system, you can add up to four expansion boards (16 transputers). Combined with the root transputer board in the Amiga slot, you end up with a total of 17 transputers.

AMIGOTIMES: So the root board contains a single transputer on it?

PREISS: Yes, but the root transputer board not only contains a single transputer, it also has on-board RAM, the interface link to the host, plus some DMA circuitry to make the high speed links. The multiple transputer boards have their own link interfaces and that's it so we get up to four transputers on each board.

AMIGOTIMES: On each of those multiple transputer cards that will fit into the PC slot, will it be possible to have only one transputer and add others as needed or do they come as four transputers permanently attached to the board?

PREISS: This is not completely decided. First of all, the transputers will be in sockets and we probably won't put the RAM in the socket.

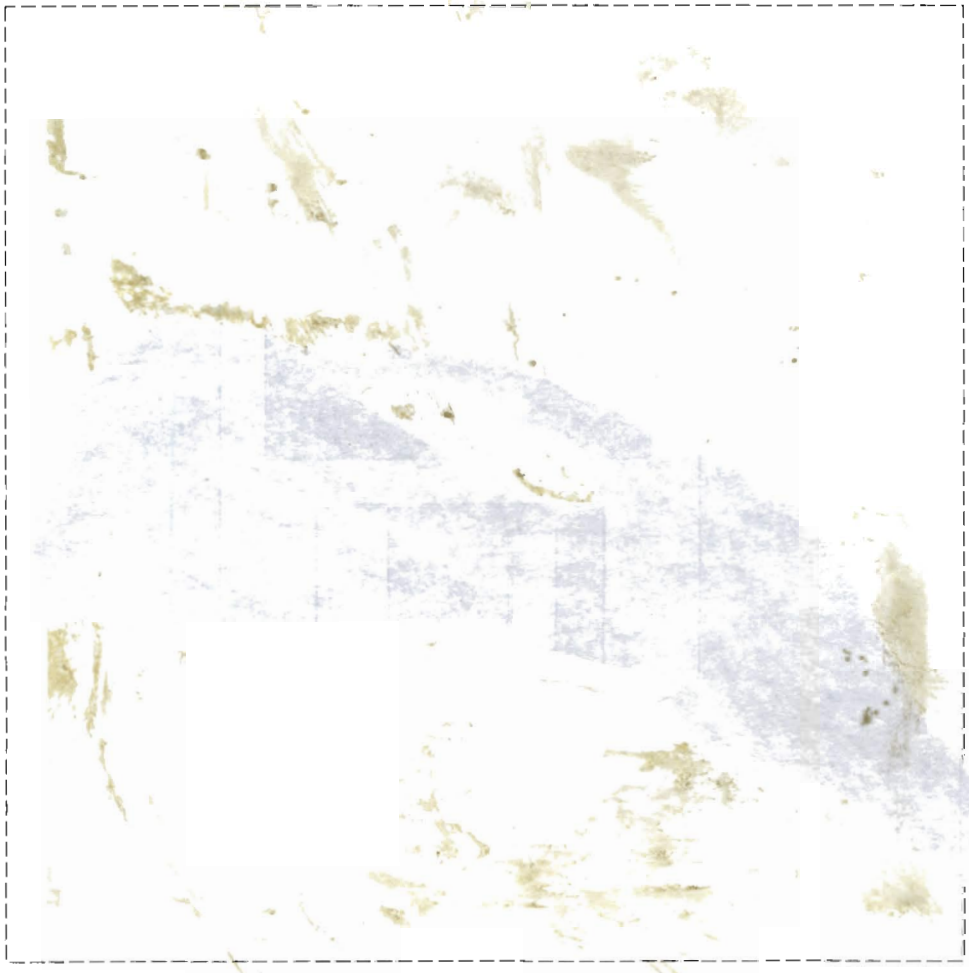
AMIGOTIMES: 1MB or 256K RAM chips?

PREISS: 1MB chips. At least. [Laughter] I'm waiting for the next shipment. You see, this is an application where the 4MB chip would make a lot of sense. But I'm glad if we get plenty of 1MB chips for the time being. It's a big problem right now getting them [Laughter].

Here is your *AmigoTimes V1.2* Diskette

Why include a disk with a magazine?
It allows AmigoTimes to provide the reader with some of the latest and best commercial demos, shareware, and public domain software available. Making demos of commercial programs available on the disk allows you to have hands on experience with the program before actually going out and buying the original package. How about public domain software and shareware? You now have access to a vast, continuously changing library.
As a programmer you will have available to you pretested source code that does not have to be typed into the computer; all source code and running programs that are referred to in AmigoTimes articles can be found on the disk.

NOTE: **THIS IS NOT A BOOT DISK**
Instead boot with your workbench disk.
READ THE DISK LABEL INSTRUCTIONS



DISK V1.2 DEPARTMENTS

Demos:
- SDB Source Level Debugger

Animations:
- Videoscape 3D 2.0 Animation
- Nemesis

Utilities:
- VirusX
- VirusX.c
- Vscreen
- Newscreen
- MoreRows

C (dir):
- Showanim
- ReadAll

Arced Files:
- BIO.arc
- LIBS.arc
- MIDI.arc
- VSCREEN.SRC.arc

Program Listings:
- Avail.asm
- Modula-2

SLEEVE OPENING INSTRUCTIONS:

The simplest solution is to cut out the whole page, then cut around the disk with a pair of scissors.
Remove the adhesive tape that is covering the disk. Page 51-52 now functions as a convenient subscription form and envelope.

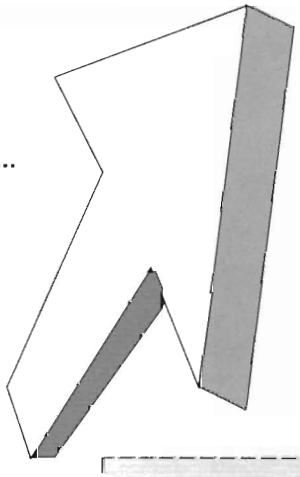
All material on the enclosed disk has been made available by third party individuals releasing them as public domain software or shareware. Some of the programs were specifically written for AmigoTimes. All DEMOS provided on the disk are made available both with the consent of the Companies, and agreement to their distribution as PUBLIC DOMAIN material. The AmigoTimes Disk is freely distributable and belongs in the PUBLIC DOMAIN. We fully support the shareware concept and suggest you contribute the amounts requested by shareware authors if you find their programs useful.

Let AmigoTimes

Designer Disk Sets

point you in the

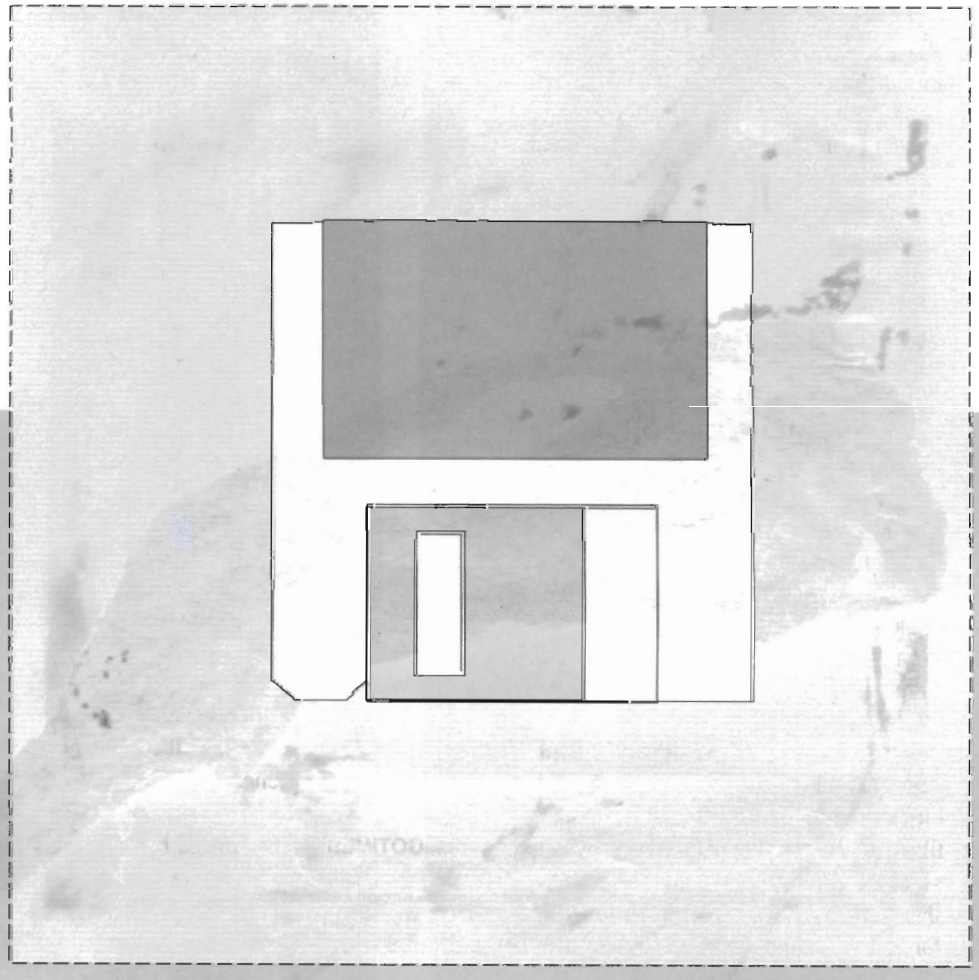
right direction...



Designer Disk Sets are "theme" disks that deal exclusively with one specific topic. The themes can be Animation, Utilities, Music, Programming, or even Graphic Images. These disks are available as a 3 disk set, only from AmigoTimes. Designer Disk Set #1 is the first 3 disk set in what may well be the most exciting PD Library for the Amiga.

To Order:

Use the subscription form located on page 51 to order **AmigoTimes Designer Disk Set #1 (3 disks packed full with Animations).**



But, by the time the board will be available this hopefully will not be a critical issue anymore. So again we are still flexible on this and we can go with what's available. This is not a technical problem but more a marketing issue and has to be solved separately.

AMIGOTIMES: How about HELIOS? Does that take over the machine or does it run as a separate task with AmigaDOS?

PREISS: HELIOS is running distributed, therefore, a little bit of HELIOS is running on each transputer in the system. This truly distributed operating system will allow you to run objects such as shells and consoles. Those console objects, of course, would preferably not run on the transputer network, so you would put your console object on the Amiga instead. Since everything is tied together with links, you are hardware independent suddenly and if you follow all the link protocols you can have mixed hardware. This way the objects would be on the hardware, where you would prefer them to run. This means on the Amiga we will have objects like keyboard, console output, TTY, graphics output and of course, file servers. All those objects, of course, could also be running on a dedicated transputer system. One day there will transputer systems serving as dedicated file services and perform that function much faster than the Amiga can do it today. Under HELIOS, they can be used from the Amiga operating system as well. There's no limit, or there's no instead, this is a co-existence.

AMIGOTIMES: Earlier, you mentioned something about the INMOS transputer chip working with 2-D movements.

PREISS: The 2-D movements that the T-800 provides is just a 2-dimensional block move operation which can act like a blitter if you have one byte per pixel in the bit plane. But of course in the Amiga we have a bit blitter, therefore, we probably wouldn't use the T-800 as a graphic processor, there are more powerful solutions available. This is not the key or the major feature that the T-800 can provide. But if you want to use the T-800 in some graphic applications you can do some rough clippings for things like that which the 2-D block movement provides. It's not routines, it's instructions.

AMIGOTIMES: What is the name of the chip that you will be using on the transputer board?

PREISS: There are two chips from INMOS, the T-414 and T-800. Both are identical except that the T-800 has a floating-point unit and the T-414 does not.

AMIGOTIMES: Which chip will be coming out with the transputer board?

PREISS: I'm not sure at the moment. Both chips will run on the board. Of course, there's a socket so that you can change the chip as you want. In the end, I think marketing has to decide which will be on the board. The T-414 megaflops are not too attractive since it has no floating point unit. The T-800 provides 1.2 megaflops at 15 MHz. The 20 MHz version will go up to 1.5 Mflops and the 30 MHz version which has been announced by INMOS - but I haven't touched it so far - is planned to be at 2.25 Mflops on a single chip.

AMIGOTIMES: The floating-point processor works at what speed?

PREISS: At the same speed as the whole thing. This is an integral part of the chip.

AMIGOTIMES: That's good, so it's different from the 68000 series.

PREISS: That's right. It's not a separate processor or a separate chip, it's an integral part of the silicon, so it's tied to the same block frequency.

AMIGOTIMES: If an Amiga has a 68020, will that do something to the transputer?

PREISS: Yes, it will accelerate everything that the Amiga is serving for the transputer network and make the file system faster. The fast filing system as we have it on the Amiga would make accesses faster anyway but the 68020 will speed that up by a factor of four again. All the graphic I/O of course will benefit from this higher processing speed that we presently have from the host at this point.
Also, if you have a complicated transputer network behind one or more Amigas you may easily run into a bottleneck, which is file I/O. So the more applications you have running in the network, the more file I/O demand you may have for the whole system. And so you can use a couple of Amigas and the faster they are, the more powerful the total performance.

AMIGOTIMES: What if one Amiga will be running with a 68000, another with a 68020, and a third one possibly with a 68030, will that cause some sort of problems with HELIOS?

PREISS: There's no problem with that, since HELIOS just waits for an operation to be done and the faster you do that operation the better it is for the whole system.

AMIGOTIMES: As far as networking is concerned, when you have three or four Amigas networked with transputers, does that mean one Amiga can access the AmigaDOS devices on another Amiga?

PREISS: The answer is yes if the user of the other Amiga permits that. It's just like UNIX, where you have a permission mask for all the files, so you can allow a user, or a group, or the world to access everything you own. In the HELIOS operating system there's no fixed permission mask but there's a similar system that permits other users to use part, or all of your resources on the machine. This includes CPUs, transputers, disk drives or anything else that is in your Amiga and that you may want to give rights to or not.

AMIGOTIMES: What will be the rate of transfer between networking set of computers that are hooked up to transputers?

PREISS: Well, all the transputers communicate via their independent hardware channel links at 20 Mbits/sec. You could say, this is twice the speed of Ethernet. The transputer links are already an improvement over the Ethernet. But remember that if you have 100 stations on an Ethernet table, only one station at a time can send and the other stations can only listen. If you have a transputer network, each connection between two chips can be activated at the same time. This means you can have a summary transfer rate of "n" (number of transputers) * 20 Mbits/sec; this is the total communication activity at that time. Any other way and you would run into a bottleneck again and this is another benefit that you get if you use transputers.

AMIGOTIMES: We have heard that the transputer has a drawback in its heat dissipation and that when you put in the 17 transputers in the PC part of the Amiga 2000, that the 17 transputers might create sufficient heat to cause problems for the fan.

PREISS: No. Each expansion card in the PC slots will contain four transputers and those four transputers will not be so close together that they form, let's say, a single point where heat will build up. So the configuration is designed such that heat will be evenly redistributed over the board. If you say a single transputer dissipates something around one watt, let's say 1.5 if it's really busy, this is approximately the same heat dissipation by an 8MB memory board. The airflow system in an Amiga is designed in such a way that all the heat generated by the power supply can be taken out of the system with the present fan.

AMIGOTIMES: How do the transputers interact with AmigaDOS devices?

PREISS: The filing system running on the Amiga, may have access to all the file devices that are known. Which means that you can open anything from df0: df1: dh0:, and all other devices that an Amiga recognizes. This includes, of course, opening something on the console device and treating it as a file. This is the same type of transparency that already exists in AmigaDOS.

AMIGOTIMES: Will this (the transputer) work with the present AmigaDOS or is this something that's being worked on for Workbench 1.3 or 1.4?

PREISS: Yes, since object accesses are made possible through HELIOS and the server object in the other Amiga still has access to AmigaDOS. So it will not be an expansion to AmigaDOS, but you will run a HELIOS shell, which will allow you go to your root transputer or on any chip in the system.

AMIGOTIMES: So the whole thing is very transparent?

PREISS: Yes. You would not see, if you don't want to, the bounds of your machine and say I'm running on a transputer in this machine or that machine.

You just have a given configuration of transputers and this is independent from the true spacial distribution.

AMIGOTIMES: If you have access to twenty computers and each one has a printer, and you have a twenty page document, does this mean that one page could be printed at each computer?

PREISS: You could write the software that does it like that. Then you have to connect them in the right order. [Laughter]

AMIGOTIMES: Will you be able to use transputers in future Amigas (2500 or eventually 3000)?

PREISS: Sure. I'm not sure whether it will be built-in, but of course you will be capable of using it in future Amiga versions, as with all the other expansion boards as well.

AMIGOTIMES: Is the transputer board going to be released by Commodore as a Commodore product?

PREISS: Yes. It will be a Commodore product and, as you saw, the board is running pretty good at the moment so we could release the board as it is. But as we have no software to go with it, we have to wait for the first HELIOS release from Perry Helion. As soon as that is done we will be ready to release the transputer board.

AMIGOTIMES: When will HELIOS be available and what version?

PREISS: Hopefully version 1.0 or 1.1 will be ready by the fall.

AMIGOTIMES: So then heavy work will commence after that, before the end of 1988 to make this a viable product?

PREISS: Yes. It mainly depends on HELIOS since the board is almost done as is and we are ready to mass produce it. But of course we have to wait for the software.

AMIGOTIMES: Thank you very much for your time. We're looking forward to the release of the Amiga transputer board in the near future.

PREISS: Its been my pleasure.

CONCLUSION

We personally saw the transputer root board working, so it's not "vaporware", but HELIOS is not ready yet and until it is, the transputer board will continue to be improved. The entire system should be ready by the fall and hopefully be ready for commercial sale just before the Christmas shopping rush (the first week of December). We have great hopes and aspirations for this hardware board and look forward to testing it for you. Sometime in the fall, as the system becomes available, a more in-depth article focusing on the technical nature of the transputer and HELIOS will follow. ❑

INVASION OF THE JOKEBENCH

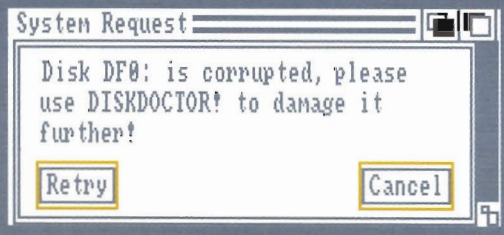
By John Foust

Joe User sits down to another late-night computing session with his Amiga. He inserts a Workbench disk, and instead of the regular Workbench screen, the screen goes dark. A glowing message appears - "Something wonderful has happened... Tandy bought Commodore." Then the screen turns to a 40 column display with the message "Load Workbench Tape and Press Play To Continue."

Is this AmigaDOS 1.3, or just a cruel prank? A mindless prank - Joe User is the latest victim of the JokeBench, a software virus.

The symptoms of the JokeBench start out simple and subtle, and grow progressively nasty as time goes on. First it blinks the power light at random moments, tricking you into thinking the machine is about to Guru. You catch sight of the Guru's blink out of the corner of your eye, and then it's gone. New kinds of Recoverable Alerts take place at random moments. They pop up and say "Just Kidding! Press Left Mouse Button to Continue."

Slowly, Workbench and Intuition are affected. Sound effects are added to everyday functions. Windows open and slam shut. When you pull down and then release a menu, JokeBench makes a sound like a window shade. When you click on drawer icons, it sounds like a file cabinet is being opened. The mouse really squeaks. Before a Guru, a low "Ommm" sound comes from the speakers. As you can see on these pages, JokeBench has some new system requesters.

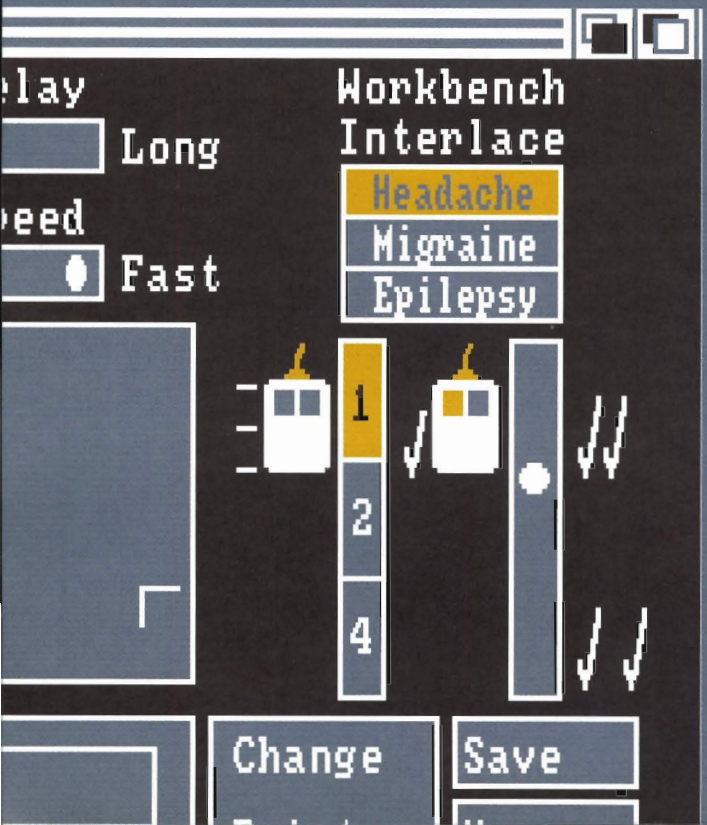


Even the infamous "secret Workbench messages" were changed. When the SHIFT-SHIFT-Amiga-Amiga-function keys are pressed all at once, baudy limericks and Burma Shave slogans slowly unfold, such as this:

> There once was a man from Los Gatos
> Who decided to make changes to A-DOS
> And Exec and Intuition
> He knew it looked bitchin'
> But there was no way they'd like it in West Chester.

JokeBench adds several new gadgets to the Preferences program. One set of new buttons sets the intensity and frequency of disk "gronks" - to "low, medium, regular and even louder." The intensity of interlace flicker is also adjustable in the new program, from "headache" to "migraine" to "epilepsy."

JokeBench also changes CLI programs in the C: directory. For example, one affected program is 'edit'. On startup, the mutated 'edit' prints "Are you kidding? No one ever uses this program" and then ends.



REALLY BIG BAD VIRUS

The JokeBench is an extremely large virus, occupying dozens of sectors on the Workbench disk. By comparison, the infamous SCA and Byte Bandit viruses take up only a few sectors of the disk. In effect, the creators of this virus re-wrote a significant fraction of the Amiga operating system.

The virus propagates itself disguised as an ordinary episode of Amiga disk swapping. When an infected disk is inserted into the system, a small piece of JokeBench code is loaded by the operating system. This small piece of code waits for the next large program to be started. It asks for the Workbench disk, then the infected JokeBench disk, then the Workbench, and so on for about six swaps, until the entire virus has been

copied to the new Workbench. Amiga users, accustomed to this degree of disk swapping, are unaware that their computer is being infected with the JokeBench.

A pirate organization takes credit for creating the JokeBench. Their acronym is SEPTICC, short for Stupid European Programmers Tinkering In Commodore Computers. SEPTICC sent an electronic mail message to Commodore explaining why the virus was created. "I wrote this virus as a favor for a friend. He didn't think that a virus could do funny tricks. It only took about two days to write. I didn't think it would go any further than his house. And we also wanted to prove we were even dumber than the Mega-Mighty SCA."

JokeBench is extremely mean to virus checkers. If it finds a virus-checking program, it tortures it by deleting and undeleting its file over and over. It changes a bit here, a byte there until the program cries "Uncle" and tells the virus where its source code is kept, so the JokeBench can destroy that, too.

"This program is really sicko. The SEPTICC virus gets its thrills from the software equivalent of pulling off the wings of a fly," according to Paul "Bugs" Enmoss, head virus killer at Commodore West Chester. "It's a software bully - it throws its weight around in the operating system, and the little unprotected programs can't fight back."

MILLIONS OF CRASHES

Enmoss has sent samples of the JokeBench to the Center for Diseases of Computers in Atlanta. The CDC has published a report on the spread of computer viruses. One major factor in the disease is the position of the computer.

In the virus report, entitled "Millions of Computers Due to Die from Lethal Virus", the CDC suggests that a computer's immunity is weakened when placed on its side, thus making it more susceptible to the virus. Zero bits are inherently lighter than the one bits, and many inexpensive computers are taxed by the extra effort required to keep the bits in the positions.

"In a tired or weakened computer, the zero bits start to float, and the one bits start to sink. It screws up a lot of calculations. The computer gets muddled and can't resist the virus," according to Dr. Marsha Meestich of the CDC staff.

Dr. Meestich is well known for her previous research at the University of California-MacLaine in Berkeley, where she taught "psychic computer surgery". She healed sick computers by pulling faulty chips from their insides without the aid of repair instruments of any kind, and without opening the case.

Meestich believes that viruses can live in quiet pools of memory, so the computer should be turned off when not in use. Also, Meestich has a theory that the Amiga 1000 may be more susceptible than other computers because viruses they can get breed and multiply in the cracks between slap-on-the-side expansion boards.

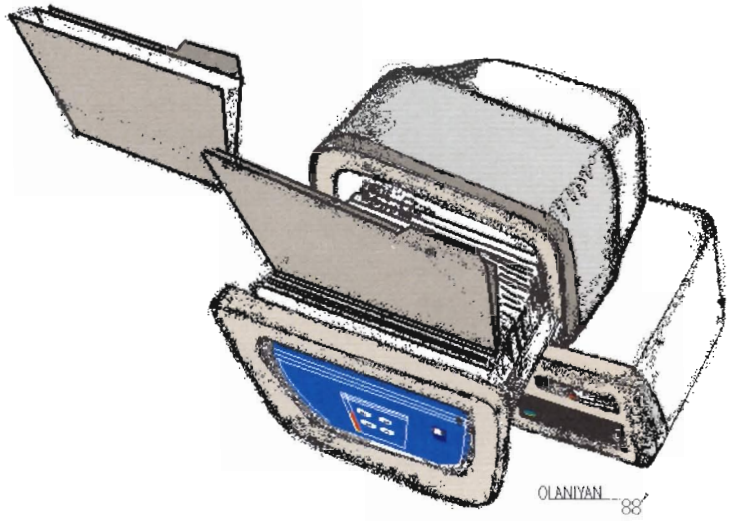
The U.S. Department of Things that Start With "V" has published a pamphlet about software viruses, and plans to send one or two to every computer owner in the country. Written by popular systems analyst Dr. Ruth Bitheimer, computer users should always practice "safe disk", according to the following guidelines:

- Always leave the plastic sleeves on disks, or at least put the sleeve back on before putting the disk in the drive.
- Refrain from any form of pirate activity, especially those practices that involve raw bytes or nybbles. As always, avoid any exchange of confidential or copyright information.
- Like the common cold, software viruses are most often spread hand-to-hand, and only rarely over the telephone. Keep your disks clean.

About the author:

John Foust, "the man some call the Father of Amiga Journalism," is a long-time Amiga writer with thousands of uninfected Amiga disks. He keeps his viruses under lock and key, also, he normally writes more serious articles than this. Also this article is included for your enjoyment only, the JokeBench virus does not really exist, but it shows how stupid the whole virus affair is.

DataRetrieve



Being a person that is occasionally disorganized, I am constantly on the look out for any programs that offer promises of organization. A database manager is one such program; with a database manager, I can actually convince myself that I am organized.

Those of you who run small businesses with Amigas, you can understand that it is no simple task; with the shortage of professional software, any tool that can alleviate some of the drudgery of repetitive tasks is a godsend. DataRetrieve will do some of this for you, and more.

The awful thing about database managers is initially entering all the information, but DataRetrieve makes it a lot less painful by being very user friendly. DataRetrieve uses intuitive windows and exploits the advantage of pull down menus while offering mouse support.

For those of you unfamiliar with database managers, first a bit of terminology. Database managers are used whenever you have a large amount of data you need to compile or organize, be it a mailing or customer list, IFF pictures or anything else you can dream up. Databases contain data "records", for example each company in your mailing list has a separate record. Each record may contain one or more places where the information is entered, this is known as a "field".

THE MANUAL

Whenever I receive a new program I am anxious to try it out, so like most people I usually try to use it without the manual; this is my gauge to see how user friendly a program is because after all, like most people I have no time to study a manual for a week before being able to understand how to run a program. When I started up DataRetrieve I found that I could guess how to use most of the functions. A minimal amount of reading was required, this was just to identify the icons etc. As the manual is concise and easy to read, I would highly recommend reading it thoroughly to obtain the full potential of DataRetrieve.

The manual is very basic in its presentation, a simple soft cover, with a black and white interior. Obviously designed purely for its functional purpos-

By Lisa Sama

es, it fulfills the adage that you should not judge a book by it's cover. This manual is very straight forward and starts off with a step by step tutorial on how to set up a simple mailing list, while allowing the user to get a feel of the program. It then systematically goes through all the pull down menus explaining each function which also has a corresponding keyboard equivalent for ease of use. Additionally you can set up function key macros for frequently used commands. Aside from the fact that I would have liked to have seen more examples, the documentation was good.

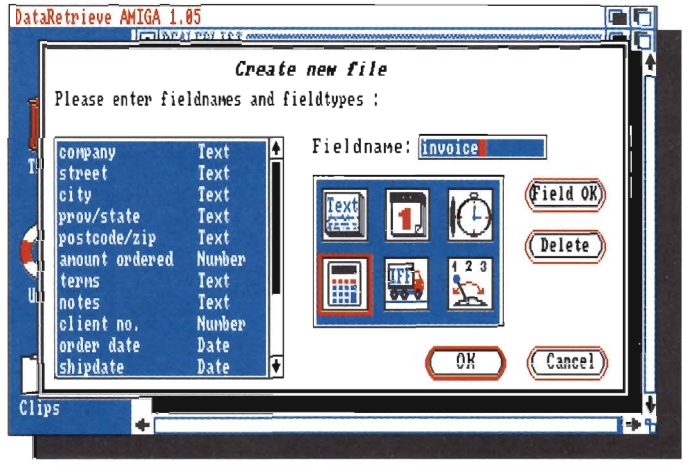


FIG 1

To create new databases, field names and field types must be defined. The field types, as shown here, are represented by icons: text, date, time, numeric, IFF, and even choice field types.

USING DATARETRIEVE

DataRetrieve will run on the Amiga 500, 1000, or 2000. It is not copy protected, but to first use Dataretrieve you must install it by entering your name, the serial number etc. before you can make back up copies. Once this is done you may then install it on your hard drive. When entering data, it is written straight on to the disk (or hard drive), which is advantageous in the event of a power failure. If you use floppy disks to store your databases, it may be slow to find a record. To counteract this you can set up indexes.

Using DataRetrieve to enter a data base is straight forward. You start up the program and it will ask you to open a file or create a new file. If you do the latter a screen will appear asking you to enter the field names and fieldtypes. In DataRetrieve you can define fields as text, date, time, numeric (including numeric functions), IFF, or a choice field type which you can predefine to only accept preselected information (Fig. 1). Once these have been entered a password requester will come up. You may enter a password as a security precaution to prevent entry or deletion of data. A password is also a way to make sure that only authorised people can access your database file. Finally a screen will appear showing the default screen mask, or template of the fields you entered to structure your database, and in the order you entered them (Fig. 2).

THE MASKS

A unique feature about this product is the use of masks or templates. DataRetrieve has screen masks, printer masks and list masks. A Mask as the name implies allows the viewer to see only parts of the information. Meaning that you may select certain items from your records on your database to appear through these masks. Databases and masks are independent, you can use several masks with the same database or the same mask for different databases. When viewing your data, a screen mask shapes the way you actually view the data on the screen. Each of the three types of masks are created with a mask editor which has many features to embellish the appearance of your masks. You can resize your fields, as your mask editors are object oriented, and move them around. You can add text and select it's style as well as that of the text in the fields, which can be different. (Fig.3)

With DataRetrieve you can control the output format to your printer. You can output a whole file or part of a file. For instance if you want to print out address labels you can set up a printer mask that contains the appropriate selected fields i.e. name, address, city etc. to be printed out. This can also be done for anything else you wish to devise, i.e. form letters, invoices etc. If you just need a list from your data base: a default list of the first six fields can be printed out as a single line, if any more than a single line is required then you must use the printer mask editor. You can even have a particular field summed for each record of your list. Once your printer or list mask is set up you can test the output on the monitor or the printer. One irritating thing about the printer mask is that there is no way of knowing where you are on a page except by counting lines. So if you set up a print mask with only a few items on a page its difficult to know exactly how many lines are in between except by trial and error. Some sort of ruler would be a useful tool.

MOVING WITHIN AND BETWEEN DATABASES

Once you have set up your screen mask

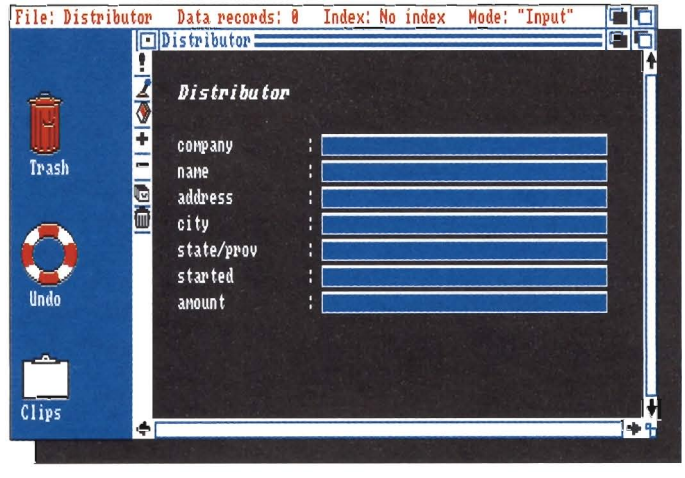


FIG 2

After entering field names and types a default screen mask will appear. The fields will appear in the order they were entered.

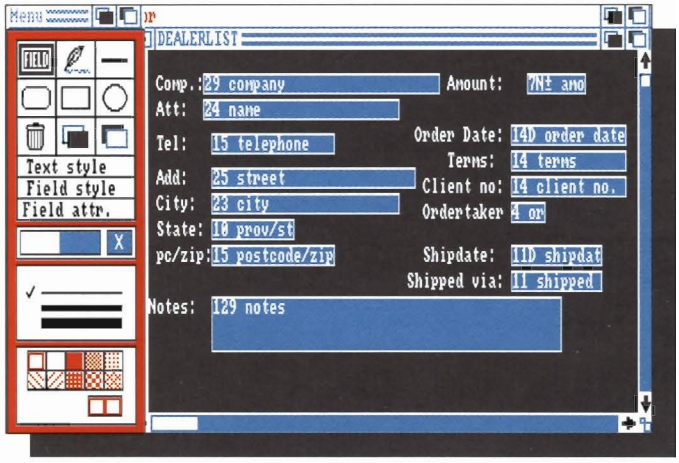


FIG 3

The screen mask editor can be used to resize and shape your fields, move them around or remove them. The text describing the fields can also be moved around and changed thereby allowing you to thoroughly customize the look of your database.

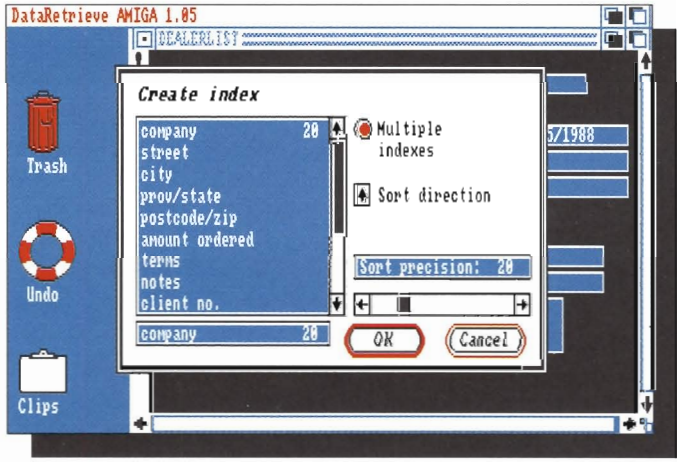


FIG 4

Create index will sort your records according to the fields you select. Once sorted, a similar window will appear showing a list of company names present in the database (as is in this case).

to your liking and exited the mask editor, you can enter the information into your database. You will notice three large icons on the left of the screen. The trashcan can delete a selected block or record. Use the lifesaver to undo the last thing you did, use the clipboard to copy a selected block. DataRetrieve has two modes: the input mode or the search mode. The mode is indicated in text at the top of the screen or by an exclamation point or question mark icon respectively. You click on the exclamation point, and the record is entered into your database. To change modes you click on the lever icon and the question mark appears, you are now in the search mode. To move between records you simply click on a minus or plus sign, clicking twice on these will get you to the beginning or end of your database. You can search a database by setting up an index. (See Fig.4) Simply select a field name that you wish to index then choose ascending or descending order. For example you could select last name in ascending order, if you have several Smith's you can use the multiple indexing feature and by selecting another field name it will do a secondary sort for that field. You can scroll through your index and select the record you are searching for. Indexes can be recreated at any time.

There are many ways to search through the data base. You can erase what is in the screen mask then enter the information in one field for example: city: Montreal and click on the "?". DataRetrieve will find all the records containing the city you are searching for, the first one will show on the screen. To view the others you must click on the "?". Many other methods for searching are available, including searching for ranges or records that have 2 or more fields in common. You can even search a database for records that have the first two letters of a field in common, the possibilities are endless, but I do not want to rewrite the manual. Subranges of the database can be created using different search criteria. They can be saved and loaded to create separate databases. Creating a subrange is also useful for printing only certain records of your database. To move data within and between records, as well as between databases, block operations can be used such as cut copy and paste. At any one time you can have up to eight files (databases) open, each will have its own distinct screen.

CONCLUSION:

As you have probably guessed by now I like DataRetrieve. Abacus seems to have thrown in features that other databases were lacking. It is a very versatile and powerful data manager (its maximum file size is 2 billion characters). You can have an unlimited number of data fields within your records. The limit to exploiting DataRetrieve depends upon the scope of your imagination. Aside from the lack of some kind of visible indication of where you are on a page in the printer mask, the only other negative point follows. On one occasion I was using DataRetrieve, which I have installed on my hard drive, when needing some information, I clicked on the depth arranging gadget to put the DataRetrieve window behind my hard drive window once finished with my other task half an hour later, having forgotten that the file was still open I tried to reopen that file and much to my horror a requestor popped up saying the file in question could not be found. I frantically tried all kinds of things, thinking I had some how deleted over 80 records that were contained in that database, until finally I remembered where it was. So on the edge of my seat I gingerly looked through the records then tried to close and reopen the file, it worked! So don't scream right away if this happens to you, look behind the other screens especially if you tend to run several things at the same time. Above all always keep back ups of your databases. ❑

DataRetrieve
Abacus
5370 52nd Street SE
Grand Rapids, MI 49508
(616) 698-0330
512K Required
Not copy-protected
$79.95 (US)

GOBBLEDYGOOK

GOBBLEDYGOOK

GOBBLEDYGOOK

WARNING:

The material presented herein is not intended to offend readers or specific groups of individuals. Its sole purpose is to be ludicrous, insane, humorous, and/or full of lies (it's your choice). Nor is the material presented here the opinion of this magazine, but those of the author; who is condidered to be a bit too wild and/or has been told to seek psychiatric treatment. Please do not attempt anything mentioned here, since you might destroy something, land in jail, or both. This column has managed to be printed again but it needs your support if you want it continued in future issues.

INSIDE AMIGOTIMES

By the time you read this, you probably know that our last AmigoTimes issue was in the "On your mark, get set..." mode for quite sometime. I personally attribute all the blame to our editors. Why? Alright, allow me to paint you a typical scenario. Once I've finished writing an article, I would edit it, proofread it, spell check it at least twenty times, and use a "FOG test" (I don't know what the weather has to do with writing). Once the manuscript is completed, I then send the finished product to the editors who sit on marble thrones atop mount Olympus while sipping wine with Zeus.

Legend has it that the first time the editors receive an article, they just say "NO" and send it back with a clap of thunder. The next copy is dropped in a pail of red ink or could it be that those markings on the paper are wine stains? The third copy is sneered at and viewed

with raised eyebrows while mumblings of "Mere Mortal..." hiss through the heavens. The final version is sterilized in some magical potion and finally adjusted in length (mostly censorship) with a scythe, after which it is transferred to "The Great Magnetic Media" where it is then molded into the desired shape for publication.

Each and every time I am summoned into the hall of "The Editors", I depart with a sore back and a headache from all the bowing and nodding that goes on in private chambers.

NEWEREST PRODUCTS

The computer industry is growing faster than kelp; one foot per day off the coast of California. This means that terminology has to change to accompany the flood of new technology.

ROM chips will be replaced by ROAM chips, which are bigger and have more room to work with. The only problem is that they tend to be all over your PC board.

Micro floppy drives will be replaced by Macro flappy drives. These new drives will be capable of containing more information and flap like no other drive before.

The MegaByte has been a standard for quite a while as a ruler for measuring the amount of memory a computer has access too. But with 16MBit chips coming on line soon the standard will be obsolete and will be replaced by the Mega Mouthful.

The ROM kernel manual has been the Amiga programmer's bible since 1986 and with the new versions of Kickstart and Workbench arriving a new release is imminent. Our crack team of researchers has discovered that the manual will now be called the "Corn Kernel Manual".

VIRUS UPDATE

The disk viruses presently infecting the disks of many Amigans has reportedly been linked to the CIA. Rumor has it that CIA hackers originally developed the virus in a Swiss test tube factory, as a deterrent to atomic warfare. The process required the melting of Swiss cheese over an exposed and inundated 3.5" disk which was then inserted into a recipient aging A1000 and then reformatted. The results of this nasty experiment have caused grief to many Amiga users. Some Amigans have reported that their machines have been exhibiting symptoms unlike the ones displayed by the first virus. Some symptoms: Hiccupping every now and then, a drunken-like attitude whereby thrown up bits are dumped onto the screen. Worst of all are the viruses that cause disk splicing. These create new deadlier strains of the virus each time you write the words IBM or APPLE on the screen; more on these next month. ❑

Creative Computers

Orders only: **800-872-8882** (outside CA) **213-370-2009** (inside CA)
4453 Redondo Beach Blvd., Lawndale, CA 90260 Mon-Sat 8AM-6PM PST FAX: (213) 214-0932

GVP
Great Valley Products

Impact SCSI Controller and memory board, 1 meg or 2 megs space
Will autoboot with 1.3 - Hard drives available up to 80 meg capacity- Call for prices.
GVP Hard Cards available. Please call.
Quantum 84 MB 12 ms 3.5" hard disk:
Shock mounted, 64KB cashe (for 12ms speed), SCSI interface. Compatible with IMPACT or A2090 boards.

Special Aegis Promotion:

Buy any three Aegis products and get *Ports of Call* **free!**
Or: Buy *Ports of Call* and get a *Ports of Call* T-shirt **free**
(while supplies last).

Sonix
Draw - CAD
Videoscape 3-D
Videotitler
Impact -Business Graphics
Arazok's Tomb
Ports of Call

Diga! -Telecommunications
Audiomaster
Animator + Images

New Aegis products:
Lights, Camera, Action!
Modeller 3-D

SOFTWARE

3-DEMON
64 EMULATOR 2, THE
A-TALK PLUS
AAARGH!
AC BASIC-COMPILER FOR AMI
AC FORTRAN
ACCOUNTANT, THE
ACQUISITION 1.3
ADRUM
ADVENTURE CONSTRCTION SET
ADVENTURES OF SINBAD
AEGIS ANIMATOR
AEGIS ART PAK#1-CLIP ART
AEGIS DRAW
AEGIS IMAGES-PAINT
AESOP'S FABLES
AIRT SYMBOLIC LANGUAGE
ALGEBRA I
ALGEBRA II
ALIEN FIRES
ALL ABOUT AMERICA
ALOHA FONTS
ALOHA FONTS 2
ALOHA FONTS 3
ALTERNATE REALITY
AMEGAS
AMIGA DOS EXPRESS
AMIGA EDITOR
AMIGA KARATE
AMIGA KERMIT
ANALYTIC ART-GRAPHICS
ANALYZE 2.0-SPREADSHEET
ANIMAL KINGDOM
ANIMATE-3D
ANIMATION EFFECTS
ANIMATION STAND
ANIMATOR FLIPPER
ANIMATOR JR.
ANIMATOR'S APPRENTICE
ARAZOK'S TOMB
ARCADE ACTION PACK
ARCTIC FOX 1.2
ARENA
AREXX
ARKANOID
ART COMPANION
ART GALLERY FANTASY
ART GALLERY I
ART GALLERY II
ART OF CHESS, THE
ART PARTS #2
ASHA'S FONTS
ASSEMPRO
AUDIO MASTER
AZTEC 68/AM-D
AZTEC C PROFESSIONAL
B.E.S.T. BUSINESS MGMT.
BALANCE OF POWER
BALLYHOO
BARBARIAN
BARD'S TALE
BARD'S TALE CLUE BOOK
BARD'S TALE II
BASIC GRAMMER SERIES
BBS-PC
BECKER TEXT
BENCHMARK C LIBRARY
BENCHMARK IFF LIBRARY
BENCHMARK MODULA-2
BENCHMARK SIMPLE LIBRARY
BEYOND ZORK
BIG PICTURE OKIMATE
BLACK CAULDRON
BLACK JACK ACADEMY
BLITZKRIEG AT ARDENNES
BLOCKBUSTER
BOMB BUSTER
BORROWED TIME-TEXT ADVNTR
BREACH
BREACH SCENARIO DISK
BRIDGE 4.0-CARD GAME
BRIDGE 5.0
BRUSH WORKS
BRUSH WORKS 2
BUMPER STICKER MAKER
BUREAUCRACY
BUTCHER 2.0
BUTTON AND BADGE MAKER
C-ZAR
C.A.P.E. 68K ASSEMBLER
CALCULUS
CALLIGRAPHER, THE
CAMBRIDGE LISP
CAPITALIZATION SERIES
CAPONE
CASINO FEVER
CB TREE PLUS
CELEBRITY COOKBOOK, THE
CENTERFOLD SQUARES
CHALLENGER
CHAMPIONSHIP BASEBALL
CHAMPIONSHIP BASKETBALL
CHAMPIONSHIP FOOTBALL
CHAMPIONSHIP GOLF
CHESSMASTER 2000
CHESSMATE
CHICKEN LITTLE
CITY DEFENSE
CITY DESK
CITY DESK ART COMPANION
CLI MATE
CLIP ART #1
CLIP ART #2
CLIP ART #3
CLIP ART #4
CLIP ART #5
CLIP ART #6
COMICS ON DISK
COMPUTER BASEBALL
CRAPS ACADEMY
CRAZY CARS
CRIMSON CROWN
CRITICS CHOICE
CROSSWORD CREATOR
CRYSTAL HAMMER
CUBEMASTER
CUSTOMS SCREENS
DARK CASTLE
DATA RETRIEVE
DEATH SWORD
DECIMAL DUNGEON
DEEP SPACE
DEFCON 5
DEFENDER OF THE CROWN
DEJA VU
DELUXE HELP CALLIGRAPHER
DELUXE HELP FOR DIGIPAINT
DELUXE HELP FOR DPAINT II
DELUXE HELP FOR PHOTON
DELUXE MAPS
DELUXE MUSIC 2.0
DELUXE PAINT II
DELUXE PHOTO LAB
DELUXE PRINT + ART DISK
DELUXE PRINT ART DISK #2
DELUXE PRODUCTIONS
DELUXE VIDEO 1.2
DEMONSTRATOR, THE
DES CARTES
DESKTOP ARTIST
DESTROYER
DETONATOR
DEVELOPERS TOOLKIT
DIABLO
DIGA-TELECOM PACKAGE
DIGI PIX #2
DIGI-DROID
DIGI-PAINT
DIGI-VIEW 3.0
DIGI-VIEW UPGRADE
DIRECTOR, THE
DISCOVERY EXPANSION DISKS
DISCOVERY/MATH
DISCOVERY/SPELL
DISCOVERY/TRIVIA
DISCRETE MATHEMATICS
DISK MECHANIC, THE
DISK PRO PLUS
DISK TO DISK
DISK WICK
DISKMASTER
DOCTOR TERM PROFESSIONAL
DOMINOES
DONALD DUCK PLAYGROUND
DOS TO DOS
DOUG'S MATH AQUARIUM
DPAINT ART&UTIL. DISK #1
DR. FRUIT
DR. T'S 4-OP DLX EDITOR
DR. T'S BACH SONGBOOK
DR. T'S D-50 EDITOR
DR. T'S DR. DRUMS
DR. T'S DX EDITOR
DR. T'S KCS
DR. T'S DR. KEYS
DR. T'S MATRIX EDITOR
DR. T'S MT-32 EDITOR
DR.XES
DRAW PLUS (AEGIS)
DRUM STUDIO
DYNAMIC DRUMS
DYNAMIC STUDIO
DYNAMIC WORD
DYNAMIC-CAD
EARL WEAVER BASEBALL
EASY LOANS
EBON STAR
EMERALD MINES
EMPIRE
ENCHANTER
EUROPEAN SCENERY DISK
EXCELLENCE
EXPLORER, THE
EXPRESS PAINT
EXTEND
FACC II
FAERY TALE ADVENTURE
FAERY TALE GUIDEBOOK
FERRARI FORMULA ONE
FEUD
FINAL TRIP
FINANCIAL COOKBOOK
FINANCIAL TIME MACHINE
FIREPOWER
FIRST LETTERS & WORDS
FIRST SHAPES
FLEET CHECK
FLIGHT PATH 737
FLIGHT SIMULATOR II
FLIP FLOP
FLIPSIDE
FLOW
FONTS AND BORDERS
FOOTBALL FACTS
FOOTMAN
FORMS IN FLIGHT
FORTRESS UNDERGROUND
FOUR IN ONE
FRACTION ACTION
FROST BYTE
GALACTIC INVASION
GALAXY FIGHT
GALILEO 2.0
GANYMED
GARRISON
GARRISON II
GEE BEE AIR RALLY
GEOMETRIC LIBRARY
GETTYSBURG
GIZMOZ 2.0
GNOME RANGER
GOLD DISK FONT SET #1
GOLD SPELL
GOLD SPELL II
GOLDEN PATH
GOLDEN PYRAMID (GAMESHOW)
GOLDRUNNER
GOMF
GRABBIT
GRAND SLAM TENNIS
GRAPHICS STUDIO, THE
GREAT STATES
GREAT STATES II
GRID START
GRID, THE
GRIDIRON-FOOTBALL GAME
GUILD OF THIEVES
HACKER II
HAICALC
HALLEY PROJECT
HARDBALL
HARRIER COMBAT SIMULATOR
HARRIER MISSION
HEAD COACH
HEX
HITCHIKERS GUIDE
HOLLYWOOD HIJINX
HOLLYWOOD POKER
HOME BUILDERS
HOT & COOL JAZZ
HOT LICKS
HUGE PRINT
HUNT FOR RED OCTOBER
IMPACT-BUSINESS GRAPHICS
INDOOR SPORTS
INOVATOOLS I
INSANITY FIGHT
INSTANT MUSIC 1.2
INTELLITYPE
INTERCEPTOR
INTERCHANGE
INTERCHANGE CONVERSION
INTERCHANGE OBJECTS #1
INTO THE EAGLE'S NEST
INTROCAD
INVENTORY MGMT
INVESTOR'S ADVANTAGE
IT'S ONLY ROCK & ROLL
J FORTH
JET
JET SET FONT SET
JEWELS OF DARKNESS
JINXTER
KAMPFGRUPPE
KARA FONTS
KARATE KID II
KARATE KING
KARTING GRAND PRIX
KEY TO C
KEYBOARD CADET
KICKSTART II-BIKE GAME
KICKWORK
KIDTALK
KINDERAMA
KINDWORDS
KING OF CHICAGO
KING'S QUEST I
KING'S QUEST II
KING'S QUEST III
KNIGHT ORC
KWIK SPEAK
LARRIE
LATTICE C 4.0
LATTICE C COMPANION
LATTICE C PROFESSIONAL
LAZERSCRIPT
LEADER BOARD TORNA DISK
LEADER BOARD-GOLF GAME
LEARNING THE ALPHABET
LEATHER GODESSES
LEATHERNECK
LEISURE SUIT LARRY
LEXCHECK
LIBYANS IN SPACE
LINKWORD DUTCH
LINKWORD FRENCH
LINKWORD GERMAN
LINKWORD GREEK
LINKWORD ITALIAN
LINKWORD PORTUGUESE
LINKWORD RUSSIAN
LINKWORD SPANISH
LINT (GIMPLE)
LION'S AMIGA ART STUDIO
LISP 1.3-BY METACOMCO
LITTLE DRAGON
LITTLE RED HEN
LOGIC WORKS
LOTTERY MAGIC
LPD FILER-DBASE
LPD PLANNER-SPREADSHEET
LPD WRITER-WP
LURKING HORROR
MACROMODEM
MAD LIBS
MAGICAL MYTHS

We carry over 900 products. Call for unlisted items.

MAGICIAN'S DUNGEON
MARAUDER II-DUPLICATION
MARBLE MADNESS
MASTER TYPE
MATCH IT
MATH MAGICIAN
MATH TALK
MATH TALK FRACTIONS
MATH WIZARD
MATH-AMATION
MAVIS BEACON TYPING
MAXIPLAN 500
MAXIPLAN PLUS
MEAN 18 COURSE DISK
MEAN 18 GOLF
METACOMCO ASSEMBLER
METACOMCO PASCAL
METACOMCO SHELL
METACOMCO TOOLKIT
METASCOPE DEBUGGER
MICROFICHE FILER
MICROLAWYER
MIND WALKER
MIND FOREVER
MIND LIGHT 7
MIRROR DISK COPIER
MIRROR HACKER PACKAGE
MISSION ELEVATOR
MODULA-2 COMMERCIAL
MODULA-2 DEVELOPER
MODULA-2 REGULAR
MOEBIUS
MONEY MENTOR C VERSION
MOONMIST
MOUSETRAP
MULTI-FORTH
MULTI-PREFS
MUSIC MOUSE
MUSIC STUDENT
MUSIC STUDIO, THE
NANCY-SPELLING CHECKER
NEWSLETTER FONTS COLOR
NIMBUS 1:RECORD KEEPER
NINJA MISSION
OBLITERATOR
OGRE
OMEGA FILE
ONE-ON-ONE
ONLINE 2.0
OO-TOPOS
ORGANIZE
OUTLINE
PAGE FLIPPER
PAGESETTER
PALADIN
PAWN, THE
PAYMASTER PLUS;PAYROLL
PAYROLL
PCLO PRINTED CIRCUIT LAYOUT
PEOPLE METER
PERFECT SCORE
PERSECUTORS
PHANTASIE
PHANTASIE 3
PHASAR-FIN'L MGMT
PHOTON PAINT
PHOTON PAINT EXP. DISK
PHOTOSYNTHESIS
PINBALL I.Q.
PINK PANTHER
PIXMATE
PLANET PROBE
PLUTOS
POLICE QUEST
PORTAL-ADVENTURE GAME
PORTS OF CALL
POWER PACK
POWERWINDOWS 2.0
PRE CALCULUS
PRINTMASTER PLUS
PRISM PLUS
PRO MIDI STUDIO
PRO VIDEO CGI
PRO VIDEO FONT SET #1
PRO VIDEO FONT SET #2
PRO VIDEO PLUS
PROBABILITY THEORY
PROFESSIONAL PAGE
PROJECT D
PROMISE:SPELLING CHECKER
PROWRITE 2.0
PUBLISHER PLUS
PUNCTUATION SERIES
PUPPY LOVE
Q-BALL
QUARTERBACK
QUICK MERGE
QUINTETTES
QUIZ MASTER
QUIZAM
R.R. AESOP'S FABLES
READ & RHYME
READ-A-RAMA
REASON:AT&T WRITERS W.B
RETURN TO ATLANTIS
ROAD TO MOSCOW
ROADWAR 2000
ROADWAR EUROPA
ROADWARS
ROCKFORD
ROGUE-ADVENTURE GAME
ROLOBASE PLUS
ROMANTIC ENCOUNTER
SAF T NET HD BACKUP
SANTA PARAVIA & FIUMACCIO
SARGON III
SCENERY DISK #11 EAST COA
SCENERY DISK #7 EAST COAS
SCRIBBLE
SCULPT-3D
SDI:CINAMAWARE SERIES
SEASONS AND HOLIDAYS
SERIAL EXPANDER
SEVEN CITIES OF GOLD
SHADOW GATE
SHAKESPEARE
SHANGHAI-STRATEGY GAME
SHERLOCK
SILENT SERVICE
SILICON DREAMS
SILVER 3-D
SINBAD & FALCON
SKYFOX 1.2
SLAYGON
SMOOTH TALKER
SOCIAL STUDIES
SOFTWOOD FILE
SOFTWOOD FILE SG
SOFTWOOD LEDGER V1.2
SOFTWOOD WRITER
SONIX (AEGIS)
SOUNDLAB
SOUNDQUEST CZ MASTER
SOUNDQUEST D-50 MASTER
SOUNDQUEST DX7 MASTER
SOUNDQUEST DX7II MASTER
SOUNDQUEST GENERIC MASTER
SOUNDQUEST MT-32 MASTER
SOUNDQUEST SQ-80 MASTER
SOUNDQUEST TX81Z MASTER
SOUNDSCAPE UTILITIES 1
SOURCE LEVEL DEBUGGER
SPACE BATTLE
SPACE FLIGHT
SPACE MATH
SPACE PORT
SPACE RANGER
SPACEQUEST
SPELLBOUND
SPELLER BEE
SPELLING IMPROVEMENT
STAR GLIDER
STARFLEET I
STATION FALL
STELLAR CONFLICT
STOCK MARKET-THE GAME
STRIP POKER
STRIP POKER DATA #4
STRIP POKER DATA DISK #5
STUDIO FONTS V1 (COLOR)
STUDIO MAGIC
SUB BATTLE
SUPER HUEY-COPTER GAME
SUPERBASE
SUPERBASE PROFESSIONAL
SUPERSTAR ICE HOCKEY
SURGEON, THE
SYMPHONY SONGS (EACH VOL)
SYNTHIA
SYSTEMS MONITOR
T & L GALLERY
TALES FROM ARABIAN NIGHTS
TALKER-TALKING WP
TALKING COLORING BOOK
TASS TIMES IN TONETOWN
TELEGAMES
TELEWARS
TEMPLE OF APSHAI
TERRORPODS
TEST DRIVE
TEXTCRAFT PLUS
TEXTPRO
THAI BOXING
THEXDER
THREE LITTLE PIGS
THREE STOOGES
THUNDERBOY
TIME BANDITS
TOOL CADDY
TRANSCONTINENTAL RAILROAD
TRIGONOMETRY
TRINITY
TRUE BASIC
TURBO
TURBO SILVER
TV SHOW
TV TEXT
TXED PLUS
TYPING TUTOR WORD INVADER
ULTIMA III
ULTRA DOS
UNCLE D CON SOUND TRATION
UNINVITED
VADER
VAMPIRE'S EMPIRE
VIDEO EFFECTS 3D
VIDEO VEGAS
VIDEOSCAPE 3D
VIDEOTITLER
VIP PROFESSIONAL
VIZAWRITE
VOCABULARY IMPROVEMENT
VYPER
W SHELL
WBEXTRAS
WESTERN GAMES
WINDOW PRINT II
WINNIE THE POOH
WINTER CHALLENGE
WINTER GAMES
WISHBRINGER
WORD MASTER
WORD PERFECT
WORD PERFECT LIBRARY
WORKS, THE
WORLD GAMES
WRITE 'N' FILE
X-CAD
ZING
ZING KEYS
ZING! SPELL
ZOOM!
ZORK TRILOGY
ZUMA FONTS VOL 1
ZUMA FONTS VOL 2
ZUMA FONTS VOL 3

HARDWARE

1 MB RAM CHIPS 16 FOR 2MB
1020 DRIVE W/ TRANS 1.2
1084 COLOR MONITOR
15' CAMERA CABLE
20MEG HD & CONTROLLER
ALEGRA WITH 0K
ALPS ALQ200 PRINTER
ALPS ALQ300 PRINTER
AMIGA 1010 DRIVE
AMIGA 1680 MODEM
AMIGA 2000 CPU
AMIGA 2010 DRIVE
AMIGA 2052 2 MEG RAM CARD
AMIGA 500 CPU
AMIGA A501 512K RAM
AMIGA LIVE!
AMIGA LIVE! FOR THE A500
AMIGEN GENLOCK
ASDG 8 MEG BOARDS W/0K
AVATEX 2400 BAUD MODEM
BRIDGE CARD W/ DRIVE
BYTE BOX 0K-RAM OPTIONAL
C LTD 20 MEG HD
C LTD 33 MB A1000 HD
C LTD 50 MEG HD
C LTD 512K UNPOPULATED
C LTD SCSI CNTRLR A1000
CA-880 FLOPPY DRIVE
CLEANING KIT (SMALL)
COLT PERSONAL COMPUTER
CPS 500-POWER SUPPLY A500
EASYL 1000 TABLET
ECE MIDI 500/ 2000
ESCORT 2 UNPOPULATED
ESCORT 2 WITH 1M
ESCORT 2 WITH 2MB
ESCORT 500 UNPOPULATED
ESCORT 500 WITH 1M
ESCORT 500 WITH 2M
EXP-1000 1M A500
EXP-1000 1M UNPOPULATED
EXP-500 512K RAM EXP
FLICKER FIXER (HARDWARE)
FUTURE SOUND-AUDIOSAMPLER
HARD DISK CONTROLLERS
IMPACT 0M/2M SCSI
IMPACT 40M HARDCARD
IMPACT SCSI 0M/1M
IMPACT SCSI/1M RAM
IMPACT SCSI/512K RAM
KWICK START
MICRON 2 MEG FOR A2000
MICRON 2 MEG FOR A500
MIDI GOLD
MINISCRIBE 20MB 3.5" FAST
MINISCRIBE 8051S SCSI 40M
NEC COLOR KIT FOR P5200
NEC COLOR P6
NEC P2200 24-PIN PRINTER
NEC P5200 24 PIN PRINTER
NEC P6 COLOR OPTION KIT
NEC P6 PRINTER
NEC P7 PRINTER
OKIMATE 20/PLUG N PRINT
OVERDRIVE HD CONTROLLER
PANASONIC WV1410 CAMERA
PANASONIC WV1500 CAMERA
PAPER (3000 SHEETS)
PAPER (3600 SHEETS)
PC10-III COMPUTER
PERFECT SOUND DIGITIZER
PERFECT VISION
PITCHRIDER 4000
PRACT. PER. 2400B MODEM
PRODRIVE
PRODRIVE 2000
QUANTUM PRODRIVE 80S
QUEST FOR CLUES (BOOK)
SCRIBE-CARD 30 FOR 2088D
SEAG SCSI 48M 3.5"HD 28MS
SEAG ST506 30M 3.5HD 28MS
SOUND SAMPLER
SPIRIT 0 MB FOR A1000
SPIRIT 0 MB FOR A500
SPIRIT 0.5 MB FOR A1000
SPIRIT 0.5 MB FOR A500
SPIRIT 1.0 MB FOR A1000
SPIRIT 1.0 MB FOR A500
SPIRIT 1.5 MB FOR A1000
SPIRIT 1.5 MB FOR A500
STAR NB24-10
STAR NX1000 PRINTER
STAR NX1000 RAINBOW
STARBOARD 2 SCSI MODULE
STARBOARD 2 UPPER DECK
STARBOARD 2 W/512K
STARBOARD 2/A1000 0K
STARBOARD 2/A500 0K
STARBOARD SB2000 ADAPTER
SUBSYSTEM 500
SUPERGEN
SUPRA 2400 MODEM
SUPRA DRIVE 20 MEG A1000
SUPRA DRIVE 20 MEG A500
SUPRA DRIVE 30 MEG A1000
SUPRA DRIVE 30 MEG A500
SUPRA DRIVE 60 MEG HD
VI 2000 RF
XEROX 4020 INK JET COLOR
XEROX 4020 STARTER KIT

ACCESSORIES

AMIGA 2000 DUST COVER
AMIGA 500 DUST COVER
AMIGA 500 MONITOR STAND
AMIGA BAG
AMIGA INTERACTIVE CABLE
AMIGA LIGHT PEN
AVATEX 1200E MODEM
AVATEX 1200HC MODEM
C-VIEW A500 COLOR COMPOS.
CERTRON 80 DISK HOLDER
CLEANING KIT (ALLSOP)
COPY STAND,2 LIGHTS, STD
CURTIS DIAMOND
CURTIS DIAMOND PLUS
CURTIS EMERALD
CURTIS PHONE LINE SURGE
CURTIS RUBY
CURTIS SAPPHIRE
DATALIGHT
DELUXE MIDI INTERFACE
DISK FILE 30
DRIVE CLEANING KIT
DRIVE EXTENSION CABLE
EASYL 2000 TABLET
EASYL 500 TABLET
EPYX 500XJ JOYSTICK
ERGO STICK
FLICKER MASTER
FOUR PLAYER ADAPTER
FUJI DISKS (20 PACK)
FUJI MF2DD 10 PACK
FUJI MF2DD 10 PACK BULK
GENDER CHANGER/ BENDER
GRAVIS MARK VI JOYSTICK
GRAVIS SWITCH CONTROLLER
ICONTROLLER
IMAGEWRITER CABLE, A1000
IMAGEWRITER CABLE, A2000
JOYSTICK Y ADAPTER
KAO BLANK DISKS
KONICA DISK
KRAFT JOYSTICK
LABTEC SPEAKERS
LENS 16MM FOR WV1410
LIGHT GUN (ACTIONWARE)
LIPSTICK+ VOICE CONTROL
MAZEMASTER JOYSTICK
MD 60L WOOD DISK HOLDER/L
MD 64 WOOD DISK HOLDER/60
MICRO 50 DISK HOLDER
MICROSTORE DISK HOLDER
MIDI LINK 6'MIDI CABLE
MIMETICS MIDI INTERFACE
MONITOR STAND (15")
MOUSE EXTENSION CABLE
MOUSE HOUSE (MAX)
MOUSE HOUSE (MILLIE)
MOUSE MATS
MOUSE TOP
MOUSE WASHERS
NEC P6 RIBBON
NX1000 DUST COVER
PARALLEL CABLE A500/A2000
POLAROID 3.5 DISKS 10PK
POWERBUSS
PRINT & WEAR
PRINTER CABLE A1000
PRINTER CABLE A500/A2000
PRINTER PAPER 1000 COUNT
QUICKSHOT II JOYSTICK
SAFE STRIP SURGE PROTECT
SERIAL CABLE A1000
SERIAL CABLE A500/ A2000
SK080 DISK FILE 80 3.5"
SONY DISKS 10 HARD PACK
SONY DISKS 10 PACK
SONY MONITOR CABLE
SPEAKERS
SUNCOM PRINTER STATION
TEAK-TECH 120 DISKHOLDER
TEAK-TECH 60 DISKHOLDER
TEAK-TECH 64 DISKHOLDER
TIMESAVER
TOUCH IT STATIC WRAP
TRACKBALL (JOYSTICK)
TRACKBALL (MOUSE)
TRANSVESTOR 1000
TRANSVESTOR 2500
TURBO-VAC
VI 500 INTERFACE
VI 500 RF MODULATOR
WAVE PAD
XEROX 4020 4-PACK INK
XEROX 4020 BLUE INK (2)
XEROX 4020 RED INK (2)
XEROX 4020 YELLOW INK (2)

BOOKS

1001 THINGS TO DO W/ AMI
1ST STEPS ASSMBLY 68000
40 MORE FLIGHT SIM. ADVEN
68000 ASSEMBLY LANGUAGE
68000 PRIMER
68000: PRIN. & PROG., THE
ADVANCED AMIGA BASIC
AMIGA APPLICATIONS
AMIGA ASSEM LANG BOOK
AMIGA BASIC INSIDE & OUT
AMIGA DOS MANUAL
AMIGA FONTS
AMIGA FOR BEGINNERS
AMIGA HARDWARE MANUAL
AMIGA INTUITION MANUAL
AMIGA MACHINE LANGUAGE
AMIGA MICROSOFT GUIDE
AMIGA PROG HANDBOOK II
AMIGA PROG. HANDBOOK I
AMIGA ROM KERNAL: EXEC
AMIGA ROM KERNAL: LIBS
AMIGA TRICKS AND TIPS
AMIGAGUIDE GRAPHICSOUND
AMIGAZINE
AMIGOTIMES
AMNEWS
BALANCE OF POWER (BOOK)
BECOMING AN AMIGA ARTIST
COMPUTE'S 2ND BOOK AMIGA
COMPUTER ANIMATION
COMPUTES AMIGA DOS REF.
COMPUTES AMIGA PROGRAMMER
COMPUTES BEGINNERS GUIDE
ELEMENTARY AMIGA BASIC
FAST ACCESS WORD PERFECT
FIRST BOOK OF AMIGA
FLIGHT SIM ADV'S FOR AMIG
FLIGHT SIM. ADVENTURES
FLYING FLIGHT SIM BK
INSIDE AMIGA GRAPHICS
INSIDE AMIGA WITH C
INSIDE THE AMIGA
KICKSTART GUIDE (BOOK)
KIDS AND THE AMIGA
MASTERING AMIGA DOS-BOOK
MUSIC THROUGH MIDI
POSTSCRIPT LANGUAGE REF.
POSTSCRIPT TUTORIAL
PRESENTING THE AMIGA
QUICK & EASY GUIDE WP
SCHEMATIC CAPTURE
SENTRY MAGAZINE
SOLUTIONS IN C (BOOK)
USING DPAINT II
WORD PERFECT EXPERT ADV.

Creative Computers is both a mail order company with a store's support and three store showrooms with mail order prices. If possible, drop by a store and you will be **Amazed!**

Store front addresses:

318 Wilshire Blvd, Santa Monica, CA 90401
Tues - Sat 11-7 PM, Sun 11-5 PM phone: (213) 394-7779
4453 Redondo Beach Blvd., Lawndale, CA 90260
Mon - Sat 11-7 PM phone: (213) 542-2292
2112 E. Thompson Dr., Ventura, CA 93001
Tues - Sat 11-7 PM, Sun. 12-5 PM phone: (805) 652-0325

MINIMUM ORDER: $20
SHIPPING INFO: 1% surcharge for Visa and MasterCard; call for shipping rates.
INTERNATIONAL PHONE & MAIL ORDERS ACCEPTED
RETURN POLICY: Defective merchandise under warranty will be repaired or replaced. Returned product must be in original package. We do not offer any refund on defective products or for products that do not perform satisfactorily. We make no guarantees for product performance.
CONDITIONS: Creative Computers reserves the right to limit the sale of any items to local in-person pick-up only. Prices subject to change without notice.
WE ALSO RUN A 24 Hr. BBS: Call (213) 394-5988 with your modem.
SCHOOL AND LARGE COMPANY PURCHASE ORDERS ACCEPTED.

Visit one of our stores soon!!

DELUXE PHOTOLAB

Is it the Ultimate Paint Package...?

Has the ultimate image manipulation program arrived? Not quite, but something pretty close has. Deluxe PhotoLab from Electronic Arts is the latest entry into the graphics world of the Amiga. The release of Deluxe Photolab was announced as early as last November. At the time, it was being described as an all in one graphics package, omni-mode paint program, image processing program, and poster maker. Well heads up people, they've delivered; and I'll let you decide if it was worth the wait.

As previously mentioned, Deluxe PhotoLab is three graphic tools in one. By far the most intricate part of Deluxe PhotoLab is "Paint". This paint program warrants a lot of attention, therefore, the bulk of this review will be centered on it. Paint allows the user to paint in every Amiga display mode conceivable, from lo-res to Extra_Halfbrites (EHB), right up to Hold_and_Modify (HAM) mode. You can open several screens simultaneously with each screen in a different display mode if you so choose. The size of your screens are no longer limited by "chip RAM" which is presently 512K on all Amiga's. With Deluxe PhotoLab, screen size is limited only by the amount of total RAM available in the system; in short, if you have an Amiga configured with 9 Megabytes of memory, you can use all of it to create a very large bitmap.

"Color" is the image processor for Deluxe PhotoLab. It offers image enhancement capabilities, display mode conversions, and image resizing.

"Poster" is, not surprisingly, the poster maker; it allows you to make posters that are up to 100 square feet in

By Olusegun Olaniyan

size. Poster can anti-alias while it prints to give some fairly impressive results.

PACKAGING

The Packaging for Deluxe PhotoLab is professionally laid out with a Cover image that might be familiar to viewers of The Computer Chronicles on PBS; this image was briefly shown on one of the extremely rare occasions when the Amiga was featured.

Deluxe PhotoLab consists of two disks, one containing the main program, the other an art and tutorial disk. Being an Electronic Arts package, it is refreshing to say that this program is not copy-protected. I feel that a program of this caliber need not be copy-protected, after all when purchasing a professional package such as this, it is always preferable to have the manufacturers support for the program, as well as being aware of current upgrades.

THE MANUAL

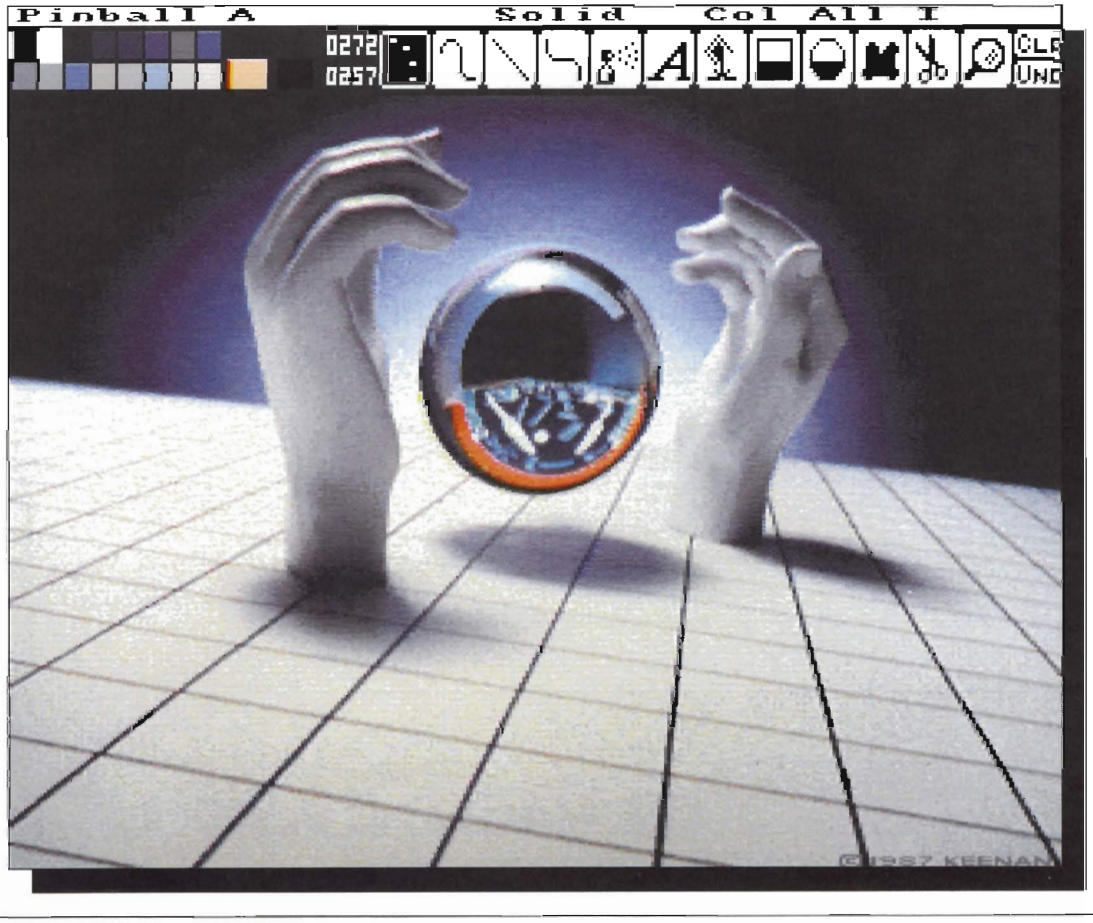
The manual for Deluxe PhotoLab can be described as being well thought out and equally well written. The manual treats the overall package as three separate programs, which is essentially what Deluxe PhotoLab is. The set up consists of an initial "guided tour" through the various functions. Going further you are then treated to an in-depth description of the functions. Tutorials follow next, and to finally finish things off a reference section. In this "read just what you need format", you can simply read the section on a feature you don't understand, then go right back to experimenting as most people often do. The tutorials that are available help to elaborate on the functions and features of this package. As fun as it is to experiment with a new program, it is always recommended that you give some of the tutorials a try to get the full benefit of the features. After all, it's always nice to at least figure out why some programs crash, or where all that memory may have gone off to. At the end of the manual is a an Appendix giving a concise introduction to color theory and an overview of the Amiga's display modes.

YOUR WORK AREA...

The work area display is shall we say, "interesting." I say this simply because I have a preference for a "Tools" menu that is located at the side of the display screen. This preference comes from many years of using Deluxe Paint. My personal preferences aside though, it would be convenient if the Tools menu could be moved up and down in the same manner as Photon Paint. One feature that I was not totally elated about was the manner in which the palette is accessed, but the set up is understandable, after all the palette has to be a HAM screen in order that all 4096 colors can be made accessible to the user in whatever mode that is being currently used.

PAINT...

The built-in paint program, aptly named "Paint," is not the simplest thing in the world to master, but when it has been mastered, it can be an extremely powerful tool. As mentioned earlier, the tools menu is located at the top of the screen, but the menu and title bar can be removed by toggling F9 and F10 accordingly. Setting up your paint palette does not come without its frustrations. At



Paint is the first graphic program to let you paint in any of the Amiga graphic modes. A 4096 color HAM image is drawn with same tools that you use to draw a lo-res 2-color image. The palette control is on a separate screen and can be called to the front at any time. Although Paint itself is a memory hog, the page size of an image is not limited by the amount of CHIP RAM on your system, it is only limited by the total amount of RAM. Creating a 1500x1500 HAM image is no problem on a 3MB Amiga.

first, the palette appears to have come straight from "Dante's Inferno", but with a little persistant reading in the instruction manual you are enlightened to the thought behind its design. In low, medium, and hi-res, you can access any of the 4096 colors in the Amiga palette by selecting according to its RGB value or HSV (Hue Saturation Value) levels.

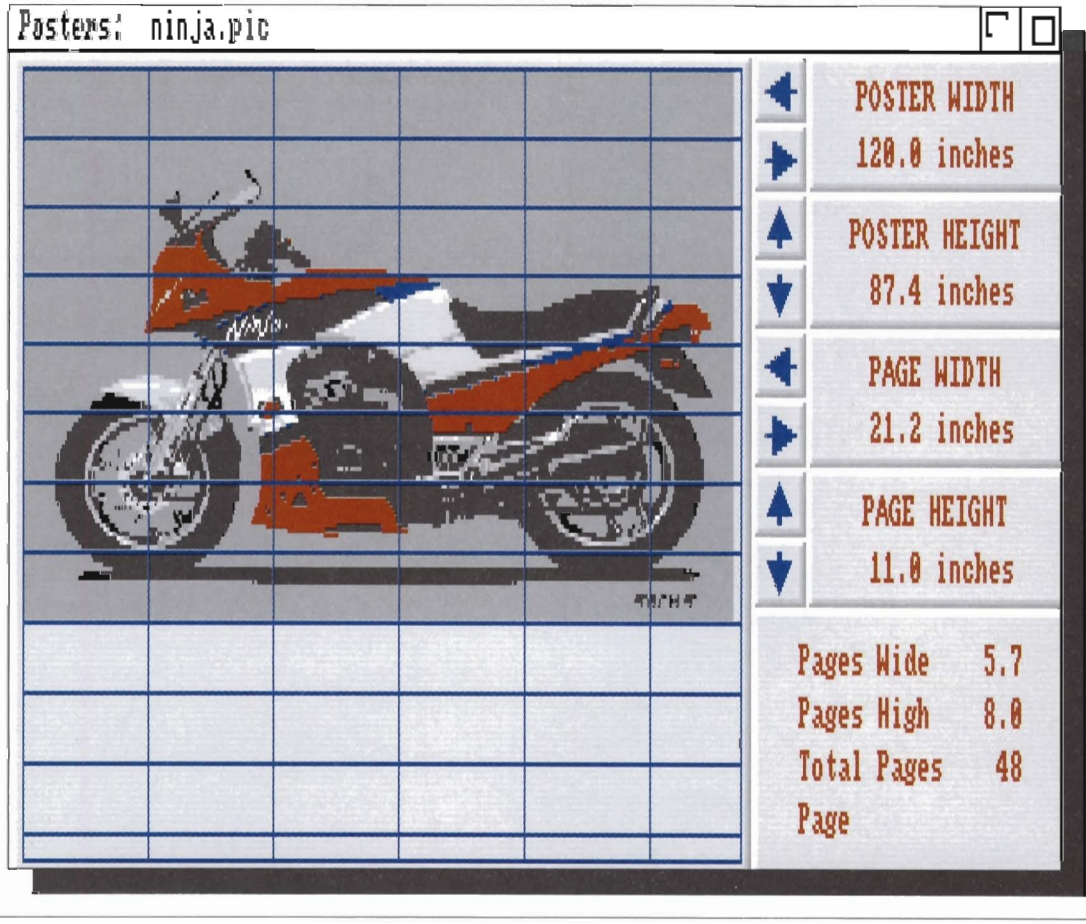
Present are all the standard features of a paint program, i.e. Freehand draw, Lines, Brushes, Filled shapes, Air brushes, etc. The paint functions are by themselves fairly impressive but it is in HAM mode that many of the "paint modes" truly shine. Deluxe PhotoLab contains several paint modes such as "Mix", "Shade", "Max", "Min", "XOR", to name just a few. The manual attempts to explain the effects that are achieved in these various modes, but to truly understand them it is best that you simply try them out. The tutorials are well laid out with quite a few examples and ideas. These examples may become quite helpful when you eventually begin to create your own masterpieces. As an added bonus, each of the major pictures on the "art disk" has an explanation in the manual, giving you a perspective on how they were created. Noteable of these pictures is the "Package Cover." The image was created by Larry Keenan, a professional photographer based in San Francisco. The work that went into this image is a testament to the potential of the Amiga in the field of graphic design and image processing.

Aside from the variuos paint modes, available are the "Shade Control" and the "Fill Control." The Shade control is to be used when in the "Shade" paint mode. If a shape is painted or an object is filled while in the shade mode, the fill will appear transluscent, or glass-like. The levels of transparency can be controlled along with varying dither or texture. In shade mode you also have a "highlight" option for various directions; you are able to control the position or point of highlight to be used. Highlight directions are, horizontal, vertical, all, or a specific point that is variable.

The Fill control is also an interesting and useful feature. The Fill control is not unlike that in Deluxe Paint II, wherein you set the range of colors for the fill, and adjust the dithering. The interesting twist with this particular control is that you can vary the dithering from the horizontal or vertical direction, while also varying the gradient. An added feature that is quite handy, particularly for a HAM paint program, is the feature known as "HAM Closeness". It lets you set the difference between two shades of colors that appear to be visually identical, but when you attempt to fill them, you find that they are not. Adjusting HAM Closeness allows you to now fill those colors. This function is variable with values ranging from 0 to 80.

NOTHING IS PERFECT...

For detailed work, the magnify mode works in the usual manner with a variable zoom. The lack of a keyboard equivalent for zooming in and out is annoying. Another feature that can be bothersome is in the area of the resizing of an object. When an object is being resized, you have no visual reference for resizing save the numerical x-y coordinates. Another personal pet peeve I found with "Paint" is the inability to re-



With Posters you can print your favourite image as small as 1" by 1", or as large as 10' by 10'. There is a smoothing option which will anti-alias the image as it is being printed. Posters will print any picture, no matter how many colors it is using. To select the size of the poster you require, you either use the gadgets along the right side of the screen, or you simply resize the image by dragging it by its lower right-hand corner.

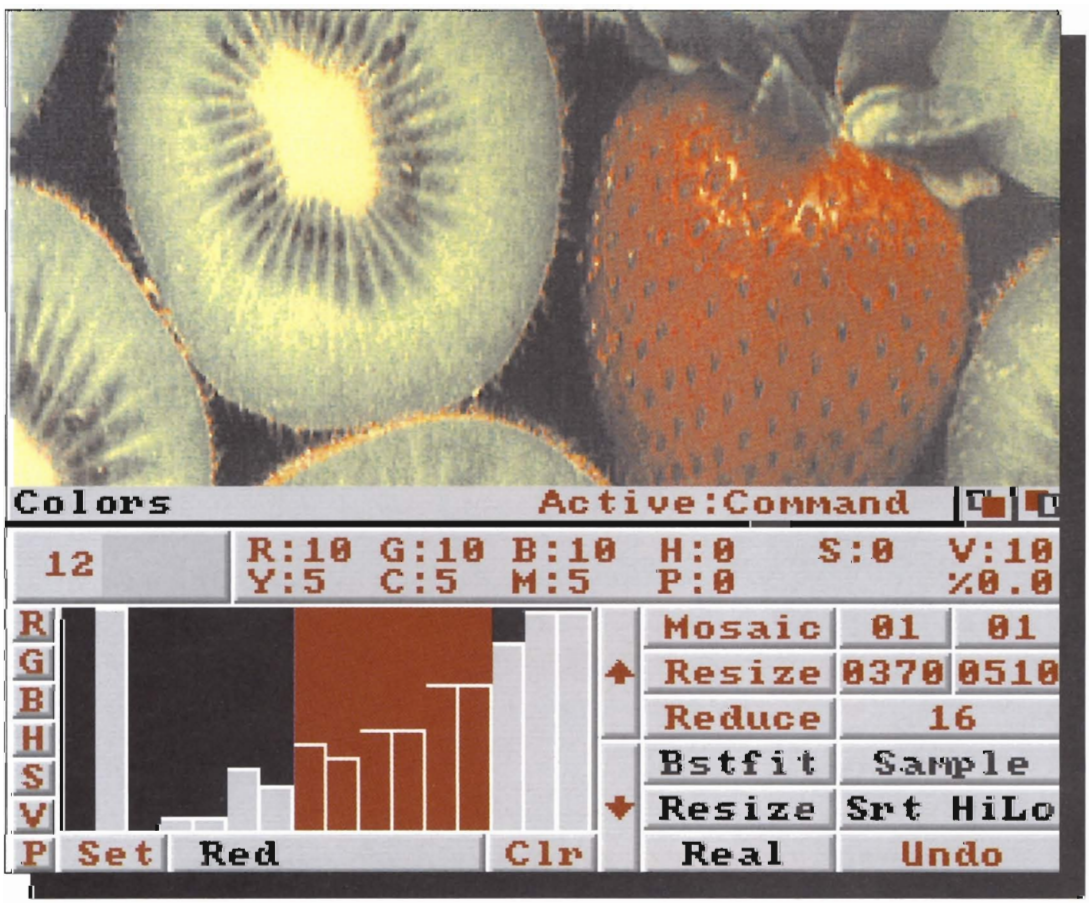
assign the fonts directory to another disk without having to quit and restart the program. Paint also has an inability to auto scale to the page size of an image that is being loaded. One way around this problem is when loading an image, make sure that the image has in the "Default Tool" field of the Info file the name of the program, "PHOTOLAB".

On the plus side, one feature that has a great deal of potential in HAM mode is the "load at" feature. "Load At" allows the user to load in an image at any preset resolution, meaning that you can display HAM images with resolutions greater than 320 x 400 - memory permitting. Because of the way that Deluxe PhotoLab sets up bitmaps, the size of the bitmap is only limited by the available amount of total RAM, whatever portion of that bitmap that is being viewed is displayed with chip RAM. This brings forth interesting possibilities because a HAM image with a resolution of roughly 1000 x 1000 would have near photo quality (high quality images are calculated to a resolution of at least 1024 x 1024). One truly incredible feature would be a software/hardware digitizing package that would permit you to digitize HAM images on a bitmap of 640 x 400 or even greater, restriction being memory (NewTek are you listening?). On a 3 megabyte Amiga 2000 I was able to open a HAM screen that was 1500 x 1500 pixels in size.

One neat little feature I just recently noticed, really impressed me. When you save a picture using Paint, the Icon that is generated looks like a mini version of your painting. There is no need to constantly re-load your pictures when you are searching for one whose name means nothing to you, just look at the icons in your picture drawer.

POSTER

Poster is the quintessential poster maker. This area of the program is a no-muss, no-fuss print utility. The instructions are very straight-forward with a lot of the functions being in fact intuitive. Poster permits the user to create posters up to 10 feet by 10 feet, or 100 square feet. The screen is set up with a series of grids, each grid representing a page. The dimensions of each page can be altered by width or height, so for instance If you have a wide carriage printer you can alter the grid according to size of paper. The poster print requester is set up in a manner that should satisfy even the most discriminating individual. You have the options of pausing the printout after each page so as to realign your printer paper, or you can just print straight through. When images are loaded in, they can be scaled with the mouse. Images can be scaled according to their original aspect ratio or x-y dimensions by selecting "Aspect Ratio" from the "Mode" menu. Images can also be rescaled with "Aspect Ratio" deselected, these images can then be resized independent of horizontal and vertical sizes. By selecting "Preview", you can preview the image that is loaded, and view how it will appear on the grid. The output from a poster that was 3 feet x 3 feet was fairly impressive, and when "Smooth" also known as anti-aliasing is selected, larger posters can still give good results. Although I was not gung ho enough at the time to try to print out a 10 x 10 poster, extrapolating, the re-



Colors is an image manipulation program. It allows you to do just about anything to your images, from changing their resolution to color separating and to creating a mosaic. The control panel and the image being manipulated are on separate screens. To view different parts of your image, you just point at it with your left mouse button and drag it around.

sults could be quite good.

COLORS...

The "Colors" section of this program is basically an image processing program, along the lines of programs such as PIXmate, and The Butcher. The usual information about an image can be obtained, such as the levels of Red, Green, Blue or Cyan, Magenta, and Yellow. All this information is graphically represented on a Register Graph that is located in the middle of the control panel. Colors will allow you to do pixel level manipulations such as changing values of selected registers thereby changing specific colors of a picture. With colors you are capable of doing separations into Red, Green, Blue, Cyan, Magenta, Yellow, and Black. You can change display modes, match palettes, convert to Black and White or make negatives. One aspect of Colors that might be considered as being a bit annoying is the fact that the program will not open up fully on an overscan screen. This little quirk in the program leaves an annoying black area or what is often referred to as the "dead zone"; this problem is also present with "Posters", but not present in "Paint." Colors is a logical complement to Deluxe PhotoLabs paint program. All graphic creation and processing can be done with one program.

THE CONCLUSION

From what has been seen, Deluxe PhotoLab can stand out as a paint program alone, not to talk of an image manipulation program and a print utility. The paint portion of the program has many unique features including the breaking of the HAM resolution barrier. The designers of Deluxe PhotoLab had two major goals set in mind when creating this program. They wanted a program that offered smooth transition from one graphics mode to another; they also felt that chip RAM should not be a limiting factor. They have achieved both of their major objectives. Deluxe PhotoLab is not without its faults, but then again what is. The poster maker functions quite well, although I have as yet to try a color poster output. The image processor called "Colors" is stocked with features found in most current Image manipulation packages, therefore you can do virtually all of your graphic work on one package. This is a very serious, low-priced graphics package, one that has to be reckoned with. Deluxe PhotoLab is still not the ultimate graphics package, but it can make the claim that it is the best overall 3 in 1 package presently available on the market. But one should also keep in mind that it is also the only one of its kind presently available. Perhaps this program may even spirit-in the age of all-in-one packages for specific functions. ❑

DELUXE PHOTOLAB
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
USA
(415) 572-ARTS
1 MB Required
Not Copy-protected

This picture, which is featured on the package cover of PhotoLab, was created by Larry Keenan using PhotoLab. The picture consists of several digitized images which were combined and then drawn over. The manual gives a very interesting account of how the picture was created.

AMIGOTIMES COLUMN

PUBLIC DOMAIN & SHAREWARE REVIEWS

UtilMast

by John Scheib

Wow! A superb directory utility program, if you don't have it you should get it. It has a built-in clock, works in interlaced mode, is quite fast and has a decent reader program built in.

You get two windows with a lot of gadget buttons that you customize to your needs. You can label the function buttons any name you want and then program them to actually perform those functions by just clicking on them.

For example I have buttons for ARC 023. Pkax, Zoo. Then when I want to Arc something I click on the file name then on "ARC 023" button and the program implements itself and arcs the file.

Nemesis

by Mark Riley

This is a small animation, about 35K in total, but never judge a program by its "K." You owe it to yourself to see and hear this animation! It depicts a flight through space and you can also partially control the animation. You'll see planets and other interesting effects, too. *(Nemesis can be found on this months AmigoTimes disk).*

MoreRows

by Neil Katin and Jim Mackraz

This is one of those oldies but goodies. This program has been around since "B.A.2000." (before the birth of the A2000) and it's still a great utility program.

It extends the amount of rows and columns of your Workbench screen. You simply set the amount of rows and columns that you want it increased by (I use 60 columns and 26 rows, which works out to 700 x 452) re-save your preferences and voila! The system-configuration will always bring your Workbench screen to the new resolution. *(MoreRows can be found on this months AmigoTimes disk).*

Vscreen

by Davide P. Cervone

Allows you to extend your Workbench to a maximum page resolution of 1000 x 1000. You can smoothly scroll your view by moving the mouse to the edge of the screen. It would be great to see it implemented on Workbench V1.4. *(Vscreen can be found on this months AmigoTimes disk).*

NewScreen

by Chris Bailey

Ever wish you had another Workbench window at times. This program makes that dream come through. It allows you to open a couple of separate Workbench screens, in different resolutions if you wanted. For example, you can create a 320x200 16 color Workbench, or just as easily, one which is 640x400 with 16 colors *(NewScreen can be found on this months AmigoTimes disk).*

Ghostpool

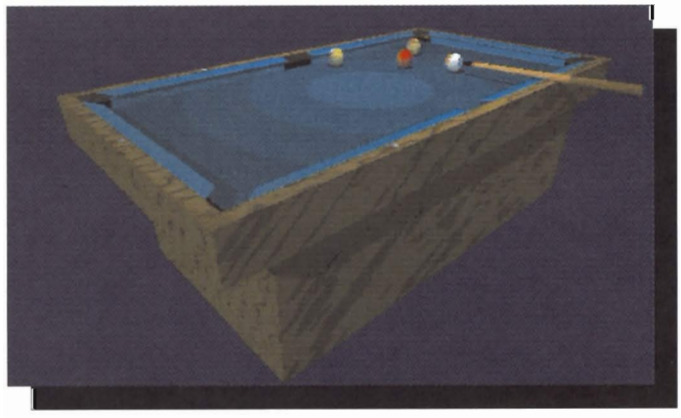
by Dr. Eric J. Fleischer

A very large file (407K) animation of a pool table. The animation runs for about a half a minute. Once the animation begins, balls appear on the pool table, along with a eerie floating pool cue that comes to line up and clear the table of all its balls. While the balls are being cleared, you can hear the "clank" sound of the cue ball hitting the other balls. After all the balls are cleared, a digitized voice names the title and creator of the animation. It's an animation that must be seen.

BThrows

by AmiGuy

It never ceases to amaze me what you can do with this amazing machine. Some computer users are so dedicated and talented with the Amiga, that they create true works of art. A good example of this is this animation of a basketball player throwing a boing ball through a basket ball hoop. The animation kept me fascinated for a couple of days. This is one of those demos that you show to IBM, Macintosh or Atari users and dare them to create something like it; their machines would probably get a hernia trying! ❑

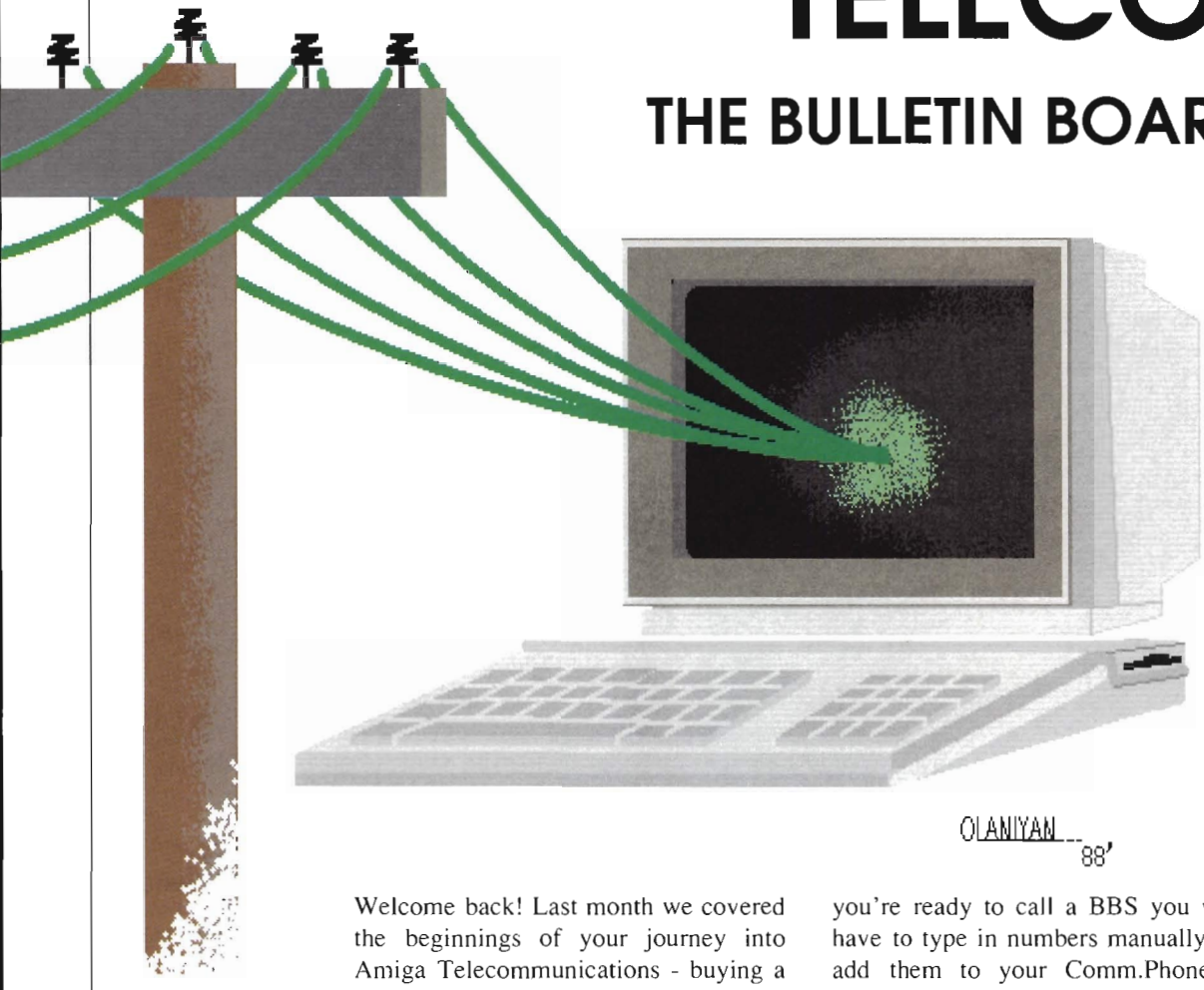


The Ghostpool animation created by Dr. Gandalf. This animation is a work of patience and art.

The Boing Throws animation keeps you awe-struck and glued to your monitor for hours.

TELECOMM

THE BULLETIN BOARD WALK



Welcome back! Last month we covered the beginnings of your journey into Amiga Telecommunications - buying a modem, hooking it up, and finding some numbers to call. This time we'll cover your first call to a local Bulletin Board system. To better explain the use of a terminal program, as an example we'll use COMM version 1.34 (included on the AmigoTimes Disk #1.1). COMM is a very easy terminal program to learn and to use, and yet it's full-featured which means it will perform all the tasks you'd expect of a good terminal program. It's best feature is that it's free. Before you spend your hard earned cash on other Amiga terminal software, try using COMM. It could very easily be all you need.

Have you created a custom Comm.Phone file yet? This will make using COMM much easier since when you're ready to call a BBS you won't have to type in numbers manually. Just add them to your Comm.Phone file which is stored on disk. Remember, COMM looks for and loads Comm.Phone automatically if it finds it. I'm sure you've thoroughly read the documentation for COMM but just as a quick refresher:

Let's take a look at the sample Comm.Phone file that comes supplied with COMM (see figure 1). This phone book can hold 44 different telephone numbers. To add your own favorite numbers to it you can simply load the sample Comm.Phone file into your Amiga ED text editor and start adding and deleting lines. You can also do this from inside COMM itself. The more you use the program the easier it is to use. Keep count of how many lines you add: COMM will only load and display

By Harv Laser

the first 44 of them. Also remember to remove any blank lines. Just follow the same format as the sample phone book and then save your revised book back to disk under the same name of Comm.Phone.

You can have as many phone books for COMM, each holding up to 44 numbers, as you wish and you can load in a new one whenever you please but remember, COMM looks for a phone book in your current directory path called "Comm.Phone" and will automatically load that one when you run COMM. Keep your most often called numbers in "Comm.Phone" and your less used ones in phone books with other easily remembered names.

Let's call a local bulletin board, logging in for the first time as a new member, and browsing some recent notices, and maybe download a couple of files from the library. I won't even try to cover all the possible commands on every type of bulletin board - this entire magazine wouldn't have enough pages for that, but I'll touch on some important highlights and tips you should know before you call your first BBS.

Most bulletin boards are run on some kind of personal computer connected to a single phone line in someone's home. It's sort of a "mini" version of what you'll find on the large national dialup networks. An Amiga-oriented BBS might not be running on an Amiga, but that really makes no difference to you, the caller. Bytes are bytes and any kind of computer can store files usable on any other kind of computer.

The bulletin board's owner, or System Operator is known as the Sysop (pronounced "SISS-opp"). Some bulletin board sysops will not give complete access to first-time callers. There's a good reason for this: the sysop doesn't know who you are and will probably want to verify that you're giving true information such as your name and the city in which you live when you call in for the first time. His BBS might be free or it might be "in the service" of an area user group and open only to paying members of that group. Opening bulletins displayed when you log in will explain to you if it is a "pay board" and how much money you are expected to contribute to gain privileges such as downloading files.

The vast majority of BBSs run on Amigas for the Amiga community use software called "BBS-PC" published by Micro Systems Software and available through Amiga dealers for about $100.00 (US). BBS-PC can be customized by the sysop to many different configurations, however, in my experience of calling hundreds of different boards I've found that except for special opening bulletins, the number of sections and their names, and a couple of keystrokes here or there, BBS-PC boards look pretty much the same all over the country.

17	17	9	32
name	number	baud	comment
AGE	1,209-438-0510	1200	CA
Amuse	1,212-269-4879	1200	NY
Amy BBS	1,303-693-4735	1200	CO
Amy Palace	1,201-446-1424	1200	NJ
Casa mi Amy	1,904-733-4515	1200	FL
CAUG	1,216-341-4452	1200	OH

figure 1

Other popular Amiga-based BBSs run under software such as Custom BBS, TAG, CommLink, and others. Some of these are commercial programs, some are shareware or even public domain. Are you ready to call? First, if you have others in your household, and your computer is hooked to your only phone line, make sure your family members know that you will be using the line with your Amiga. Tell them not to pick up any extension phones while you're online. This will cause a lot of garbling when your computer is trying to communicate through its modem.

If you have "call waiting" service, check with your phone company as to how to disable it while using your modem. If you should get an incoming call while you're using your modem, the call waiting "beep" will disrupt your telecomm session, maybe even disconnect you abruptly.

Okay, let's dial the number. Assuming you've set up your Comm.Phone directory and have run Comm, access the phonebook by holding down the right mouse button and touching the top menu bar. A big menu will drop down with the names of the BBSs in your phonebook.

Drag the mouse over the name of the BBS you wish to call and let go. If your modem has a speaker you should hear it go "off hook" and dial the number very quickly. Keep listening. You'll either hear the number ring, or you'll hear a busy signal. Busy signals are very common when dialing popular BBSs. Remember, most of them have only one phone line.

If the line is busy just wait a few moments, maybe that other caller has finished. If you have a Hayes compatible modem (most are these days, such as the Avatex and Supra modems) just hit "a/" (that's the letter 'a' key and a slash) which tells the modem to repeat the last command you gave it. In this case, the last command was to dial a phone number, so the modem will redial. COMM does not have "built-in redial." You could also have selected the number off from Comm's phone menu again. Either way will work fine.

"Ring Ring!" Alright! We're connected! Now listen to your modem speaker and watch the screen. You should hear the phone being answered followed by a high-pitched squeal sound. This is the BBS's modem answering the phone. Your modem will hear this tone and send its own tone. For a moment you'll hear both tones at once and then your modem speaker should shut off. On your screen, depending on which baud rate your using, your modem will display one of three messages:

CONNECT
CONNECT 1200
CONNECT 2400

This means the two modems are talking to each other. Now depending on what kind of BBS you've called, one of many possible things will happen. If you've called a board running BBS-PC, you'll see a prompt telling you to "hit

[Return]". Other kinds of boards may immediately start sending text to your screen.

The BBS will identify itself, usually tell you its name and what kind of software it is running, and then ask for your name, your ID number, your "handle" (a pseudonym you can pick for yourself) or some other information.

BBS-PC is smart software - when you enter your name it immediately checks its disk-based data and looks for a match. If your name is not found, you'll be taken to a "new user signup" bulletin which should be self-explanatory. Enter all the information requested. It's likely you'll be asked to supply your true name, address, and phone number. It's up to you if you wish to give out this information. Many BBS Sysops will call you to verify you are who you say you are and will promise to keep the information you have supplied to them confidential. Some may even call you collect.

I won't get into legalities here. Just use some common sense and good judgement. Remember, you're going to be allowed to use the BBS by its Sysop.... like driving a car, this is a privilege, not a right. Treat others as you would yourself like to be treated.

After you've entered your personal information it'll be displayed back to you for you to verify you typed everything correctly. Check it and then enter your personal password when requested. Make your password a combination of letters and numbers that cannot be easily guessed - certainly DO NOT use your name as your password. The most secure passwords are a combination of two unrelated words separated by a punctuation mark such as TIMBER*PEN or 1850/ORANGE or something so strange no one would ever think of it.

Be sure to write down your password so you don't forget it the next time you call the BBS. You can add it as a "memo" into Comm's phone book but be sure if you give your copy of Comm to others you do NOT include your personal phone book containing your passwords.

You have now logged onto your first BBS. You'll probably be given limited access by the Sysop until he verifies you. He may phone you or he may not - that practice varies from Sysop to Sysop. Give the Sysop at least a day or two to verify you. He's probably running his BBS as a hobby in his spare time. Don't expect to be verified the same day you call. Then again, the Sysop may be sitting at home watching you log into his BBS and may break into a "live interactive CHAT" with you. If he thinks you're okay, he may verify you and give you full access on the spot.

With your first-time limited access you should be able to check out the various message areas. You may be able to read notices but not post any. You may be allowed into the library section to look at what files are there for downloading, but not allowed to download. This is common - do not be offended by this limited access during your first call to any BBS.

When you've finished looking around, or when your "trial time" is up, whichever comes first, log off the BBS via its menus. Do not just power off your modem or disconnect. This is rude. BBS software can often recover from a caller just hanging up, but other times it can cause problems and the software may have trouble resetting itself. Always log off via the commands or menus the BBS provides. Look for a menu command resembling "goodbye", "exit", or "terminate call".

Congratulations. You've done it. You're now a member of the Amiga society of modem addicts! If you've gotten a few BBS numbers, try calling some others. Remember, time goes by quickly online. Check the front of your telephone book to see what numbers are in your local dialing area, or how much out-of-area calls will cost.

Before we conclude this session, there's one important point worth mentioning and that is "line noise." Depending on various factors - what part of town you live in, how close you may be to a radio transmitting tower, what other electronic equipment you have near your computer, you may experience the phenomena known as "line noise." If you see "junk" characters on your screen during an online session; if your cursor moves without you having typed anything, if you see things like ~r or }i or other spurious characters you're experiencing line noise. You can have line noise during a voice telephone conversation, and you probably have, but you could still hear the other person speaking and it didn't affect your conversation very much.

Over the modem line noise is more serious. It can send characters to the other computer's modem that will be misinterpreted and issue false commands that you didn't mean to type. It can make downloading and file transfer nearly impossible. Check the cable between your Amiga and modem. You should have purchased a round "shielded" cable. They're slightly more expensive than simple flat ribbon cable but they're better at rejecting interference. Make sure you don't have electrical motors running near your computer. If line noise is very bad in your area, check with your local Telephone Store or Radio Shack for something called an "RF Interference Filter" which costs about $10 and snaps onto your modem's phone line. It can really help clean up line noise in many cases.

Next time: DOWNLOADING: using Xmodem and the ARC program. Happy modeming!

In future issues I'll be guiding you through the wonders that await you on such large and diverse systems as American People/Link and Usenet. ❑

Subscribe to...

AmigoTimes
News and Information Resource for the Commodore Amiga

☐ Yes! **BEGIN** my subscription to AmigoTimes for:

	Canada ($CDN)	U.S.A. ($US)	Foreign Air Mail ($US)
6 Issues	☐ 51.00	☐ 42.00	☐ 65.00
12 Issues	☐ 87.00	☐ 72.00	☐ 118.00
24 Issues	☐ 158.00	☐ 131.00	☐ 223.00

☐ Yes, Please include *AmigoTimes* **Designer Disk Set #1** (Animations) 3 disk set at: US $12.95 (CDN $14.95)

TO:

Mr./Mrs./Ms. Please Print Full Name

Company

Address City

State/Province Postal Code/Zip Country

Please allow 30 to 60 days for delivery of first issue

Enclose Check or Money Order Payable to:

AmigoTimes
5124 St. Laurent, Suite 100
Ville Ste. Catherine
POB 1228
Quebec, J0L 1E0,
CANADA
tel. (514) 638-6303

AmigoTimes Reader Survey:

1. What type of machine do you own?
- Amiga 500
- Amiga 1000
- Amiga 2000

2. Where do you use your Amiga?
- At Work
- At School
- At Home for business
- At home for recreation

3. What peripherals do you own?
- Printer
- Second disk drive
- Hard disk drive
- Modem
- Expansion Memory
- Sidecar
- Genlock or Digitizer
- Musical Equipment
- Other

4. Which do you plan to purchase within the next 6 months?
- Printer
- Second disk drive
- Hard disk drive
- Modem
- Expansion Memory
- Sidecar
- Genlock or Digitizer
- Musical Equipment
- Other

5. What are your interests?
- CAD
- Music
- Desktop Publishing
- Desktop Video
- Graphics
- Games
- Other

6. Which other computer magazines do you read?
- AmigaWorld
- Amazing Computing
- Amiga Transactor
- Amiga Sentry
- Robo City News
- Info
- Byte
- Other

7. What topics would you like to see in future issues?
- More Programming
- More Reviews
- More Features
- Applications for the Amiga
- Hardware Projects
- Desktop Video
- Music
- Other

8. What are your favorite parts of AmigoTimes?
- Editor's Corner
- Tricks 'n Tips
- The Amiga Monitor
- GobbledyGook
- Telecom
- Midi
- Programming
- Reviews and Features

9. How would you rate this issue of AmigoTimes?
- Terrible
- Poor
- Fair
- Good
- Very Good
- Excellent

10. Where do you purchase your Computer Products?
- Dealer
- Mail Order
- Direct from Manufacturer
- Department Store
- Other

11. From which of these categories do you plan to purchase software?
- Financial
- Desktop Publishing
- Desktop Video
- Programming Tools
- Entertainment
- Music
- Education
- Word Processing
- Communications
- Painting
- Database
- Spreadsheet
- Productivity

PUBLIC DOMAIN LIBRARY

CAM Club Amiga Montreal

Indicate which disk you have selected with a small ✓ or an ✗ beside the appropriate disk number.
Please send me:

☐ _____ Disk(s) at US $5.95 (CDN $6.95)
☐ _____ Ten (10) disks or more at US $4.95 (CDN $5.50) each
☐ _____ Catalog Disk(s) at US $2.95 (CDN $3.50)

☐ 1	☐ 17	☐ 33	☐ 49	☐ 65	☐ 81	☐ 97	☐ 113	☐ 129
☐ 2	☐ 18	☐ 34	☐ 50	☐ 66	☐ 82	☐ 98	☐ 114	☐ 130
☐ 3	☐ 19	☐ 35	☐ 51	☐ 67	☐ 83	☐ 99	☐ 115	☐ 131
☐ 4	☐ 20	☐ 36	☐ 52	☐ 68	☐ 84	☐ 100	☐ 116	☐ 132
☐ 5	☐ 21	☐ 37	☐ 53	☐ 69	☐ 85	☐ 101	☐ 117	☐ 133
☐ 6	☐ 22	☐ 38	☐ 54	☐ 70	☐ 86	☐ 102	☐ 118	☐ 134
☐ 7	☐ 23	☐ 39	☐ 55	☐ 71	☐ 87	☐ 103	☐ 119	☐ 135
☐ 8	☐ 24	☐ 40	☐ 56	☐ 72	☐ 88	☐ 104	☐ 120	☐ 136
☐ 9	☐ 25	☐ 41	☐ 57	☐ 73	☐ 89	☐ 105	☐ 121	☐ 137
☐ 10	☐ 26	☐ 42	☐ 58	☐ 74	☐ 90	☐ 106	☐ 122	☐ 138
☐ 11	☐ 27	☐ 43	☐ 59	☐ 75	☐ 91	☐ 107	☐ 123	
☐ 12	☐ 28	☐ 44	☐ 60	☐ 76	☐ 92	☐ 108	☐ 124	
☐ 13	☐ 29	☐ 45	☐ 61	☐ 77	☐ 93	☐ 109	☐ 125	
☐ 14	☐ 30	☐ 46	☐ 62	☐ 78	☐ 94	☐ 110	☐ 126	
☐ 15	☐ 31	☐ 47	☐ 63	☐ 79	☐ 95	☐ 111	☐ 127	
☐ 16	☐ 32	☐ 48	☐ 64	☐ 80	☐ 96	☐ 112	☐ 128	

The available disks vary in content. The contents range from Utilities to Slideshows; Animations, Communications utilities, Music, Games, Tutorials, and Fonts.
To aid you in your selections, a Catalog Disk is available from *AmigoTimes*. A printed catalog will also accompany each order.

CUT ALONG DOTTED LINES WITH CORRECT REPLY CARD ON OUTSIDE - Seal with Tape or staple, but do not glue please

PLACE
STAMP
HERE

AmigoTimes

5124 St. Laurent, Suite 100
Ville Ste. Catherine, POB 1228
Quebec, J0L 1E0
CANADA

△ Fold Carefully Along Dotted Line. This side facing out for **CANADIAN** postage △

▽ Fold Carefully Along Dotted Line. This side facing out for **USA** postage ▽

PLACE
STAMP
HERE

AmigoTimes

P.O. Box 1158
Champlain, NY 12919-1158
USA

TO KNOW AVAIL

Add Hundreds of Bytes to Your Amiga Without Doing Anything!

AVAIL is a command for reporting memory in use and memory still available, for both FAST and CHIP RAM. It will likely be part of the standard command set in the 1.3 release of AmigaDOS. We'll look at a "fast and tight" assembly language version that provides an excuse for exploring list traversal, long division, "residential purity," and base-register and PC-relative coding.

SOME HISTORY

I ran into the need for an AVAIL-type command back when I started doing more intensive C programming on a then-standard 512K A1000. The compiler would run out of system memory unless I remembered to delete unnecessary files from RAM beforehand. After getting a "not enough memory" message for the umpteenth time, I decided it would be real nice to have a program that would show how much memory was available, so I'd know when to delete extraneous stuff.

I had already made considerable use of the Exec AvailMem function in debugging other projects, so there was no puzzle about how to find the needed information. Some of the early ARP work by Charlie Heath and his cohort had been released, and the source for one of the commands provided an example of outputting text to the screen. The only remaining problem was how to convert the values from AvailMem into ASCII strings for the Write routine.

There is a simple algorithm for converting values to their ASCII representation. You just divide the value by the base (= 10 for decimal), convert the remainder to the appropriate digit, and save the quotient for the next division. In this way you build the number up from right to left, from least to most significant digit. In C, you might do it like this:

```
#define BASE 10
/* decimal representation */

void anitoa(value, where)
 long value;
/* number to convert */
 char *where;
/* points to end+1 of string
    getting ASCIIed number */
{
do
 {
 --*where = (value % BASE) + '0';
/* hex is more complicated */
 }
while (value /= BASE);
}
```

The only problem, so far as 68000 assembler is concerned, is that the built-in division commands, DIVS and DIVU, generate only 16 bits of dividend, that is, no number greater than 65535. Even with my half-meg Amiga, this wouldn't be adequate.

But I had the solution at hand. Frustrated by the slowness of integer arithmetic in Lattice 3.03, I had previously written routines for full 32-bit division and multiplication. I joined all these pieces together, and bingo!, I had an assembler AVAIL command. It had some bolts in its neck and walked funny, but it told me how much memory I had left-over and eliminated most of those nasty "not enough" messages.

Some time later, I discovered that I had once again reinvented the wheel: a very similar AVAIL command was on the Commodore "SW Toolkit" disk that had come with the 1.2 gamma release of AmigaDOS. Still, my version of AVAIL was pleasingly smaller than Commodore's (932 to 3228 bytes).

In Washington, D.C at the 1988 Amiga Developers Conference, AVAIL came up in a conversation with John Toebes, of Software Distillery and Lattice (SAS Institute) fame. He mentioned a C version he had written that Lattice 4.0 compiled down to a mere "728 bytes." That got my attention. An assembler program should always be smaller than any high level equivalent.

Even though Toebes' AVAIL turned out be be actually 744 bytes long, I felt I had to take another whack at it. Like him I would duplicate the appearance of Commodore's version: the program would run from the CLI, take no arguments, and output the following information to the screen:

Type	Available	In-Use	Maximum	Largest
chip	441536	81696	523232	441112
fast	2816904	321392	3138296	2017856
total	3258440	403088	3661528	2017856

And while I was at it, why not throw in re-entrant code, and base register and

By Gerald Hull

PC-relative addressing to boot?

The result is an assembler program I call TRAVAIL: a "TRimmer AVAIL." It takes up only 472 bytes and fits into a single disk block. Alas, AmigaDOS allocates an additional block for file information, so for conserving disk space, TRAVAIL is no improvement over Toebes' C AVAIL. However, because it's smaller, the program shows more memory available when it's run. Hundreds of extra bytes, everytime you look!

Nonetheless, there's an intrinsic virtue in striving for fast and tight code. You learn to distinguish between what's important and what's not, and to analyze programming tasks down to their essential requirements. Such habits will ultimately benefit coding in other projects, regardless of size or language. How often on the Amiga are our disks burdened by programs that have swollen to enormous, ponderous behemoths, presumably because "size doesn't really matter"?

I'VE MADE A LITTLE LIST

My original AVAIL differed from Commodore's in having no "In-Use" statistics. Adding that capability requires a circuit of the memory list to find the total amount of memory, CHIP and FAST, known to the system, and then subtraction of the unused amounts obtained through AvailMem.

Linked lists provide the skeleton of the AmigaDOS operating system. Just about everything - memory, devices, tasks, libraries, interrupts, ports, and so forth - connects together that way. These are "doubly" linked lists, meaning they can be followed both forward to the end or back to the beginning. Most AmigaDOS lists are anchored in AbsExecBase, and that's where we find MemList.

Linked lists constitute one of those areas in computer science slashed and burned by successive hordes of doctoral candidates, ever questing for greater efficiency and economy. The 68000 implementation in AmigaDOS is especially ingenious, but somewhat incomprehensible as a consequence. This isn't helped by errors in Commodore's Exec documentation, continued in the Addison-Wesley edition.

Since linked lists are so fundamental, their speedy traversal is an absolute priority. What can slow this down is the need to accomodate special cases, for example when the list is empty. AmigaDOS avoids testing for that condition by guaranteeing every list has first ("HEAD") and last ("TAIL") nodes even though empty of "actual" nodes. It further saves space by merging head and tail into a single "header."

The best way to understand what's going on in linked lists is to draw lots of boxes connected by arrows (Fig.1). In "real life," each node would be just one component in a larger structure, for instance with a block of memory attached.

Every node has PRED and SUCC fields which point to the next and previous nodes, or contain zero if it's at the end of the line. Since a HEAD node has no predecessor, and a TAIL no successor, both these fields will always be zero, and can be combined. Consequently, a header contains only three fields, which represent both head and tail nodes as follows:

```
header      function

HEAD        HEAD SUCC
TAIL        HEAD PRED  = TAIL
SUCC = 0
TAILPRED    TAIL PRED
```

If you play with the list in Fig.1, you will see how it's possible to traverse it in a forward direction by starting with the HEAD and tracing through the SUCC fields. Or, beginning with the TAIL node, you can trace backward in reverse via the PRED fields. In either case, you traverse the whole list.

The code for TRAVAIL's traversal of MemList is adopted from an example in the Exec manual:

```
      jsr     _LVOForbid(a6)
  . . .
      move.l  MemList(a1),d3  * beginning of list
SCAN  movea.l d3,a1
      move.l  LN_SUCC(a1),d3  * get new ptr, set ccs
      beq.s   DUN             * found list end

 <add to memory totals>       * deal with node

      bra.s   SCAN            * continue
DUN   . . .
      jsr     _LVOPermit(a6)
```

An important detail is the "lookahead" function of register D3. On the 68000, movement of data into an address register has no effect on the condition codes, so if you tried to simplify with

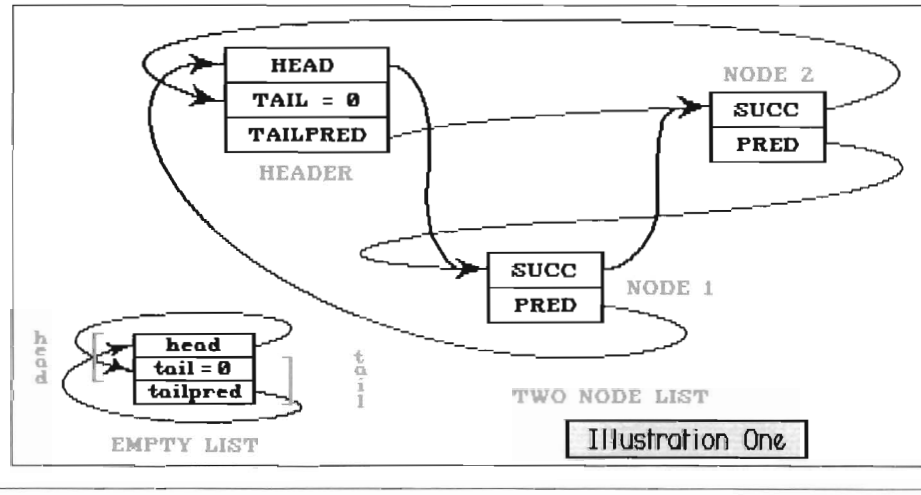
```
movea.l  LN_SUCC(a1),a1
```

you'd have to add an additional test to see if you had reached the end of the traversal. Even more important is bracketing searches of public lists with calls to Forbid and Permit. Otherwise, another task could delete a node while you are in it, leading to that flashing black and red screen that Pournelle complains about.

THE GREAT DIVIDE

The long division routine LDIV in TRAVAIL is based on code in a manual for a 68000 training course I attended, back when the chip first came out. It's an adaptation of the familiar grade school algorithm for long division. Using X for the divisor, and YZ for the two words (Y = high order, Z = low) of the dividend, what we want to do is

$$X\overline{)YZ}$$



which we can break down into

$$X\overline{)Y*65536+Z}$$

Continuing the operation, we get

$$\begin{array}{r} Q1*65536+Q0 \\ X\overline{)\,Y*65536+Z\,} \\ R1*65536+Z \\ \hline R0 \end{array}$$

Q1 and R1 are the quotient and remainder from dividing X into Y, the high order part of the dividend. Q1 is the high order part of the final quotient, while R1 gets appended to the low order part of the dividend (= Z). X into R1Z yields Q0, the low order part of the quotient, and R0, the remainder. The comments in the Listing at the end of this article, show how this works out in detail.

After describing this long division in gory detail, I must confess it ain't really necessary. Wesley Howe, author of the Inovatronic's CAPE assembler, has sent me yet another version of AVAIL, this one by Jim Cooper, also of the Software Distillery. It seems that there's an Exec function that will do C-like output string formatting for you.

It's called RawDoFmt, and is called according to the formula:

```
RawDoFmt(FmtSt, DatLst, PutPrc, PutStr)
          a0     a1      a2      a3
```

where

FmtStr -> an output format string, ala C's printf;
DatLst -> a sequence of long words containing the data to be output;
PutPrc -> a procedure to handle the character-by-character output from RawDoFmt; and
PutStr = a pointer to the output string that get passed along to PutPrc.

In other words, RawDoFmt takes a null-terminated C type format descriptor like "%c: Dec %3d Hex %2x", plus a sequence of long words (three in this example), and calls a routine you specify, character by character, until it has generated the appropriate string.

In calling your routine PutPrc, RawDoFmt has the next character in register D0 and passes along whatever address was put in register A3, which obviously should point to the output string you are preparing for a call to Write. Here's how Jim Cooper does it. Both code and comments are his, save for some minor changes in style:

```
printf
   lea    FMT(pc),a0       load format string
   lea    store(pc),a2     routine that puts chars in
                           output
   lea    v_OUTPUT(a4),a3 where to put 'em
   move.l a3,a5            also, save it for PRINT
   jsr    _LVORawDoFmt     have system 'make' output
                           string
   move.l d5,d1            Output file handle
   move.l a5,d2            pointer to buffer
   moveq  #127,d0          absurd number > max
   moveq  #0,d3            init char count

LENLOOP
   tst.b  (a5)+            NULL yet?
   beq.s  PRINTIT          yes, goforit!
   addq.l #1,d3            increment char count
   dbra   d0,LENLOOP       and check again

PRINTIT
   move.l d6,a6            recover DOSBase
   jsr    _LVOWrite        and print it all out!
   move.l _AbsExecBase,a6 and restore Exec Base
   rts

store
   move.b  d0,(a3)+
   rts
```

By using RawDoFmt, Cooper is able to output an entire string with about the same amount of code TRAVAIL uses just to perform the long division. As a result of this and other tricks, his latest version of AVAIL is only 460 bytes long. So the "TRimmer AVAIL" isn't the "TRimmest AVAIL." The fast and tight game, like any track and field event, is one in which records are constantly being broken.

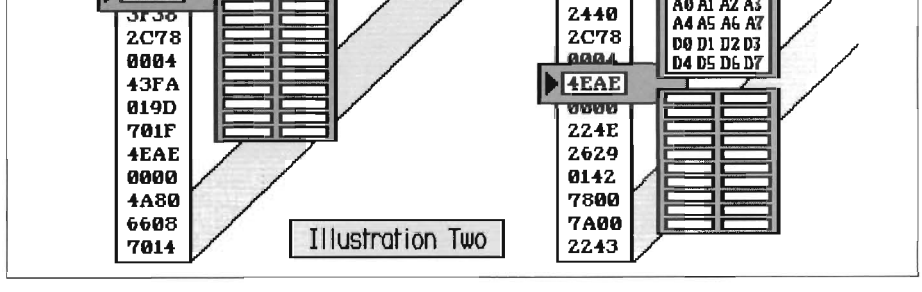
PROGRAMS IN RESIDENCE

Despite the various efficiencies of AmigaDOS multitasking, there are some areas in which it is pretty gawky and awkward. Many people, for instance, load commonly used system commands into the RAM directory to speed up execution speed. When they want to run one of those commands, the operating system loads them into another area of memory before execution. If a different task wants to run the same program at the same time, yet another executable image gets loaded.

This hardly represents an effective use of memory. Fortunately, the situation should change with AmigaDOS 1.3, which will likely include a RESIDENT command. Like AVAIL, RESIDENT was originally made available to developers on the Commodore "SW ToolKit" disk. It provides a means of storing a single copy of a program in memory - making it "resident" - which is used and reused by any task that calls it.

Residency, however, imposes special requirements on software. If a program does not explicitly initialize all its variables, they may have improper values the next time it is run. Non-constant global and static variables pose additional problems. If two tasks are executing the same piece of code at the same time, they both will try to operate on the same memory locations, with chaos the guaranteed victor.

A program which allocates a different local area for any variable data each time it's run, and doesn't alter its executable image, is called "reentrant" or "pure." To get an idea of this, try to imagine a single piece of code being processed at different locations by different tasks (Fig.2). If you are familiar with microbiology, this will remind you



of nothing so much as a segment of DNA being parsed simultaneously by multiple RNA polymerases.

In effect, each task has its own set of registers (they get swapped in and out) and its own private segment of the stack for data and calculations. By leaving the code itself untouched, and confining all data manipulations to the registers and private stack area, you eliminate the danger that one task can have "side effects" on another task executing the same resident code.

TRAVAIL has a common global data area appended to the executable code (see listing), but it is used solely for character strings constants. For such, there is no problem with multiple concurrent use by different tasks. All "true" variables are confined either to registers (which is speedier anyway), or to a "local stack frame" allocated and deallocated with the 68000 LINK and UNLK commands.

Local stack frames are typically used by the subroutines of high level languages, which need a local variable space that can be freed up when the routine exits. However, nothing prevents us from doing the same thing for a program as a whole. Each time the program is executed a new local stack frame is allocated - in a different area of the stack - which prevents separate tasks from messing up each others' numbers.

REDUCING THE LOAD

One of the much heralded initial advantages of Manx C on the Amiga was its ability to provide PC-relative and base register addressing, though Lattice and some assemblers (Wesley Howe's CAPE) can now do the same. Instead of using 32-bit addresses to specify locations in memory, you instead use 16-bit offsets to the value in the program counter or an address register.

In machine code terms, the difference looks like this:

```
49F9  0000  01AE     lea      TOTL,a4
2039  FFFF  FFF4     move.l   TAVAIL,d0

49FA  0114           lea      TOTL(pc),a4
202D  FFF4           move.l   TAVAIL(FP),d0
```

These addressing modes limit the range of memory you can work in, of course: plus or minus 32K from the register or PC contents. But the immediate advantage is smaller code - you save two bytes every time - that executes more quickly (a by now familiar aesthetic). On the Amiga, however, there are even further advantages, which have to do with the difference between "relocatable" and "position independent" code.

More primitive operating systems, like those on the Commodore 64 and IBM PC, find it advantageous to load into absolute locations. However, a multitasking operating system such as AmigaDOS has to be able to load and run programs anywhere in memory. This obviously causes a problem with code that refers to locations identified only by label. How do we know where in memory that location is going to end up?

The solution is a cooperative process involving the compiler or assembler, and the AmigaDOS loader. The program translator treats references to labels as if the code begins at address 0, but also lists where those references occur. The result is an object file module that contains both a "code hunk" and a "reloc hunk," the latter with the locations of any label-mediated references.

When you run the program, the loader finds an unused place in memory and stuffs the code there. Then it goes through the reloc list, and at each location adds in the new (actual) starting address (Fig.3).

However, if you avoid any references to labels, by restricting yourself to base-register and PC-relative addressing, you generate code that is truly "position independent." This means the compiler or assembler generates no list (= smaller object module), and the loader doesn't have to relocate (= faster loading).

There is an interesting synergy between these forms of addressing and reentrant code. The 68000 does not allow PC-relative addressing for destination operands. However, in a program like TRAVAIL it's only needed for references to the constants at the end of the program, and residency requires they not be changed anyway. All of the variables that you do need to be able to change are defined as offsets to the frame pointer - that is, as base register operands that are allowed as destinations for 68000 instructions.

ACKNOWLEDGEMENTS

The LDIV algorithm and comments have been adapted from an example in "MC 68000 Course Notes," a text distributed at a Motorola Technical Training Seminar. Talks by Carolyn Scheppner and Jim Goodnow at the 1988 Commodore Developers Conference in Washington, D.C. contributed greatly to my appreciation of AmigaDOS residency and program loading. John Toebes' listing for AVAIL.C, which ingeniously doubles as its own execute script, was very helpful in the redesign of TRAVAIL. Finally, Wesley Howe made a number of useful comments on an earlier version of the program in addition to passing along Jim Cooper's program. ❑

The assembler listing of TRAVAIL can be found on the accompanying AmigoTimes disk.

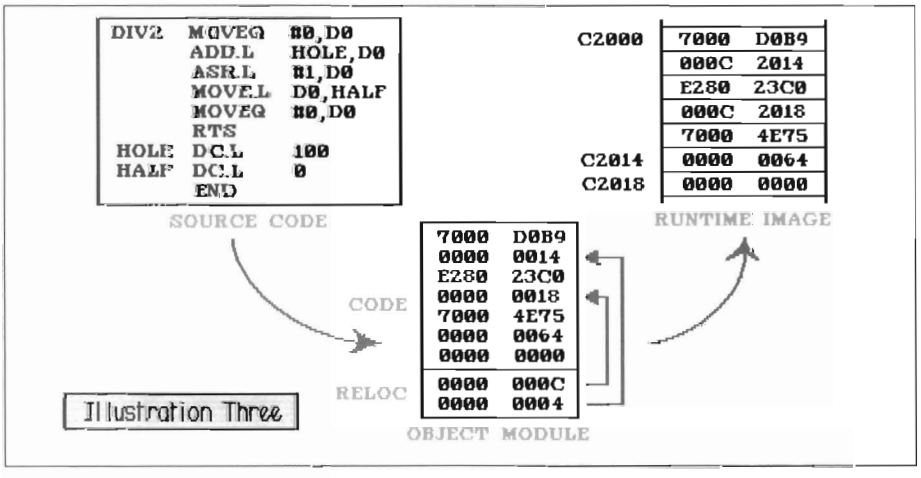


Illustration Three

The Amiga Monitor
An AmigoTimes Supplement

EUROPE IS YOURS TO DISCOVER

NEW HARDWARE FROM CSA

CSA (Computer System Associates) continues to crank more CPU speed out of the Amiga. Finally, official news has arrived regarding CSA's "Accelerator board" and "FastPac".

The "Accelerator board" (ND-500) features a Motorola 68000 chip running at 14.32 MHz, as well as a socket for an optional 68881 or 68882 running at speeds up to 25 MHz. Another version of the same board is the ND-500L, which will contain Motorola's new low power 16 MHz 68HC000 (faster than the Amiga's 7.13 MHz). Both the ND-500 and ND-500L are designed to upgrade the A500 and A1000. The ND-500 is priced at $495.

"FastPac" consists of Kickstart V1.2.2 (upgradable when new versions are available) in very fast EPROM on CSA's 32 bit SRAM (Static Random Access Memory) running at 14 MHz. This feature allows almost all standard Amiga software to run faster by increasing the operating system speed of the Amiga. Basically, it doubles the Amiga's information transfer capability from its present 16 bit rate to CSA's 32 bit. You will still be able to use your Amiga's slower 7 MHz, 16 bit DRAM (Dynamic Random Access Memory) and still notice a sizable processing speed increase. FastPac will work with CSA's 68020, 68030 or new ND-500 series boards. FastPac is available to current CSA product owners for $295

CSA
7564 Trade Street
San Diego, CA 92121
USA (619) 566-3911

Scenery Disk #14 called "Western European Tour" is now available for use with either Flight Simulator II or Jet. The scenery covers large areas of Great Britain, France and West Germany.

Southern Great Britain highlights centers on the city of London. Details include: the Tower Bridge and Tower of London, Parliament, Westminster Abbey, Buckingham Palace and the Thames River. Building and street lights illuminate the city at night. Many highly detailed airports are available. Other highlights include Stonehenge and lighthouse beacons along the south England coast.

Paris is the centerpiece of northern France. Some of the sights include: the Eiffel Tower, Arc de Triomphe, Concorde Obelisk, Louvre Museum, Notre Dame, and the Seine River. The city lights come on at dusk and stay on through the night. Major airports include Caen, Le Toquet Lille, and Charles de Gaulle. Several mountains complicate the landing approach to Strasbourg near the German border.

Detailed West German cities include Munich, Nurnberg, Stuttgart, and Frankfurt with major airports located at Neubinberg and Frankfurt. Some of the sights include Munichs Olympiaturm Tower on the Olympic Grounds, parks, rivers, lakes, mountains, highways, railways and canals can be used as visual aids during cross country flight.

Once you get to Finland you may want to fly across the Iron curtain (a la Mathias Rust) to Moscow and land in "Red Square." Some Moscow details include the Kremlin Wall and park, the Moskva River and many small lakes. The Russian capital can be found in its proper location hundreds of miles inside the Soviet Union. It's no easy task, since the city's coordinates are not listed in the Scenery Disk documentation. If by some fluke you find Moscow, you must then find and land in "Red Square" in order to determine its exact coordinate location. If you can get this far, write the North and East coordinates of "Red Square" on any *SubLOGIC* flight product registration card or official sweepstakes entry form and mail it to *SubLOGIC*. One winning entry will be randomly selected from all eligible entries postmarked by November 15, 1988. You could qualify to win a free trip for two to Western Europe for two weeks with $1000 (US) cash spending money.

Scenery Disk #14
SubLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
USA
(217) 359-8482
$24.95 (US) add $2.50 for S&H

Paris at night on a budget account, all made possible by Subiogic.

NIMBUS VERSION 1.3!

As part of its policy to continually update products, Oxxi Inc. has been working on improvements to its Nimbus program. Nimbus is an accounting program made exclusively for small businesses using the Amiga computer. Among the problems encountered by many users were difficulty inputting more than 15 invoices at a time, as well as occasionally having display of numbers altered. Many of these problems have been addressed, as well as new added features such as an installation menu and increased mouse support. In addition, the manual for Nimbus has been rewritten and expanded.

New disks and manuals can be obtained for a fee of $25.00 (US) plus $4.00 for S&H. This offer applies to registered Nimbus owners who contact Oxxi Inc. and request the update.

Nimbus V1.3
Oxxi, Inc.
P.O. Box 90309
Long Beach, CA 90809-0309
USA
(213) 427-1227
$149.50 (US)
512K Required

PROFESSIONAL DRAW!

Goldisk Inc. creators of *Professional Page* the first true Amiga Desktop Publisher with PostScript output, will be announcing the release of two new software packages at the Chicago AmiExpo. Tentative names for the new packages are *Professional Draw* and *Moviemaker*.

Professional Draw will be a structured drawing program for producing high quality art. This full-featured drawing program will be along the lines of Illustrator from Adobe Systems Inc. for that other computer. Professional Draw will allow you to draw precise curves, arcs, and lines without the "jaggies" that are associated with standard bitmapped drawing programs. Professional Draw will feature special effects, and will offer color output. An upcoming version of Professional Page will support files created with Professional Draw for Desktop Publishing applications.

Moviemaker is to be an animation program with a user friendly interface. It will permit you to create animations fairly quickly. Animation will be both fast, and compact. Both Professional Draw and Moviemaker are slated for release this fall.

Professional Draw
MovieMaker
Gold Disk Inc.
P.O. Box 789, Streetsville,
Mississauga, Ontario
Canada
L5M 2C2
(416)828-0913

MAXIPLAN VERSION 1.9 READY FOR RELEASE

By the time this issue is released, *Oxxi Inc.* will have released *MaxiPlan Version 1.9*. MaxiPlan is Oxxi's award winning Amiga spreadsheet program that features built-in functions such as a database, color presentation, and Lotus 1-2-3 compatibility. MaxiPlan version 1.8 introduced many new features including an entirely revamped Chart Interface. Along with performance improvements over previous versions, MaxiPlan version 1.8, unfortunately, had a few new bugs.

All registered owners of MaxiPlan version 1.8 are entitled to a free update, and will be receiving the new version 1.9 in the mail. This is mainly a bug fix along with the addition of a Blitter Option in charts, as well as the ability to use the mouse to change the column width.

The Blitter Option now gives the Chart Border Area or Data Area a second color, rendering a 3-D effect. Column widths can now be expanded or contracted by merely pointing and dragging with the mouse on the right hand column border. This essentially means that the column width can be changed when a new data entry needs a wider cell space.

MaxiPlan Version 1.9
Oxxi, Inc.
P.O. Box 90309
Long Beach, CA 90809-0309
USA
(213) 427-1227
$199.00 (US)

VIP Virus Infection Protection

VIP will be the first Amiga program to offer a preventive cure for viral disk infections. It will save users the expense and hassle of replacing their software by not having to go back to the retailer to have him restore your program.

VIP will be compatible with all Amiga models and will operate in English, German, Danish, French, Italian and Spanish. Think of VIP as a vaccine safeguarding your software library, before any virus sneaks into your boot block. Essentially, the way VIP works is through prevention by recording the boot blocks of all your bootable software packages while they are still healthy! What you get is a disk that contains the original boot blocks of your software and should any of your originals contract a virus, no problem. VIP has a copy and its simple to cure the original disk.

If VIP only saves one of your originals, it will have paid for itself.

Virus Infection Protection
Discovery Software International
163 Conduit Street
Annapolis, MD 21401
USA
(301) 268-9877
$49.95 (US)

THE KURTA DRAWING TABLET

Kurta Corporation designs and manufactures a complete line of the latest computer graphics input systems. These input systems are used in such diverse application fields as desktop publishing, business, CAD/CAM, architectural design and graphic arts.

Kurta Input System is an intelligent tablet interface software application controller permitting you to use a tablet with any mouse driven software. All tablets are designed to emulate a mouse. Smaller tablets can be scaled to produce the same output as larger tablets, with no needed system software changes.

The "IS" series tablets can produce instant template activation for the appropriate software or session. These tablets also have macro command capability. The IS/TWO and IS/THREE both allows you to customize your application with "IS/template builder" program. You can then control the entire system from tablet templates by switching instantly from one application to another with the touch of a menu key.

"Kurta Input System" comes in four models; IS/Penmouse, IS/ONE, IS/TWO and IS/THREE.

"IS/Penmouse" provides mouse emulation on a 6"x9" tablet, with no programming capabilities. It comes with a cordless 3-switch pen or cordless 4-button cursor.

"IS/ONE" provides a mouse emulation tablet in three sizes (8.5"x11", 12"x12", 12"x17"). It also comes with some factory pre-programmed standard configurations, that meet the requirements of most applications.

"IS/TWO" has all the capabilities and same board sizes as "IS/ONE". The added features on this version include, battery backup memory, sound indicator, higher accuracy, built-in menus and larger programming capability (allowing for future enhancements). Field programmable with disk download capability for standard as well as custom programming.

"IS/THREE" Kurta's digitizer incorporates added capacity, modularity, flexibility and performance to handle the largest, most complex CAD/CAM tasks. Sizes 24"x24", 30"x36", 36"x48" and 42"x60".

IS (Input System) series features four different pointing instruments; all compatible with "Kurta's Input System" configurations.

1. High performance 4 button cordless cursor.

2. High performance Dual switch Pen allows you to use the same tablet surface for drawing (soft action switch) and menu selections (snap action switch) and can instantly convert between tablet and keyboard characters or macro outputs.

3. Cordless 3-switch pen, offering 3 switches.

4. Cordless 4-button cursor. This cursor shuts down automatically when your hand is removed, to lock cursor position. The four buttons duplicate all functions of the corded version.

Kurta Input System
Kurta Corporation
4610 S. 35th St. Phoenix, AZ 85040
P.O. Box 60250 Phoenix, AZ
85082-0250
USA
(800) 445-8782

A-TALK III

New Communications Program and Terminal Emulator

Oxxi Inc. is proud to announce the release of a new communications program called *A-Talk III*. A-Talk III, the successor of *A-Talk Plus*, is scheduled for release in the second quarter of this year. There are many improvements to this program as well as astounding new features.

Some of the improvements and features include an expanded Script Language with a Learn Mode, Kermit, XMODEM-Checksum, XMODEM-CRC, YMODEM-1K, YMODEM-Batch, and ZMODEM Transfer Protocols. Available are seven terminal emulations including Tektronix 4010 and 4014, VT100 and VT52, H19, ANSI, and TTY. Also featured is a 60 number Phone Directory, usage of different keymaps for access to foreign character sets, full overscan with 132 characters by 48 lines. Selectable redial time and number of redials, ASCII capture with resizeable and scrollable buffer, and a Voice option for the blind or hands free user.

Included with A-Talk III will be an expanded manual with sample scripts for several online systems. In terminal emulation mode, A-Talk brings graphic terminal capabilities to the Amiga. This allows users to run sample programs and graphics off-line, thus making for a low cost, flexible alternative to mainframe access.

Registered A-Talk and A-Talk Plus owners can upgrade to A-Talk III for $25.00 (US) plus $4.00 (US) for shipping and handling. Owners of MaxiComm can obtain A-Talk III for $50.00 (US) plus $4.00 (US) shipping & handling.

A-Talk III
Oxxi Inc.
P.O. Box 90309
Long Beach, CA 90809-0309
USA
(213) 427-1227
$99.00 (US)

POLYGON FONT GENERATING PROGRAM

Presently, all Amiga fonts available on "Workbench v1.2" are composed of pixel patterns, called bitmaps fonts. These bitmaps are not structured graphic objects and cannot be used in 3D modeling programs.

Interfont will change that by becoming the first Amiga polygon font generating program. It will allow you to create smooth, splined character fonts in the editor and then enter the text into the InterFont Module window. From there, just press the Create button, and it comes out as an object which can then be loaded into any of the 3D formats that InterChange (also from Syndesis) supports such as Sculpt, VideoScape, Forms In Flight and Turbo Silver. This feature will turn your 3D program into a video titler.

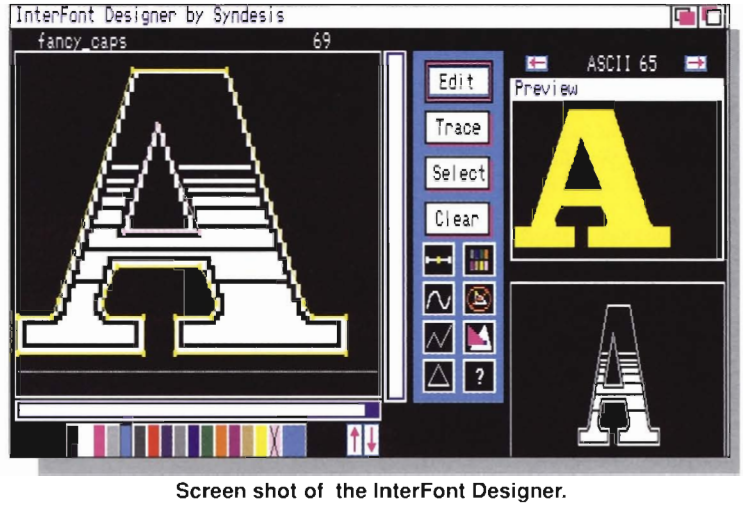
Interfont designer refers to characters based on their ASCII (American Standard for Character Information Interchange) value and will allow you to trace around any character's bitmap outline, thereby creating characters composed of flat polygons. If you are tracing around bitmapped fonts the program will generate an identical polygon font. These polygon fonts are structured graphic objects which any 3D modeling program can manipulate. But InterFont is not just limited to tracing around a font's bitmap, it also gives you the freedom to create a structured graphic object out of any bitmapped drawing (e.g. Make the letter 'Z' out of the Coca-Cola logo).

Creating a font with InterFont is only the first of two steps necessary to add text to your animations. The second step is to run the InterFont Conversion Module with InterChange. It is this step where you actually specify the text you would like to create for your 3D modeling program. The InterFont Conversion Module works with all InterChange modules.

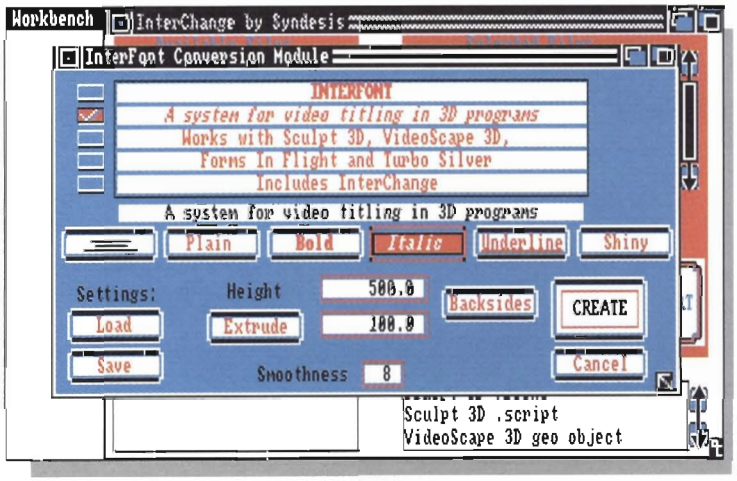
There are gadgets on the InterFont Conversion Module window for editing the bitmap with functions like, Extrude, Height, and Smoothness. Extrude turns on 3D extruded block letters instead of flat characters, with settable depth. Height is the height of each line. Smoothness sets the smoothness of splined curves. 3D programs that have a "smoothing" option algorithm (Phong shading model) such as VideoScape 2.0 or Turbo Silver, will allow the PointReduce module (part of the Turbo Silver conversion module for Interchange) to produce the optimimal smooth look.

Each line has texture settings as supported by InterChange, so text can look shiny, dull, mirror, wireframe, luminous or glass-like. Backsides function gives you the choice of whether or not to make the backs of the characters as well. Each line has justification settings: right, left and centered, as well as styles such as italic, plain, bold. All of the settings (including text) on this window are loadable and settable to an ASCII settings file, so users can edit these in a text editor, if they wish.

The Interfont package will provide some interesting features, and its ability to freely transfer fonts between various 3D programs makes it all the more attractive. It is scheduled to debut debut on July 22, 1988 at the Ami-Expo in Chicago.



Screen shot of the InterFont Designer.



InterFont conversion module for Interchange.

Complete InterFont package:

InterFont Designer (Creates polygon font structure).
Several pre-made structured fonts
InterChange Titling Conversion Module (allows text transferal to any 3D program).

INTERFONT
Syndesis
20 West Street
Wilmington, MA 01887
USA
(508) 657-5585
Tentative cost: $119.95 (US)

PERFECT VISION: Real Time Video Digitizer

A real time video digitizer is available now from *Sunrize Industries*. *Perfect Vision* can capture pictures off a video camera or playing VCR in real time. Once captured, all images can be edited with any one of the many paint or image manipulation programs, or the images can be pasted into a document with a desktop publishing program.

Images that are captured at 1/60th of a second by Perfect Vision are in 16 level gray scale. Color pictures can also be captured, but not in real time. Black and White or colors modes can support resolutions up to 320 x 400. Perfect Vision also supports HAM and the 32 color lo-res mode.

Perfect Vision
Sunrize Industries
3801 Old College Road
Bryan, TX 77801
USA
(409) 846-1311
$249.95 (US)

Tshell . . . an Alternative

Tshell can be described as an alternative CLI, but with a difference. Tshell offers power and versatility for software development or any work requiring total control of AmigaDOS. It is simple to learn and use, but offers more power than the standard AmigaDOS CLI. Tshell's inherent flexibility and ease of use is inherited from the design of the popular UNIX shell. But Tshell has been designed around the Amiga, creating not merely an emulation of UNIX, but it is said to be an improvement upon UNIX.

Some features of the Tshell include C-like syntax, command line editing and history, the ability to abort commands, and two-level user-extensible online documentation via the HELP key; 40 in built commands, commands from the AmigaDOS Replacement Project (ARP), and extra utilities. Tshell offers a UNIX-like interface, and an enhanced UNIX-style filename expansion (plus sense inversion, directory/file differentiation and directory tree searching). Also included are 8 forms of I/O redirection (including pipes, here documents and backquoted commands), integer and string variables, 4 looping statements, and 2 conditional statements (if/else, switch/case). The Tshell will run on the Amiga 500, 1000, 2000 computers.

Tshell
Metran Technology
Box 890
West Oneonta, NY 13861
USA
(607) 432-4836
$50.00 (US)

AMIGA-BASED VIDEO WORKSTATION

AMIGA FAIRLIGHT COMPUTER VIDEO WORKSTATION

The 8th of June marked the opening date for the SIIM Computer show in Montreal, and the unveiling (at the Commodore booth) of a new turnkey computer-video workstation aimed at the professional and broadcast video markets.

Some of the show stopping effects which attracted many people around this display were a variety of wipes, fades, freezes, split screens, boiling images, colourizations, mirrored images, chroma-keying, stencils and drawing over live video from a video camera (directed at the gathered crowd). Stretching and strobing the video images created amazement in a crowd raised on Macs and IBMs.

Digital effects are what excited the crowds at the exhibition, however, quality of signal is what it takes to excite the professional video market. The Neriki has demonstrated this "quality of signal" in April 1988 at N.A.B. (National Association of Broadcasters) in Las Vegas.

The "Amiga Fairlight Computer Video Workstation" unveiled at SIIM was configured by *Compu_Art* of Canada and consists of:

HARDWARE:
Amiga 2000 (left)
Fairlight CVI-Compact (far right)
Fairlight CVI-Plus (middle top)
Neriki Image Master pro-genlock (middle bottom)

SOFTWARE:
CVI Link

Fairlight CVI (Computer Video Instrument) provides real-time processing of video signals, allowing you to produce an unlimited variety of programmable digital effects, such as those seen on many music videos. The Amiga's video output has always been the missing link in allowing the Amiga to be used for professional video broadcast quality images. This is why the Neriki Image Master genlock was included in this system. The Neriki Image Master provides broadcast quality video output; functioning as a 520 line NTSC encoder and a genlock with overlay.

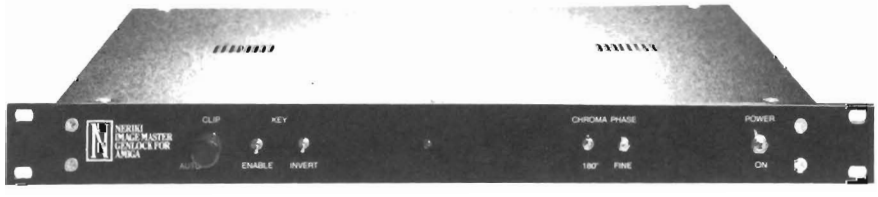
The Amiga Video WorkStation at the SIIM show in Montreal.

An assortment of professional Amiga software is included to enhance any video production needs. Software includes the CVI-Link which provides the communication between the Amiga and the Fairlight. CVI-Link allows the Amiga to control the Fairlight directly as well as providing a software management system for saving, editing and printing of preset digital effects. Other optional software packages available in certain workstation configurations include:

- EDLP (Edit Decision List Program) with CMX compatibility.
- SMPTE (Society of Motion Picture and Television Engineers) time code reader system.

Compu_Art will configure a system to your individual need, and also supplies support, service and training on all the hardware and software in their packages.

The Neriki ImageMaster Genlock for the Amiga



Compu_Art
P.O. Box 712 - Victoria Stn.
Montreal, Que. H3Z 2V8
CANADA
(514) 483-2080
(514) 737-5865

TOUCH-SCREEN FOR THE AMIGA

Future Touch is a new touch-screen system for the Amiga. This system will function along the lines of the *Hewlett Packard Touchscreen*. Along with the touch-screen hardware system, Future Touch has also developed two new software systems. The two new software systems are named Touchsystem, and Touchmaker. Touchsystem is a driver program that makes the touch screen compatible with various other applications, while Touchmaker will be a screen application generator program. The total hardware and software system will be configured with a hi-res touch-screen color monitor, floppy disk drive, 2 MB hard disk drive, keyboard, and an Amiga 2000 with 3 MB of onboard RAM. This total system will be priced at $3500 (US). A scaled down version of the complete package will also be available, this will consist of a stand alone monitor with touch-screen installed. Also in the works are kits which will allow you to install the Future Touch on an Amiga, or Multi-Sync monitor.

Future Touch
Business Technology Services
485 5th Ave.
Suite 1042
New York, NY 10017
(212) 682-2910

GOLD DISK INTRODUCES FRENCH VERSIONS OF PROFESSIONAL PAGE AND PAGESETTER

GOLD DISK BREAKS THE LANGUAGE BARRIER...

Gold Disk Inc. has broken the language barrier with the release of French versions of their popular programs, *Professional Page* and *PageSetter*.

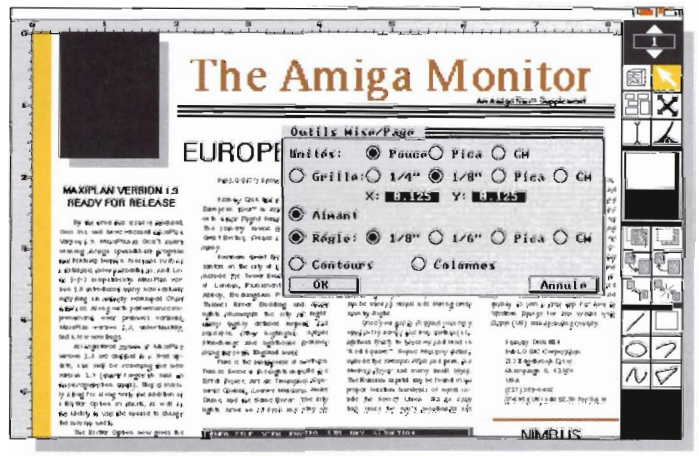
For those that are not familiar with Professional Page, it is a full-featured high-level desktop publishing system that incorporates many of the features that are only found on expensive typesetting equipment. ProPage, as it is known, offers WYSIWYG (what you see is what you get) word processing, algorithmic and discretionary hyphenation, and text wrapping. ProPage also offers an assortment of structured graphics drawing tools, as well as the ability to manipulate, rotate to any angle, and combine output pages.

As an added feature from version 1.0, Professional Page V1.1 offers full color and mechanical separations, on paper or film. All color information is maintained with up to 256 colors, or 4096 colors for images in the Amiga HAM (Hold And Modify) mode.

This version will also output to all dot matrix printers that are supported in the Amiga Workbench Preferences. The french version is a direct translation of the current version 1.1. All menus will be in french, as will all requesters, and the program manual.

Also available in a translated version is PageSetter, the long standing entry level program in the Amiga desktop publishing field. PageSetters major components are a Text Editor, a Graphics Editor, and Page Layout design facility. The text Editor is fully functional, complete with block operations including Cut, Copy, Paste, and word Search and Replace. The Graphics Editor contains various drawing functions including magnification, area fill with 16 patterns, freehand or line drawing, and an airbrush. The Page Layout Facility allows box manipulations such as chaining text boxes, moving boxes, and spilling Text or Paint graphics into boxes. Pagesetter can be used for preparing school flyers, campus newspapers, personal letters, or even manuals. Like Professional Page this version of PageSetter will have all of its requesters, menus, and program manual in french.

Professional Page
Pagesetter
Gold Disk Inc.
P.O. Box 789
Streetsville, Ont.
CANADA, L5M 2C2
(416) 828-0913
(800) 387-8192 for orders



NERIKI OFFERS PROFESSIONAL QUALITY GENLOCK FOR AMIGA

Neriki Image Master is the latest full broadcast professional Genlock to enter the Amiga market. The Image Master connects to the Amiga's RGB port (with a standard Amiga RGB 23-pin "D" socket), "genlocks" a reference video signal (or studio black signal), and keys the computer image into the reference video by using a fully adjustable luminance keyer. Your Amiga will be transformed into a professional tool capable of enhancing all forms of video production. It becomes the perfect tool for video titling, animation and graphics because of its capacity to provide full character generation, ray-traced imagery, cut & paste, animation, scroll and crawl.

The supplied reference signal can be composite (PAL or NTSC) such as Super-VHS, M2, Betacam or any other broadcast format. Image Master does not produce reference video degradation and encodes the Amiga's RGB video into a composite video output. This composite video is of broadcast quality and capable of up to 520 lines vertically for NTSC and 600 lines for PAL (which is higher than the Amiga's screen resolution). An edited second generation master can be overlaid with Amiga graphics (all resolutions including overscan) and titles, which forms a third generation production tape.

Image Master sports a fully controllable "luminance keyer" and background colour function key. Image Master simply keys into the color register 0 that is being generated by the computer. This results in a "chroma key effect" and gives you the ability to define any color from the Amiga's 4096 color palette as your key color.

With the "Key Enable" switch, an image on the computer can be dropped "in and out", glitch free which is ideal for displaying titles. The "Clip Control" adjusts to varying shades of grey, from black to white, and permits keying of the computer's image. The "Key Invert" performs the opposite of the "Clip Control", allowing the keying effect to move from white to black.

"Video Out" from Image Master is in the form of a BNC connector that provides both the reference signal and keyed computer image which can be recorded. "Red", "Green" and "Blue" BNC connections can be used to feed an external coder or an existing chroma keyer. "Sync" and "Key" BNC can be fed to a production switcher allowing wipes, fades and external keys of the Amiga image.

Neriki Computer Graphics PTY Ltd.
Spectrum Centre, 200 Pacific,Highway
Crows Nest
Sydney, Australia 2065

COMMODORE CANADA

Commodore's marketing department has decided to get serious about marketing the Amiga computer. It is the most ambitious Commodore marketing plan since the *Commodore 64* plan.

Marketing for the *A2000* will be targeted at the business market. Advertising insertions will appear in business magazines which will also be flanked by newspaper coverage in major regional centres.

Commodore is beginning to push the *A500* to the same level of success that the Commodore 64 has enjoyed. The Amiga 500 is being targeted at the home computer user. Advertising will include full page colour ads in major magazines and exposure on national television. This most recent advertising campaign will effect over 50 million consumers throughout North America.

What has Commodore set up in Canada for 1988?
- National exposure will be in English and French.
- A $2 million dollar advertising budget for (June 16 to September 30).
- $300,000 for dealer promotions.
- CO-OP expenditures totaling over $1.5 million.
- About $6 million worth of spillover advertising from the US.

Programs set up by Commodore include a "Dealer Incentive Program" set up for the Amiga 500. This program will provide dealers with the opportunity to take advantage of Commodore's advertising blitz by co-ordinating marketing efforts during this period.

The "Amiga Action Team" is a team of highly motivated young professionals trained by Commodore to promote the A500, as well as Amiga peripherals and software. The team will be on the roads of Canada, visiting dealers and retailers who service the home market. They will offer their assistance in setting up special Amiga Promotions, demonstrating the A500 and providing A500 training for dealers' staff and customers. This program will last from July 1 until August 30.

Dealers and retailers should contact their Commodore Territory Manager for more details. All these programs are a great start and Commodore promises to make the next quarter (October to December) even better.

MORE ENTRIES FROM ELECTRONIC ARTS

The Bard's Tale II

Bard's Tale II, the sequel to Bard's Tale is available from Electronic Arts. This version is 50% larger than the original Bard's Tale. There are more animated color monsters, with over 100 kinds of monsters in all. You now have a total of 79 spells that can be used in 25 dungeon levels, and 6 entire cities.

Lawless mercenaries from a neighbouring kingdom have invaded the realm. Your objective in this game is to assemble a band of adventurers, track down the seven pieces of the Destiny Wand, and defeat the evil Archmage, Lagoth Zanta. When you have defeated the evil Archmage, and collected the seven pieces of the wand, you must then reforge the Sceptor into a unified whole, thereby reunifying the realm (and winning the game). Simple isn't it, this may sound like a few hours of work, but don't bet on it. While tromping through the world of Bard's Tale II you will run into some shall we say, unsavory characters. Werewolves from hell, Orcs with serious chips on their shoulders, and Archmages that would give Rambo a hard time are just a few of the local celebrities.

If you were an avid Bard's Tale player, you have the option of transferring characters that were created in The Bard's Tale for use in The Bard's Tale II. Should you need a few hints, *The Bard's Tale Cluebooks Vol. I & II* are available for $12.95 (US) each plus $3 for S&H. Happy adventuring...

WORLD TOUR GOLF

After a hard day at the office, there is nothing more relaxing than 18 holes of golf. If you're not up to actually walking an 18 hole course, there is an alternative, World Tour Golf. You have a choice of playing on more than 12 of the world's greatest courses, from Pebble Beach on the Pacific Coast to St. Andrews in Scotland.

If these courses are not challenging enough, you also have the option to simply design your own courses. The course editor allows you to draw the terrain, set the tee, select slope of the green, change the skyline, and place objects such as trees, rocks, markers, sand traps, and of course, a dinosaur. Yes, a dinosaur. Oh those boys at ECA.

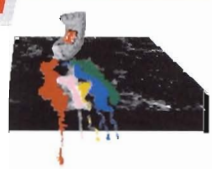
The game takes into account random conditions such as wind, green dampness and pin placement. Your golf player's adjustable attributes include strength, accuracy, tendency to hook or slice, and ability to recover from bad "lies"; the "lie" of a ball refers to the quality of ground where it rests, and not the other more popular lie that arises when telling what your handicap is.

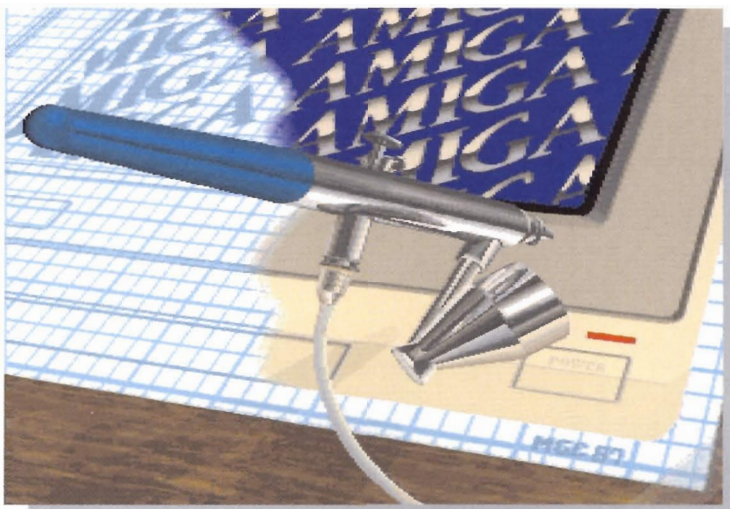
You can load and save different courses and holes on disk.

The Bard's Tale II
World Tour Golf
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(USA)
(415) 572-7171

Screen shot of World Tour Golf from ECA.

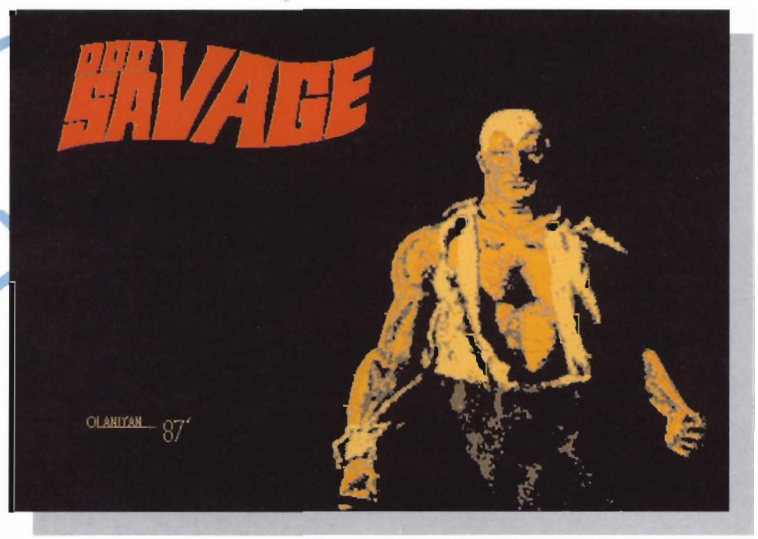
Amiga Art Gallery





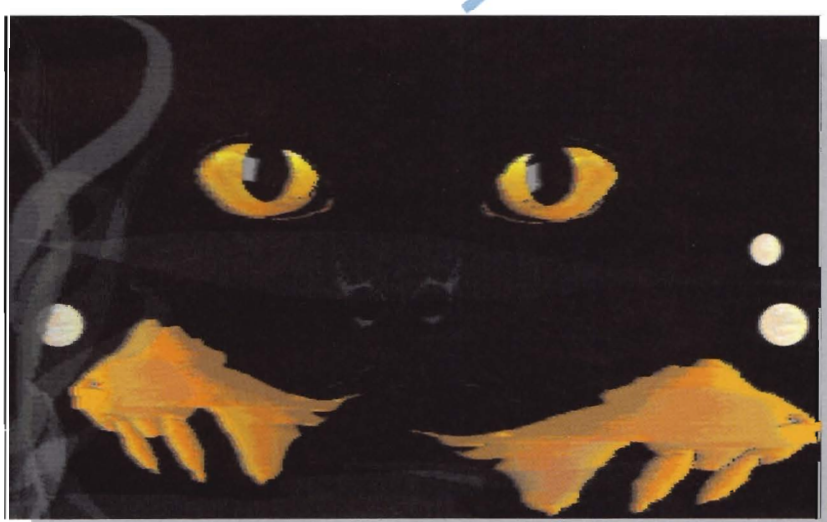
Back to the Drawing Board
by Mike Crossmire
Alexandria, VA, USA
Resolution: HAM Interlace

Rendered with Deluxe Paint II and Digi-Paint



"Doc"
by Olusegun Olaniyan
Montreal, Quebec, CANADA
Resolution: Hi-res Interlace

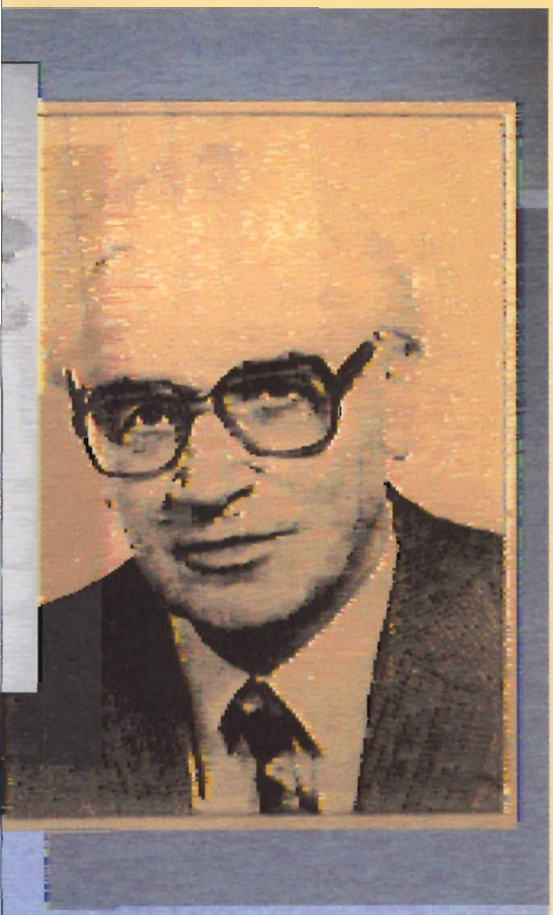
Rendered with Deluxe Paint II

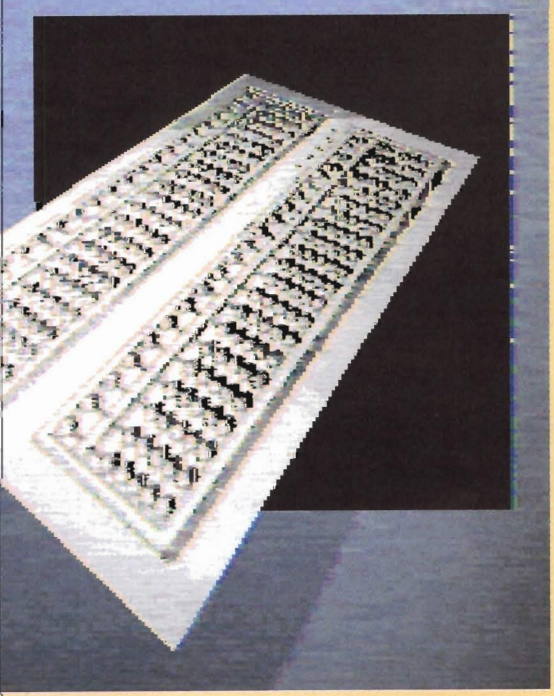


Fishbowl
by R. M. Ellis
LaSalle, Quebec, CANADA
Resolution: HAM Interlace

Rendered with Photon Paint, Deluxe Paint II, and Digi-Paint

If you would like to see your work exhibited in the Amiga Art Gallery, send your masterpieces on a 3.5" formatted diskette to:
AmigoTimes, Amiga Art Gallery, 5124 St. Laurent, suite 100, Ville Ste. Catherine, POB 1228, Qubec J0L 1E0, CANADA





The History Of Computers (part II)

With the outbreak of World War II, both the Axis and the Allies spent a great deal of money and manpower building code breaking machines; as a result, great improvements in computer technology were achieved.

At the time a German engineer named Konrad Zuse made some important discoveries in the field of computer science, without using very much of the information that was available to scientists before him. In essence, he formulated his own computer theories. His designs called for a storage unit, an arithmetic unit, a selection mechanism to link the two and a control unit, all working in binary. The control unit would be directed by punched tape (ticker tape) and would deliver instructions to the selection mechanism and arithmetic units. Zuse's first computer, the Z1, was completed in 1938. Ironically, Zuse's accomplishments went unnoticed by the Germans and the rest of the world. At the time, they would never have understood its capabilities for Zuse was ahead of his era. While Zuse was the first to make a major contribution during wartime, the Americans and English were not far behind.

Helping the Americans, George Stibitz, working for Bell as a mathematician, designed and completed the Model 1 in November, 1939. The Model 1 was the world's first computer that was controlled by long-distance. The machine itself, was based on electromechanical relays and incorporated binary math.

On December 5, 1941, Zuse had finished constructing the Z3 at a cost of $6500 (US). The Z2 never saw completion because it fell casualty to the war bombings. The Z3 was put to actual use up until 1960. It could store 1000 words in the space of 1 cubic meter. Zuse used programming notation for his Z3 machine (that included => and <= symbols) and it was the first computer to achieve automatic control of a sequence of calculations.

The British were by no means to be left out of computer history, for they had Alan Turing. Turing is credited with being the first person to explain stored program concept on paper and he initiated the use of

By Ernest N. Nagy

subroutines in programs. He also contributed greatly to code breaking during World War II. Turing's contributions, along with other computer scientists' improvements, are not fully known because the documents are still classified on all sides. One of the main achievements by the British during World War II, was the completion of Colossus in 1943. It had an internal clock that kept all parts of the machine working together and one of its strong points was that it worked in parallel. It was said that Colossus generated so much heat that anyone working in the same room normally wore short-sleeved shirts and sweated profusely.

Work on the the first fully automatic calculator, the Mark I or ASCC (Automatic Sequence Controlled Calculator), began in 1939 and was completed at Harvard in 1944 by Howard Aiken. The Mark I used relays (which are electromechanical and had slow moving parts) instead of vacuum tubes.

Konrad Zuse's final contribution to computing was the Z4 which was completed in 1945 and occupied the space of a large coffin. The exact specifications and abilities of the Z4 are unknown because it was captured by the Allies and the documents remain classified even to this day. One thing is certain, Zuse had carried computer design farther than anyone else before him. In fact, except in size and nature of circuitry, the Z4 is similar to microcomputers today. After the war, Zuse devised the first algorithmic language. It was called "Plankalkul" and was so encompassing, that only pointers and recursion were left out. Later, Zuse formed a company called "Zuse Kommandit Gesellschaft" (Zuse KG). In 1969, after a series of mergers and takeovers, it became part of the Siemens computer division.

John Vincent Atanasoff (an American of Bulgarian heritage) set down ideas for a computer in the winter of 1938. He teamed up with Clifford Berry (a gifted engineering student) to create the "ABC" (Atanasoff-Berry Computer) at Iowa State College. Atanasoff did the conceptualizing and Berry did the detailed design and construction. By December of 1939, they had verified the basic ideas on bread boards. While actual construction of the computer was in progress, Atanasoff met John Mauchly in 1940 at a conference. In the summer of 1941, Mauchly actually visited the computer's construction site and Atanasoff went into the detailed workings of the machine. By 1942, the computer was nearly finished, but Atanasoff had to take a position in the Naval Ordnance Laboratory in Washington before he was able to complete work on the machine.

The computer was never fully functional but the ideas it generated were very good. "ABC" was built for solving systems of equations by using vacuum tubes and regenerative memory. Its arithmetic unit was composed of 300 vacuum tubes capable of addition and subtraction. Another 300 tubes controlled the memory apparatus, which consisted of a large number of capacitors mounted onto rotating drums. The computer used a process called jogging wherein it would jog its own memory onto the rotating drums at a rate of 60 numbers (each stored as 50 bits) per rotation. Each rotation refreshed the data as fast as it could be withdrawn from memory. It was also capable of permanent storage, by burning holes in cards. "ABC" is credited with being the first computer to incorporate regenerative memory and demonstrate techniques in digital calculation. Atanasoff also claims to have coined the word "analog."

ENIAC (Electronic Numerical Integrator And Calculator), was a computer envisioned and built by John Mauchly and J. Presper Eckert, jr. In 1943, the U.S. Army gave Herman H. Goldstine the responsibility to find ways of speeding up the production of ballistic tables. Prior to the war, Goldstine was an assistant professor of mathematics at the University of Michigan and he stumbled upon the work of Mauchly and Eckert. On April 9, 1943, Mauchly and Eckert were given the necessary funding to build ENIAC. Actual work on the computer did not begin until May 31st, 1943, and it was completed in February of 1946 at the University of Pennsylvania.

ENIAC became the first fully working electronic computer to use vacuum tubes and the first all-purpose electronic digital computer. It weighed in at 30 tons and contained 18,000 triode vacuum tubes (containing 16 basic types). In the machine were 1,500 relays, 70,000 resistors and 10 000 capacitors; in total, the machine consumed 140 kilowatts of power per hour. Its dimensions were 8 feet high by 3 feet wide, with a 100 foot long front panel and was only able to store 20 words. The machine occupied 1 800 square feet and required the room to be well air-conditioned because of the occasional 120 degree fahrenheit temperatures generated by the vacuum tubes. This little toy cost the U.S. Army $486,804.22 back in 1946.

Mauchly was a friend of Atanasoff and often contacted him while Atanasoff was building his computer out on the west coast. Later, when Mauchly had completed his computer, Atanasoff accused him of stealing his ideas and took him to court. In the meantime, Berry became mentally unbalanced and took his own life in 1963. The whole affair was just recently (in 1972) settled in court with Mauchly's computer holding its own patents.

The year 1948 proved to be an important year for the British. Sir Fredrick Calland Williams and Tom Kilburn both were professors at Manchester University (in England) where they fathered the Manchester Machine. It executed its first program in 1948, making it the first computer to contain an alterable stored program. It also was the first computer to use a new type of direct access memory system by using a "William tube." A prototype existed by 1947, but was somewhat inadequate. A year later, they had progressed to a system that could store several thousand bits and retain its information for hours.

Probably the most influential computer scientist of these early developing years for computers was a Hungarian mathematician by the name of John von Neumann. His knowledge of computers was rather vague until he met Goldstine in 1945. Goldstine met Neumann while waiting for a train in Aberdeen, Maryland. It was then that Neumann (at the time working on nuclear weapons for the military) had first heard of ENIAC's computing power.

Mauchly was a professor for the Moore School of Engineering at the University of Pennsylvania and so Neumann went to the University of Pennsylvania to become indoctrinated into the world of computer science. One of Neumann's favorite pastimes was standing next to a computer's systems operator who was entering a complicated mathematical problem into the computer. Neumann would attempt to solve the problem before the computer and most of the time he succeeded. Neumann became so involved with the final stages of work on ENIAC, that he took notes on everything that Mauchly explained about his machine and then added some of his own improvements. Apparently, these notes were somehow printed in a journal (in 1946) under the title "Preliminary Discussions of the Logical Design of an Electronic Computing Instrument" and Neumann was mistakenly credited with being responsible for the principal design of ENIAC.

Neumann was never really responsible for ENIAC, but he did manage to work on his own project called EDVAC. Before EDVAC was completed in 1957 (a few months before Neumann's death), the ideas behind it had already influenced the future of computer science and the machines that were being developed concurrently.

Neumann did not want computers to have a limited scope. Previously, computers had to be partially rewired in order to solve a new problem (as with ENIAC). This rewiring process sometimes took several days. The reason for the rewiring was because previous machines did not have stored program capabilities. To avoid rewiring computers, the instructions had to be entered and executed one at a time. So Neumann deviated from parallel computer ideas and he used serial computer ideas, thereby designing the first truly programmable computer to have three parts:

1. *Internal computer memory that could store instructions and data. The ALU (Arithmetic Logic Unit) could access the memory whenever necessary, without any external intervention.*
2. *An ALU that used a coding system that allowed the computer to juggle data inside itself.*
3. *A connection (or bus) between memory and the ALU.*

The computer worked in series (unlike most of its predecessors) and it used a CRT (cathode ray tube) as its display device. The addition of the CRT was a last minute addition by Calland Williams and Tom Kilburn. This added a whole new dimension in itself and on the whole, Neumann created the first truly programmable digital electronic computer.

After ENIAC, Mauchly and Eckert decided to form a company to manufacture computers. This became a reality in December of 1948, when they formed the Electronic Control Company. They also formed a firm called Eckert Mauchly Computer Corporation, but due to financial difficulties, they sold out to the Remington Rand Company. In March of 1950, the Rand company completed UNIVAC (UNIVersal Automatic Computer) and delivered it to the U.S. Census Bureau. It was the first computer to handle both numerical and alphabetical data with equal facility. Magnetic tape was used for output. UNIVAC was the first commercially available electronic data processing machine. Eventually Remington Rand became the Sperry UNIVAC division of Sperry Rand corporation, and recently, it merged with Burroughs to form Unisys.

In the same year that UNIVAC was built, MIT was constructing a real-time control machine called Whirlwind. It was digital and had magnetic core memory elements (ferrite ceramics in donut shape and mounted on lattices and magnetized).

Johnniac was completed in 1953 and used punch cards for I/O. It was the first computer to generate music while running programs. After Johnniac, no major innovations or improvements were made to mainframe computers.

THE RISE OF THE PERSONAL COMPUTER

All the previous computers were built before a new component arrived that has since been the fundamental building block of all modern computers. The new component was the semiconductor chip with integrated circuits. It was invented by Jack St. Clair Kilby on September 12, 1958, and patented on February 6, 1959. Kilby only worked at Texas Instruments for four months and was working through the regular staff's summer holidays; he was not eligible for them due to his short period with the company. It was during this time, while working alone that the idea on how to produce integrated circuits dawned on him. So the idea was there, but it still had to be mass produced somehow. Five months later, Robert N. Noyce working with G.E. Moore (both at Fairchild Semiconductor) solved that problem by filing a patent on July 30, 1959, for the manufacturing technique employed in mass producing integrated circuits. It was the integrated circuitry that made semiconductor chips viable; allowing transistors, resistors, capacitors, connections and the such to be fabricated together on one semiconductor chip. The creation of Integrated Circuits produced a new crop of computers, called minicomputers. The minicomputer was invented to allow programmers access to a computer immediately that could answer their less intricate problems then and there.

The placement of several different integrated circuits together onto a single chip makes it a microprocessor. A microprocessor becomes a CPU if it contains at least a control unit and an ALU. More advanced CPUs are those that have RAM (Random-Access Memory), ROM (Read-Only Memory) and other support devices built right onto the chip all living in harmony with each other. The first CPU on one chip was developed by the Intel Corporation back in 1972 and it was called the 4004. Initially, it helped give birth to a healthier design of calculators which in turn led the way for personal computers.

The first commercially available personal computer was the MITS Altair 8800 back in 1975. It was available only through mail order and it was an assemble it yourself kit. When assembled,

(continued on page 70)

F/A-18 INTERCEPTOR

F/A-18 Interceptor is the new jet fighter simulator released by Electronic Arts. When you first begin Interceptor, it will ask you to enter a callsign in order to enroll you in a Tour Of Duty. Each time you play the game, it will use your callsign to update a log of your crashes, hits, successful missions and flight time. Interceptor works on all Amigas with at least 512K of memory. If your Amiga has 1MB of memory, you will get enhanced sound and be able to see the demo sequence in full. The game can be played entirely from the keyboard, but it's much more realistic using a joystick for aircraft control.

DOCUMENTATION

Included in the Interceptor package is a "wheel" called the Flight Computer. You must use the wheel to retrieve the security countercode needed to begin any Flight Option. While this may seem inconvenient to some, most people will find it preferable to a copy-protected disk.

The manual is fairly short and well laid-out. There are instructions on how to boot the disk, use the Flight Computer, control commands, weapons & mission descriptions, and tips from a combat veteran. At the back of the manual are the aircraft specifications for both jet fighters. Unfortunately, no specs for the Soviet aircraft are included. It would have been interesting to know more about what the enemy is capable of.

AN F-18 AMIGA?

Electronic Arts claims F/A-18 Interceptor is the first flight simulator designed specifically for the Amiga's graphics and sound capabilities. The proof is in the simulator which has superb graphics and the smoothest animation I've seen from any microcomputer simulator. If you take a look at your plane from the outside while you are flying, you'll be treated to some incredible angles of the jet soaring and roaring through the sky.

The cockpit display looks great, even though it doesn't resemble an actual F-18 control panel. The HUD (Heads-Up-Display) and target indicators will make you think that you're actually flying the real plane with the actual weapons systems. Using the keyboard you can look over your shoulder to see if anyone is trying to smoke your tail.

PEACE THROUGH SUPERIOR FIREPOWER

ECM (Electronic CounterMeasures) is available for both the F-16 and F-18 fighters. You should use the ECM to jam an enemy's missile that is locked onto your "heat signature." However, it's wise to use the ECM only during combat since it also acts as a beacon to your position. In addition to the radar jammer, you can drop chaff (foil) to confuse radar-guided missiles, and you can drop flares to redirect heat-seeking missiles.

There are two types of missiles available and a short-range cannon. The medium-range missile, the AIM-120A AMRAAM, has an effective range of over 30 miles. The short-range missile, AIM-9L Sidewinder, has a range of 11 miles and reaches a speed of Mach 3. The cannon, a GE-M61, is a 20mm cannon capable of firing 570 rounds at a rate of 6,000 rounds per minute. Not only are the cannons appropriate for close quarter dogfights, but when you pull up alongside a couple of defecting F-16s, a few bursts to their side might help you to "communicate" with them.

TOUR OF DUTY

The Mission Selection screen lists the options available. Number one on the list is the demonstration. It's a spectacular demo showing an example flight and a quick run-in with a Soviet Mig fighter.

The second option is Free Flight, where you can use either the F-18 Hornet or the F-16 Falcon. Apart from the first mission, this is the only other time

By Michael Hermann

There are several missions which you will be called on to complete including one that involves chasing and turning back two defecting F-16 pilots. This shot shows the F-16s being intercepted.

that you can use the F-16 Falcon.

JET FIGHTER TACTICS 101

When you're ready to learn some flying skills, select the Training option. This option will allow beginners to learn both simple and difficult maneuvers that come in handy during a dogfight. The plane in front of yours is the instructor plane that will guide you through seven different maneuvers. The manual describes how most of the maneuvers can be used in a dogfight. If you find it hard to keep the instructor in view, just hit "S" and he will leave a smoke trail.

Unfortunately, landing the fighter onto the aircraft carrier is not part of the training. While it's not a terribly difficult procedure, it may pose some difficulty for beginners.

YOUR COUNTRY CALLS

Before you actually begin flying missions, you must pass the Qualification test. You have to take off from the aircraft carrier, turn around and land on the runway. Once you make a successful landing, it will be written to your log disk (if you have one) and you won't have to select Qualification again.

After you've qualified, you'll be allowed to begin the first mission. You must successfully complete a mission in order to advance to the next mission. Each time you retry a previously completed mission, the level of difficulty increases.

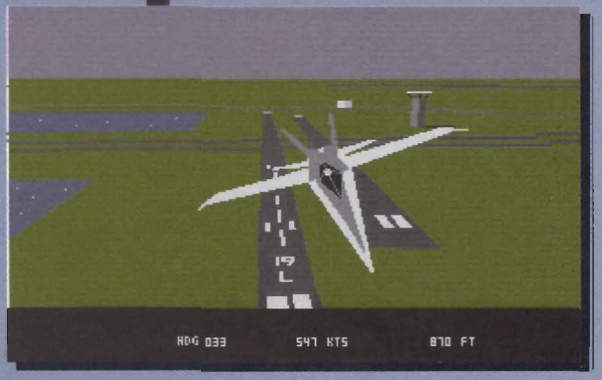
Each mission begins with a slick and impressive "zoom" from a map view straight down to the jet waiting on the runway. There are more missions, but only the first four are mentioned in the manual. They are: Visual Confirmation, Emergency Defense Operation, Intercept Stolen Aircraft, and Search & Rescue Operation. The following two missions not mentioned, involve intercepting a cruise missile and attacking the enemy's submersible aircraft carrier (this is the year 1994).

One of the many reasons that Interceptor is such a treat to play is that each mission is different and involves a variety of tasks, as opposed to simply going out and shooting everything in sight. For example, the objective of the third mission is to intercept two stolen F-16s en route to Russia, and "persuade" them return to San Francisco. Meanwhile, you must avoid a confrontation with their Soviet Mig-29 escorts. In another mission, you must locate a downed pilot and deploy a rescue pod before a Soviet fighter reaches him.

BIG GUNS & TOP GUNS

Firepower aside, brains and experience will get you through the day in this game. It's easy to get carried away while tangling with a Mig over the Pacific. Maybe you'll win the fight, but will you have enough fuel to return?. Or any weapons remaining in case you meet his friend on your way back? The Migs were designed to be difficult to hit, so it's important to keep your wits about you. They are quite skilled at piloting their jets and dodging your missiles.

F/A-18 Interceptor is the closest thing to a jet fighter simulator available to any personal computer owner. With the attention that was paid to detail, you will soon find yourself lost in its realism. I hope the author, Bob Dinnerman, will consider developing a comparable normal plane flight simulator for the Amiga. ❑



The F-18 just took-off from one of the San Francisco area airports. Interceptor allows you to look at your jet from several angles outside the craft.

The locking mechanism works just like it does on the real thing. Anything within a 135 degree angle off the nose is automatically locked onto. The HUD (Heads-Up-Display) indicates airspeed, altitude, g-force, heading, and targeting information.

F/A-18 INTERCEPTOR
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
USA
(415) 571-7171
$49.95 (US)
not copy-protected
512K required (1MB recommended)
Joystick (optional)

(continued from page 67)
it had 36 lights, 25 toggle switches and 256 bytes (0.25K) with no keyboard or monitor. It retailed at $539 (US).

The Apple (I) was designed late in 1975 by Stephen Wozniak and Stephen Jobs. It was sold by word of mouth in the California area and later it went retail across the U.S.A. to limited retailers. It sold for under $700 (US) and this was just for the CPU unit. The Apple (I) was the first computer to completely integrate display generation circuitry, microprocessors, memory, and power supply on the same board. The Apple (I) was programmable in Apple basic only. The Apple (II) was a vastly superior machine to the Apple (I) and it debut on November 20, 1976. It used the Motorola 6502 and, for the first time, a computer could be used to draw. Its microprocessor was the Motorola 6502 and became the first computer to introduce draw and paint programs for the personal computer market.

Commodore originally manufactured calculators but decided to enter the PC market in June of 1977 with a machine called PET (Personal Electronic Transactor). Its CPU was the Motorola 6502 and was programmable in BASIC. The next step for Commodore was in late 1978 when they introduced the 3.5K VIC 20. Their aim was to provide a low priced machine for anyone who was interested in computers.

The year 1980 marked the most important next step, when VLSI (Very Large Scale Integrated circuits) made their debut making PCs a viable technology. Also in the same year, as a result of VLSI, a new generation of computers called "workstations" were developed. It was started by Apollo and Sun (two separate companies which began almost simultaneously). These machines were designed for professionals who required impressive graphics, fast computational capacities and menu windows for ease and speed of operation.

The best selling PC (12 million sold world-wide) is the Commodore C-64, originally released in 1982. Back then, the manufacturer suggested price was $895 (US); today, one can be bought for $199 (US). It was a marvel back then to own a computer with a 64K memory, now a mere five years later we are buying computers with 512K of memory as standard on their motherboards.

IBM decided to enter the PC market in January of 1982. They presented a machine that used the Intel 8088 (running at 4.77 MHz) chip and priced at $1,265 (US). Their machine was, almost exclusively, built with the business world in mind.

The Apple Macintosh was the first PC with the MC68000 chip, it became available in February of 1984. It was also the first PC to be "user friendly." By user friendly, I mean you could take the machine out of its packaging and, within an hour, be working on your first task. It used pull-down menus, had multi-windowing capabilities, and provided a mouse with the original package. It also started a new field, desktop publishing.

A whole new revolution was started by the Amiga 1000 when it debuted in November, 1985. It contained the MC68000 (a 16/32 bit) as its main processor and ran at 7.16 MHz. The motherboard not only contained the 68000 but it also had 3 coprocessors (Agnes, Daphne, Paula) that operated concurrently with the main CPU. This allowed the machine to produce incredible graphics, multitasking, stereo sound, and rapid calculations. The screen offered resolutions ranging from 320x200 pixels to 640x400 and up to 4096 colors.

The next step for the microcomputer world was the first pseudo hybrid machine, in that the best of both worlds were combined into one computer, the Amiga 2000. It gave access to the IBM's extensive and proven software base and the Amiga's superior capabilities. The Amiga 2000 was brought out by Commodore in March, 1987, and is an attempt to BRIDGE (pun intended) the gap between computer worlds.

Commodore, attempting to bring the capabilities of the Amiga 1000 at a price that everyone could afford, released the Amiga 500. Here, Commodore is trying to reproduce the same sort of formula that worked so well with the Commodore 64.

There have been other inclusions into the computer field that I have not talked about (space and time constraints); supercomputers, parallel computers, Neural Net's, laptop's, IBM's PS/2 and Apple's Mac II, etc.

The computer revolutions that have occurred already are:

1. *Vacuum tube technology, millisecond second speed (1950's)*
2. *Transistors, micro second (1959)*
3. *Microprocessors, nano speed (1964)*
4. *VLSI technology, pico speed (1980). Mico's come of age.*

Computer revolutions on the horizon (not necessarily in order presented):

1. *ULSI technology*
2. *Vector capabilities (this is what separates Super computers from everything else) for PC's*
3. *PC Networking (already started)*
4. *Telecommunication explosion (already started)*

Each new computer revolution has spawned their own champions, and most probably further improvements in technology will show new breeds of faster and more user friendly machines.

So the brief history lesson (maybe not so brief) is over. Hopefully this article has brought you pretty much up to date with respects to major historical computer developments. After reading this article in its entirety you can appreciate how fast computers have developed in the past. Every day, Amiga computer owners operate state-of-the-art technology, which would never have been possible without the unmeasurable efforts of countless individuals throughout history. ❑

Modula-2 File Requester

(PART II)

This is part two of a three part article on writing a file requester in Modula-2. A file requester is a small window for interactively selecting a filename. For this article, I will assume that you know how to program in Modula-2. If you know Pascal, you should also be able to follow along. The source code for this article is written to be compiled with the Benchmark Modula-2 compiler. This month, I will describe eight utility procedures that are needed before I outline the main body of our file requester.

To begin, the psuedo-global variables must be defined for the module. These variables are not really global, they are local to the FileReq procedure, but global to our utility procedures.

A pointer to an array is needed to hold filenames. This array will be defined of type 'FileEntry' that we defined last month in the ReadDir module. This type must be imported from the ReadDir module. We will define the array from 0 to 800. Remember, this is a pointer to an array and not the array itself. We must allocate the array each time FileReq is invoked. Another variable will be defined to hold the size of the array.

```
List      : POINTER TO ARRAY [0..800] OF FileEntry;
      (* holds filenames *)
ListSize  : LONGCARD;
(* bytes used by 'List' *)
```

The variable Gad will be the anchor of the gadget chain. A gadget chain is a linked list of gadgets.

```
Gad       : GadgetPtr;
(* ptr to gadget list *)
```

This variable will hold a value used to calculate the scroll bar position.

```
VISOR : CARDINAL;
(* used to caluculate prop value *)
```

MyWin is a WindowPtr for our file requester's window. RP is the RastPort that graphic and text functions use to draw into the file requester's window.

```
MyWin     : WindowPtr;
(* ptr to winbdow *)
RP        : RastPortPtr;
(* ptr to our window's RastPort *)
```

These variables hold the current status of the filename display area.

```
FI,
(* first item on screen *)
LI : CARDINAL;
(* last item on screen  *)
```

This variable will hold the count of filenames that are in the filename array.

```
NI : CARDINAL;
(* number of items      *)
```

The first two procedures that we need to write are easy. MIN is a funcion that returns the lesser of two cardinal values and MAX is a function that returns the greater of two cardinal values.

```
PROCEDURE MIN(A,B : CARDINAL): CARDINAL;
 BEGIN
  IF A<B THEN RETURN(A); ELSE RETURN(B); END;
 END MIN;

PROCEDURE MAX(A,B : CARDINAL): CARDINAL;
 BEGIN
  IF A>B THEN RETURN(A); ELSE RETURN(B); END;
 END MAX;
```

The next is a cleanup procedure to deallocate the system resources that we use. There are three resources that need to be deallocated. First, is the memory that we use to hold the variable name array. Second, is the window that we open for our file requester. Third is the gadget chain.

```
PROCEDURE CleanUp;
 BEGIN
  IF List#NIL THEN DEALLOCATE(List,ListSize) END;
(* deallocate*)
  IF MyWin#NIL THEN CloseWindow(MyWin^);   END;
(* close wind*)
  IF Gad#NIL   THEN FreeGadgetList(Gad^);   END;
(* free gadgets *)
 END CleanUp;
```

The fourth procedure is used to write text onto the file requester window. The x and y coordinates along with the string and its size are passed into the procedure. First the system function Move() is used to locate the graphics cursor to the coordinates, then the system function Text() is used to draw the text into the window. Both of these system functions use a RastPortPtr as the first parameter. This RastPort is a system structure that is used to hold information about a display structure, i.e. our window.

```
PROCEDURE Print(X,Y,L : INTEGER; S : ADDRESS);

(* write text *)
 BEGIN
(* of length L, at X,Y *)
  Move(RP^,X,Y);
  Text(RP^,S,L);
 END Print;
```

Now we will write a procedure that

(continued on page 77)

By Mike Scalora

Bio-Rhythm

Bio-Rhythm
Bio-Rhythm
Bio-Rhythm
Bio-Rhythm

BIORHYTHM is a program, written in AmigaBASIC, that will graphically plot your biorhythmic behavioral patterns (cycles) for 187 days, compute a compatibility analysis between two persons and provide a character analysis from the person's input.

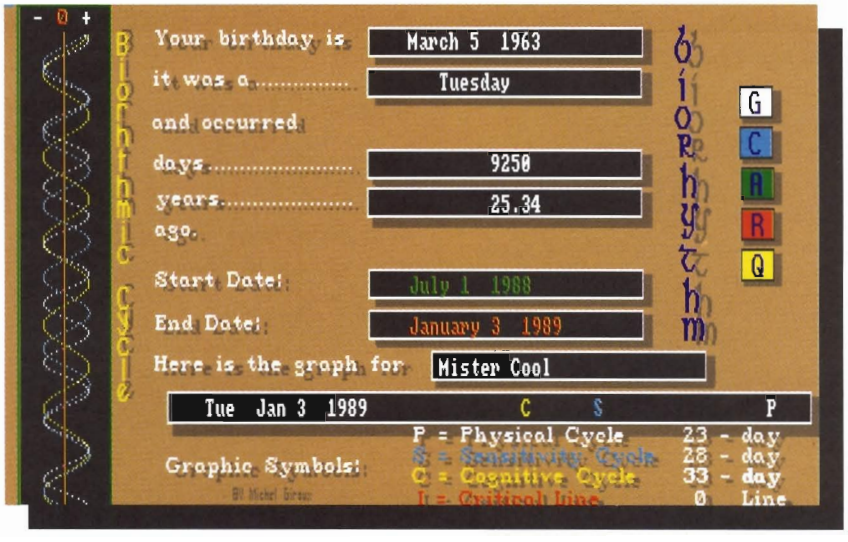
What is a biorhythm? A biorhythm is the rhythmic course of life processes of organisms. Biologically, everyone has periods of high and low peaks in their everyday experiences. There are three phases which regulates the life of an individual:

1. Physical phases of 23 days which include physical fitness and the basic bodily functions.

2. Sensitive or emotional phases of 28 days which include mental health, creativity and mood.

3. Cognitive or intellectual phases of 33 days which regulate alertness, memory, and receptivity to knowledge.

The next question is will it work? Let me point out that this program will not convert your Amiga into a crystal ball, but it will emphasize days where you should be careful or days where you will be at your peak. I've experimented with this program often, entering past dates (note that this program will not work on dates prior to 1800).



At the left of the picture is the graph that displays the biorhythmic cycles for Mr.Cool (the guy on our cover). As the programplotseach day, the corresponding date is printed in the box near the bottom. This information is printed rather quickly at first, but can be viewed again once the entire graph has been plotted.

For example, my friend had an accident on the 25 of July 1978. For "Today's date", I entered the 1st of July, 1978, and his birthdate. Entering a date prior to the target date will allow a visualization of the cycles prior to the accident and after the accident. Believe it or not, his physical and cognitive cycles were both on the critical line! This does not predict the accident but shows that he was probably physically tired and that his mental alertness was out to lunch. Given the same situation another day he probably would have avoided the accident.

I have also experimented with persons deceased. My wife's grandmother died at an age over 80 of heart failure. Her biorhythmic cycles demonstrate that on the date that she died her physical cycle was on the critical line.

Strange? Yes I must agree. Do I believe? I won't swear by it but there is a limit to coincidence. I could fill pages

By Michel Giroux

full of examples that would make skeptics wonder but instead I will let you experiment with the program yourself and allow you to draw your own conclusions.

SAMPLE RUN

As you startup the program, you will be asked to input today's date. Enter the month, the day and the year. Example: 05,24,1988. Next, enter the birthdate using the same format. Finally, enter the full legal name of the person (the character analysis uses this information).

After this sequence of data input, a new screen will appear. The program will show the day of the birthdate, how many days and years ago this date occurred, and indicate the start and end date for the graph.

The program will now proceed in calculating the biorhythmic cycle and will plot a graphic representation of the cycles in the biorhythmic cycle box while showing detailed information in the message box. Although the information flashes too fast for you to read in the message box, you will be able to re-examine that information once the whole cycle (187 days) is calculated.

On the chart, the 0 (red line) is the critical line and is when most accidents are most likely to happen. The high periods (+) are when you have the most energy and the low periods (-) are regarded as recuperative periods. The white line of the cycle represents the physical cycle, the light blue line represents the sensitivity cycle and the yellow line represents the cognitive cycle.

Once the cycle has been calculated (approximately 4 minutes) you may point the mouse pointer at any point in the chart and relevant information will appear inside the message box. For example, if you see a point on the chart where your physical cycle is on the critical line, click on that point. Two horizontal bars will appear illustrating the point where you clicked and day X of cycle along with the day and date will appear in the message box.

GADGETS

On the right hand side of the screen you will see five boxes containing the letters G, C, A, R and Q. The explanations for these are as follows:

[G] An explanation of the graphic symbols will appear in the message box.

[C] An analysis of character will be calculated for the person for which the biorhythm was calculated.

[A] An analysis of compatibility will be calculated between a second person and the person for which the biorhythm was calculated. First you will have to input the second person's full name and birthdate in the message box with the same rules and format as when you entered the data for the first person. An analysis of character will follow for the second person followed by the analysis of compatibility.

[R] Restart the program.

[Q] Quit.

A NOTE OF WARNING

If you exit the program without clicking inside the Q box, the screen and window of the graphics of the program will sneak behind the Workbench screen and will cause your Amiga to go crazy if you try to restart this program or another program (GURU...). If you do exit the program using the STOP option, pull down your workbench screen and you will see that the program screen is still intact. Select QUIT from the projects menu to close the screen.

If you only have a 512K machine, you will have to close all unnecessary windows prior to starting the program.

CLOSING COMMENTS...

The program will also play happy birthday for you if it encounters your birthday while calculating the cycles, or play another tune if it hits a new year. ❑

VideoScape 2.0

MORE POWERFUL, STILL COMPLICATED

After its initial release, VideoScape 3-D was met with mixed reactions. The animations it can produce, guided by an experienced and patient owner, were fantastic. It was a sophisticated and complex piece of software, but most people found it to be difficult to master.

Now over a year later, VideoScape 3-D version 2.0 has been released and there are probably a couple of burning questions that should be addressed immediately. Can you do more with version 2.0? Yes, and some major complaints in the way the program operates have been nicely addressed and enhanced. Is version 2.0 any easier to use? No, but there are ways around this and a new program to be released shortly will make it a lot easier to use.

There's a little piece of fine print on the back of VideoScape's package which says "Note: VideoScape 3-D is a sophisticated script-file-based animation tool designed for producing special video effects. It is intended for the professional or advanced video hobbyist." I think this is a suggestion that should be taken at face value.

CREATE YOUR OWN WORLD

The necessary pieces which constitute a 3-D animation are easy to list: You have a miniature "world." You place one or more "objects" in that world. The objects can move around inside the world in 3-D space and you can point a camera at them and film them as they move around. The objects can move and the camera can be stationary and watch them. The objects can sit still and the camera can move around them. The objects and the camera can both be moving.

VideoScape 3-D provides all the tools needed to create wonderful, smooth flowing impressive 3-D animations. But I won't kid you - it's not easy. You need not be an artist, but you will have to educate yourself about the program's complexities.

VideoScape 3-D comes with a supply of stock objects: boing balls, Amigas, rainbow checkmarks, and so on. If you want more objects you'll either have to buy them, download them from a network or bulletin board, or make them yourself.

VideoScape 3-D provides some

By Harv Laser

This animation, created by Allen Hastings, features a HAM background with a transparent rotating champagne glass in the foreground.

rudimentary tools for object creation. A program called D3D (Designer 3D) is a slightly enhanced version of Colin French's original 'ROT' program which can be obtained through public domain channels. Two other programs, EGG (Easy Geometry Generator) and OCT (Object Composition Tool), permit the creation and modification of simple objects. If you are ambitious, patient, and understand the procedures involved you can use graph paper and a text editor and build the ASCII text file which describes an object yourself - this is obviously the most difficult way.

There are other methods to object creation which involve purchasing software from other manufacturers. This might actually be the easiest route, but more on that later.

Once you have the concept of your animation laid out, or even if you just want to fool around having fun making "test" animations, you need to learn and understand the VideoScape "way" of creating motion files. This is the weakest feature of VideoScape 3-D, in that, no motion file creating tools are provided with the program. It comes with some simple example motion files and the rest is left to you.

Object and camera motion files must be built by hand, using a text editor. Reading, re-reading, and understanding the concepts, explanations, and examples in the manual is the only way to learn how these files work.

WHAT'S NEW IN VERSION TWO?

VideoScape 3-D version 2.0 introduces many new features and enhancements over 1.0 - so many new features that it takes a 60 page addendum manual provided with 2.0 to explain them. Some of the enhancements can be gleaned by checking out the program's interface itself. Many others are not as obvious, but every change is an improvement over the original 1.0 version.

Here's a rundown of some of the new features of VideoScape 3-D version 2.0:

New menu selections. One of the most asked-for is the "Clear" selector. In version 1.0 when you returned to the menu screen from the animation screen, all of your objects and settings vanished. You had to load them all in again - a real pain. Now all your loaded objects and other settings are kept loaded, and the "Clear" selector gives you control over when to clear out objects, settings, or both. A major improvement.

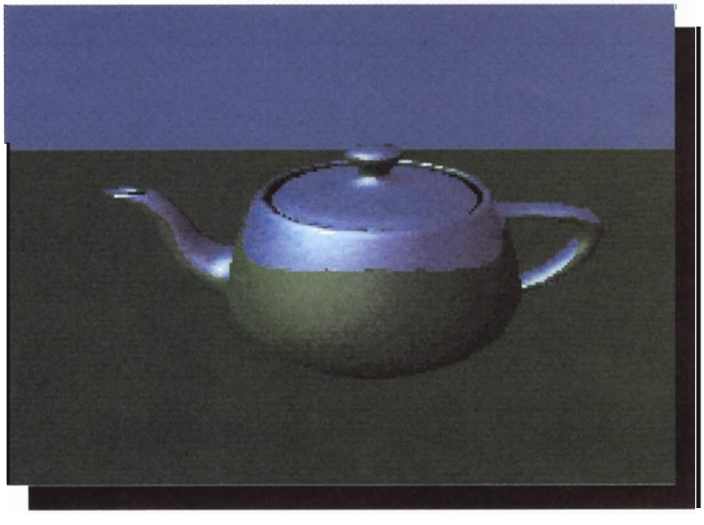
HAM support. A new HAM rendering mode lets you the use all 4096 possible colors at the same time. HAM pictures can be used as foregrounds and backgrounds within your animation - even digitized pictures. You could digitize yourself from a photograph or with a framegrabber and create an animation of a spaceship flying in one ear and out the other!

A warning about HAM animations, they need a lot of RAM memory to create. 512K isn't really enough to do anything above the very simplest objects and motions. HAM animations will take up more disk space, too. They also take longer to render, around three minutes per frame. HAM mode is menu-selectable, as is a new "black outline" animation mode which gives your animation a "Saturday Morning Cartoon" appearance, surrounding each object's polygons with a thin black line. Not only is this helpful to indicate where all the polygons are but visually, it's very attractive.

New color codes. By imbedding new sequences of numbers in an object's file, that object can be smoothly rounded, or appear with a shiny chrome-like surface. More colors are now possible including transparent colors.

Support for the 64-color Extra Halfbrite chips if your Amiga has them (all Amiga 2000s and 500s have the EHB chips as do many Amiga 1000s) EHB mode is menu-selectable. VideoScape 3-D 2.0 comes with a sample picture which tests for and shows off EHB mode if your machine has it.

Hierarchical motion paths. This new



Yet another Allen Hastings creation. Each image of the animation took 3 minutes to render. The teapot rotates around the y-axis and has a reflective surface. The surface is using the mirror color feature and phong shading.

feature lets you define one object as a "parent," another as a "child" and the child object will move in relation to its parent. The 2.0 disk includes a tutorial example of this, a spinning propeller attached to the nose of an airplane which moves across the screen.

"Severe" overscan mode which removes any possible hint of a border around the animation, taking the edges all the way out past the "mask" which surrounds your monitor's CRT. Professionals don't make videos with black borders. All modes of overscan, including turning it off completely (to conserve memory and disk space during animation recording) are menu selectable.

A new "extras" menu also gives you command over exactly which frame to start your animation. Now you don't have to wait for 50 frames to render to see frame 51. You can select frame 51 from the menu and see it rendered immediately - this is a great feature when planning and "debugging" your animations.

Support for European and Australian PAL Amiga.

More light sources, up to four lights, each with its own intensity level shining on your scene. A new requester pops up when you select "Solid" object rendering and takes string input from you for the light source settings.

Non-HAM Animations ("anim" files) are now saved to disk in a more compressed size. An anim is smaller and will load in faster for playback.

You can load a new color palette from an existing IFF picture. You can export VideoScape's standard palette to a paint program, change it, and bring it back and use it in your animation.

A new "IFF Save" mode permits individual frames to be saved as separate IFF disk files rather than compressing them into one large anim file. In this way you can plop each frame of your anim into a paint program, embellish and enhance (or clean up) each one, then reassemble them into an anim file with one of the many "page-flipping" programs available, both commercially (such as Aegis Animator) or in the public domain (such as MAKEANIM.ARC which you could download from People/Link).

The VideoScape 3-D accessory programs, EGG and OCT also have some useful new features. One of the best is that OCT can modify existing objects and re-save them in a new smaller "binary" format which will load into VideoScape 3-D much faster than the older ASCII format files.

OTHER PROGRAMS THAT HELP

All things considered, VideoScape 2.0 is a major improvement over 1.0. It addresses and fixes a few bugs and adds many new enhancements to an already powerful animation-creation environment. But as I mentioned earlier, making object and motion files from scratch are not its strong suit. So what are your alternatives? What's out there to ease the pain of creating these necessary files? Here are some suggestions:

OBJECT CREATION: If you own Byte By Byte's Sculpt 3D ($99.95) you can use its interface to create and modify objects and then convert them to VideoScape format using Syndesis' Interchange program ($49.95), which will also convert them back the other way for further editing.

Syndesis also sells objects in different formats on disk ($19.95), and objects are available for downloading on BBSs and the national networks. As I write this in early June, Mimetics is about to release 3-Demon ($99.95), a sophisticated stand-alone object editor/converter which can handle many different formats including VideoScape, Sculpt, and Forms In Flight.

OBJECT AND MOTION FILES

Aegis Development will soon release the long-awaited Modeler 3D program ($99.95) which will not only create and edit VideoScape 3-D objects, but let you define motion and camera paths with the mouse! Modeler 3D could be the "front end" that VideoScape owners have been begging for since the program was first released. If it lives up to its press release, Modeler will be quite an important program.

Do I recommend VideoScape 2.0? If you own version 1.0, definitely. The upgrade price is reasonable - even free if you bought 1.0 recently. If you're already familiar with the program, you'll love all the new features. If you don't yet own VideoScape, I hope I've given you an insight as to some of its peculiarities and complexities. There are other programs out there to ease the burden of object creation and editing, and more of them are just around the corner. ❑

VideoScape 3-D 2.0
Aegis Development, Inc.
2115 Pico Blvd.
Suite 277
Santa Monica, CA 90405
(213) 397-9972
$199.95 (look for the "2.0" sticker)

$ 30.00 for owners of version 1.0 if purchased prior to March 1, 1988.

$ 0.00 for owners of version 1.0 if purchased after March 1, 1988.

not copy-protected
512K required (1MB recommended)

(continued from page 71)

will be used to display a filename in the file requester window. Two cardinal variables are passed into the procedure. The first, 'Name', is an index into the filename array. This index points to the filename that we are to display. The other parameter is the position number that filename will be displayed to. The expression '22 + (8 * P)' is used to calculate the y coordinate that we will use to display the filename.

```
PROCEDURE PrintName(Name,P : CARDINAL);
(* print a filename *)
 VAR
  LC : LONGCARD;
  C  : CARDINAL;
  S  : ARRAY [0..26] OF CHAR;
 BEGIN
  S := '
(* start with 26 blanks *)
```

This WHILE loop is used to copy the filename onto a field of blanks.

List^[Name].Name is the string that holds the filename.

```
  C := 0;
(* overlay the filename on it *)
  WHILE (List^[Name].Name[C]#0C) AND (C<26) DO
   S[C] := List^[Name].Name[C]; INC(C);
  END;

  Move(RP^,16,22+(8*P));

(* setup *)
  Text(RP^,ADR(S),26);
(* write the name *)
 END PrintName;
```

The sixth procedure is a function used to calculate if the scoll bar was moved enough to move the display up or down. This function helps us to make sure we only refresh the display when we need to.

```
PROCEDURE Moved():BOOLEAN;
(* return TRUE if update is needed *)
 VAR
(* i.e. if the prop gadget was moved enough *)
  NFI : CARDINAL;
(* New First Item *)
 BEGIN
(* if we have less than 11 don't bother! *)
```

If we have less than 11 lines, then all are on the screen and there is no need ever to refresh the display.

```
  IF NI<11 THEN RETURN(FALSE); END;
```

This assignment calculates what the NFI (new first item) value is. It is a function of the 'pot' value from the Prop gadget's PropInfostructure.

```
  NFI := PIPtr^.VertPot DIV VISOR + 1;
(* calc new first item *)
```

This makes sure that we don't move down to far and leave a blank at the bottom of the display.

```
  IF NFI>(NI-9) THEN NFI := NI-9; END;
```

Now the NFI is compared to FI (first item displayed) and a boolean is returned.

```
     (* do we need to update? *)
  IF NFI=FI THEN RETURN(FALSE);
  ELSE RETURN(TRUE); END;
 END Moved;
```

This procedure is used to refresh the filename display.

```
PROCEDURE DoDisplay;
(* refresh the display *)
 VAR
  C,D : CARDINAL;
 BEGIN
```

First check to make sure that there are some filenames to display.

```
  IF NI=0 THEN RETURN; END;
(* do we have any items? *)
```

Next, calculate what the new FI (first item) on the display will be.

```
  IF NI<11 THEN FI := 1;
(* calc what should be the first *)
  ELSE
(* item (filename) on the screen *)
   FI := PIPtr^.VertPot DIV VISOR + 1;
   IF FI>(NI-9) THEN FI := NI-9; END;
(* don't go too low! *)
  END;
```

Now calculate what the LI (last item) on the display will be.

```
  LI := MIN(FI+9,NI);
(* calc last item (filename) *)
```

Set the colors for normal items (files).

```
  SetAPen(RP^,1); SetBPen(RP^,0);
(* assume normal file *)
```

Now, display each filename. If an item is a directory then color three is used to display it.

```
  FOR C := FI TO LI DO
(* for each item... *)
   IF NOT(List^[C].Type) THEN
(* if it's a DIR, then use red *)
    SetAPen(RP^,3); PrintName(C,C-FI);
    SetAPen(RP^,1);
   ELSE  PrintName(C,C-FI); END;
(* else use normal colors *)
  END;
 END DoDisplay;
```

The last procedure is a function used to calculate the position number that was clicked on by the user. This function returns a zero if the mouse click was not on a position number.

```
PROCEDURE CalcMouse(X,Y : INTEGER):CARDINAL;
(* calc item number *)
 VAR
(* for a mouse click *)
  Item : CARDINAL;
 BEGIN
(* if outside the file area, return 0 *)
```

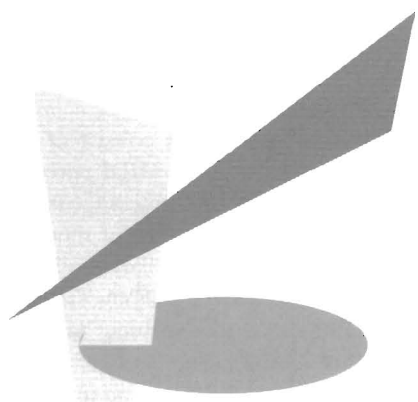
Was the click in the right place? If not, return zero.

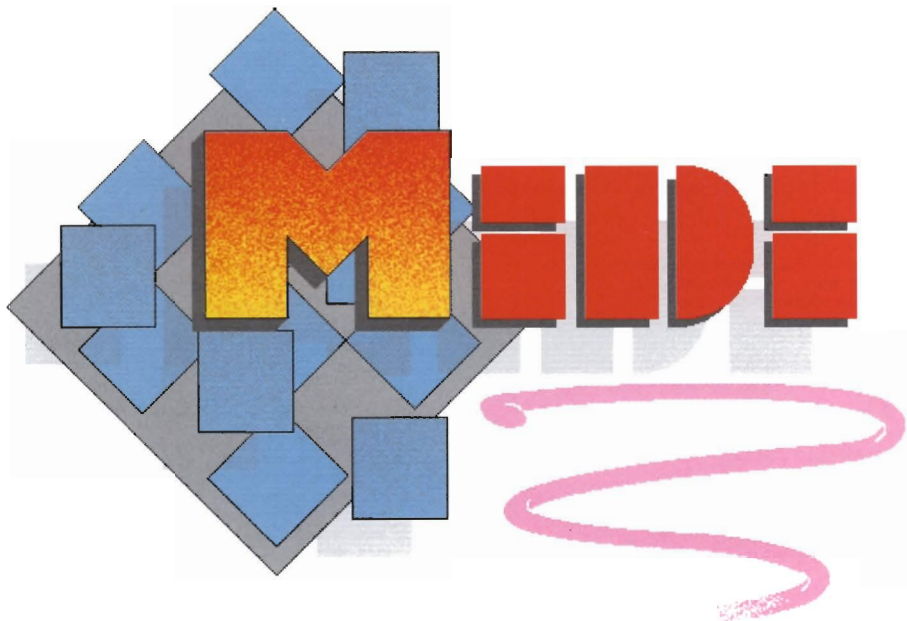
```
  IF NEW OR(X<10)OR(X>228)OR(Y<15 OR(Y>95) THEN
   RETURN(0); END;
```

Now calculate which position number was clicked on.

```
  IF Y=95 THEN Item := 10;
(* kludge for last item *)
  ELSE Item := CARDINAL(Y-7) DIV 8; END;
(* calc the item number *)
  IF Item<=NI THEN RETURN(Item);
(* make sure it exists *)
  ELSE RETURN(0); END;
 END CalcMouse;
```

Next month we will complete the file requester. ❑





This article is an introduction to a series on MIDI programming.

This is the first part of a series on MIDI programming. This month, we will take a look at the way the MIDI code is structured. In order to talk to synthesizers, you must understand their language. The MIDI code structure is the basis of MIDI programming.

MESSAGES

MIDI communications consist of messages sent through the MIDI ports. The basic format of a MIDI message is a status byte followed by zero or more data bytes, usually no more than two (except for system exclusive messages). If you are familiar with machine language, MIDI is similar. The number of data bytes (operand) following an instruction is dependent on the type of instruction used. If the length of the data is not what is expected by the instruction, something will surely go wrong. However, as an additional protection, MIDI devices are programmed to ignore a command that does not make sense. Data might be lost but the device should not "hang." Furthermore, a status byte has its most significant bit always set to one, while a data byte is the opposite. This serves as an insurance against bad or corrupted data - a nice feature when anything and everything can go wrong in a complicated set-up.

There are two basic types of messages, channel messages, and system messages. MIDI is a channel based system, each device on the system is listening on one channel. Channel messages are meant for an individual device in the system, while system messages are meant for the system as a whole.

CHANNEL MESSAGES

The status byte of a channel message can be separated into two nibbles. The most significant nibble determines what type the message is. The least significant nibble determines to what channel the message is addressed to. Four bits (a nibble) means that there are sixteen possible values, 0 to 15, or channel 1 to 16. This is why the maximum number of channels in a MIDI set-up is 16.

There are two types of channel messages, channel voice and channel mode. Channel voice messages, the ones we are most accustomed with, are: note off events, note on events, polyphonic key pressure, control change, program change, channel pressure and pitch wheel change.

Note on and note off events are straightforward; a note number is sent as one data byte followed by the desired velocity for this note. These two bytes must come after the note on or note off command (status byte). Remember that the most significant bit of a data byte must be zero, this means that note value and velocity value are between 0 and 127 ($00 and $7F in Hexadecimal). Table 1 gives the note corresponding to each numeric value. The values for a standard 88 note piano keyboard are between 21 and 108. If the velocity sent with a note on command is zero, then this is considered as a note off.

To understand the term "velocity" we have to remember that these messages were originally meant for keyboard equipment. The velocity refers to the speed at which a key is pressed or released. In most cases, the note on velocity will determine the sound level of the note, while the note off velocity is not used. Its value usually is 64 when note off is sent, but more often, a note on is sent with a velocity of zero.

Polyphonic and channel pressure also apply to keyboards; it is the pressure at which a key is held. Certain instruments can sense the variation in pressure and will respond to it. Polyphonic pressure is when a keyboard can detect the pressure of every individual key while channel pressure is only one pressure value for the whole keyboard.

Because many synthesizer keyboards have a pitch wheel, there is a

By Serge Boucher

message specifically for changing pitch value. There are two data bytes following a pitch wheel status byte, this means that pitch values have a resolution of fourteen bits, it also means that a lot of MIDI data can be generated by changing the pitch wheel position.

A control change message is the only type of message for all other kinds of controllers. It has an effect on the value of controllers such as a breath controller, modulation wheel, sustain pedal, etc. Controllers can be of three types, switches, continuous or data controllers. If the controller is a switch, the data byte following a control change status byte and the controller number will be one of two values, on (0) or off (127), while continuous controllers have values of either 7 or 14 bits precision. For a controller with 14 bits precision, two different control change messages must be sent, one for the most significant data byte and one for the least significant data byte. Data controllers are for changing parameters such as programming parameters (sound envelope levels and time).

For now, let's just say that you have to send messages telling what parameter you want to change, then you can send an increment or decrement message or the value desired for the parameter. Table 2 is a list of MIDI controller numbers. You can see that a lot of information can be sent with channel voice messages (Table 3).

Channel mode messages have the same status byte as control change messages, but with the first data byte having a value between 122 and 127. Mode messages deal with MIDI mode selection and various types of device control messages. We will concentrate on the meaning of the MIDI modes, an important aspect of MIDI communication. There are four possible modes, depending if Omni mode is on or off and if we are in Mono or Polyphonic mode. Omni is the possibility for a device to receive messages on either only one (Omni off) or all channels (Omni on). Mono mode is when a synthesizer assigns only one sound per channel. Polyphonic mode, being the opposite, assigns more than one sound to a particular channel. These four possible combinations are known as MIDI modes 1, 2, 3 and 4.

MIDI mode 1: *Omni on, Polyphonic.*
MIDI mode 2: *Omni on, Mono.*
MIDI mode 3: *Omni off, Polyphonic.*
MIDI mode 4: *Omni off, Mono.*

Mode 4 has a special feature, it can recognize messages in more than one channel. It is like having more than one monophonic synthesizer, each one accessible in a different MIDI channel. The number of voices used is specified in the mono mode on message, and each voice is assigned to one channel starting with the basic channel and adding one voice to the next channels until every voice has its own consecutive channel.

SYSTEM MESSAGES

System messages are meant for all the devices in a MIDI system, this is why there is no channel number information in a system message status byte. There are three types of system messages, system real time messages, system common messages and system exclusive messages. As long as a system exclusive start message is sent at the beginning of the transmission, and an end of exclusive message is sent to indicate the end of the transmission, a manufacturer can have a device send anything in between. The only limitation being that the most significant bit of every data byte must be zero. We will look more into this subject in a future column.

As the name implies, real time messages are used to control MIDI devices in real time. This is why these messages are only one byte long and can be sent at any time in a transmission. A real time message byte can be inserted between a note on status byte and its first data byte. Every device in the MIDI set-

TABLE 3
Channel Voice Messages

CHANNEL VOICE MESSAGES

STATUS BYTE MSN	LSN	FUNCTION	FIRST BYTE	SECOND BYTE
.8	M C	NOTE OFF	KEY NUMBER	VELOCITY
.9	I H	NOTE ON	KEY NUMBER	VELOCITY
.A	D A	POLY PRESSURE	KEY NUMBER	PRESSURE VALUE
.B	I N	CONTROL CHANGE	CONTROLLER NUMBER	CONTROL VALUE
.C	N	PROGRAM CHANGE	PROGRAM NUMBER	
.D	E	CHANNEL PRESSURE	PRESSURE VALUE	
.E	L	PITCH WHEEL	PITCH VALUE LSB	PITCH VALUE(MSB)

SYSTEM MESSAGES
SYSTEM COMMON

STATUS BYTE MSN	LSN	FUNCTION	FIRST BYTE	SECOND BYTE
.F	0000	SYS. EX.START		
.	0001	UNDEFINED		
.	0010	SONG POSITION	POINTER (LSB)	POINTER (MSB)
.	0011	SONG SELECT	SONG NUMBER	
.	0100	UNDEFINED		
.	0101	UNDEFINED		
.	0110	TUNE REQUEST		
.	0111	SYS. EX END		

SYSTEM REAL TIME

STATUS BYTE MSN	LSN	FUNCTION
.F	1000	TIMING CLOCK
.	1001	UNDEFINED
.	1010	START
.	1011	CONTINUE
.	1100	STOP
.	1101	UNDEFINED
.	1110	ACTIVE SENSING
.	1111	SYSTEM RESET

TABLE 2
MIDI Controller Numbers

Controller Numbers and Channel Mode Messages.

No.	Function	Type
0	Undefined	Continuous cont.
1	Modulation wheel	"
2	Breath control	"
3	Undefined	"
4	Foot controller	"
5	Portamento time	"
6	Data entry MSB	Data controller
7	Main volume Continuous cont.	"
8	Balance	"
9	Undefined	"
10	Pan	"
11	Expression controller	"
12-15	Undefined	"
16	General purpose controller #1	"
17	General purpose controller #2	"
18	General purpose controller #3	"
19	General purpose controller #4	"
20-31	Undefined	"
32-63	LSB for values 0-31	"
64	Sustain pedal	Switches
65	Portamento	"
66	Sostenuto	"
67	Soft pedal	"
68	Undefined	"
69	Hold 2	"
70-79	Undefined	"
80	General purpose controller #5	"
81	General purpose controller #6	"
82	General purpose controller #7	"
83	General purpose controller #8	"
84-91	Undefined	"
92	Tremolo depth	Continuous cont.
93	Chorus depth	"
94	Detune (Celeste)	"
95	Phaser depth	"
96	Data Increment	Data controller
97	Data decrement	"
98	Non-reg. Parameter Number LSB	"
99	Non-reg. Parameter Number MSB	"
100	Registered Parameter Number LSB	"
101	Registered Parameter Number MSB	"
102-120	Undefined	"
Channel mode messages.		
121	Reset all controllers	"
122	Local control on/off	"
123	All notes off	"
124	Omni mode off	"
125	Omni mode on	"
126	Mono mode on (Poly off)	"
127	Poly mode on (Mono off)	"

TABLE 1
MIDI Note Chart

Midi Note Chart

Note Number Note->	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
-2	0	1	2	3	4	5	6	7	8	9	10	11
-1	12	13	14	15	16	17	18	19	20	21	22	23
0	24	25	26	27	28	29	30	31	32	33	34	35
1	36	37	38	39	40	41	42	43	44	45	46	47
2	48	49	50	51	52	53	54	55	56	57	58	59
3	60	61	62	63	64	65	66	67	68	69	70	71
4	72	73	74	75	76	77	78	79	80	81	82	83
5	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107
7	108	109	110	111	112	113	114	115	116	117	118	119
8	120	121	122	123	124	125	126	127	N/A	N/A	N/A	N/A

up will react properly.

In a system where there is more than one sequencer, it is important to have some way to synchronize events. For this reason, system real time messages include timing clock messages, start messages, stop messages, continue messages, active sensing messages and system reset. Timing clock messages are sent by the controlling device to be used by all the sequencers in the system as a timing clock. This assures that all the sequencers play at the same tempo and stay synchronized. Start, stop and continue are sent to control sequencer action. Active sensing messages are sent regularly by the controlling device every 300 milliseconds. Once this has been initiated, every device in the system expects this message. If the message doesn't arrive at the proper time, it is understood as a problem in the MIDI connections and the device stops playing the notes that are still on. This prevents a synthesizer from holding notes indefinitely if a connection comes loose and it can no longer receive note off messages. System reset messages are to tell every device to reset to its default settings.

System common messages are used to prepare a system setup before beginning to play. The messages are: Song Select, tells a sequencer to load a song identified by a number from 0 to 127. Song Position Pointer messages are sent to position the starting point inside a song. There are two data bytes giving a value from 0 to 16,383. Tune Request is exactly that, it is like an orchestra tuning up before playing a song.

It is important to remember that not all synthesizers can recognize every type of MIDI message, even if you send a certain type of message, it will not respond to the message if it does not have the capabilities necessary to do so. You must refer to the synthesizer's MIDI implementation chart to know what type of messages the synthesizer can recognize.

PART II

Next month, we will take a look at how to use the MIDI library to write our own programs. We are very lucky in the Amiga community to have dedicated people who are willing to share their work in the form of freeware or shareware; MIDI programming is no exception. Bill Barton has released his MIDI library into the public domain and we will look into its use in C programming.

This month's AmigoTimes disk contains some example programs to explore the MIDI code. These programs will allow you to examine the messages that are sent. ❑

Ad Index

At your service...

Your Amiga service bureau!!!

- Linotron-300 high resolution output to black & white paper or colour separated film
- Polaroid Palette slide or print output (35mm slide, 4 x 5 transparency, instant slide or instant print)
- Telecom / FAX
- Colour dot matrix proofs, chromalins, or colour keys on request (for colour separations)
- Training and consulting

VELLUM

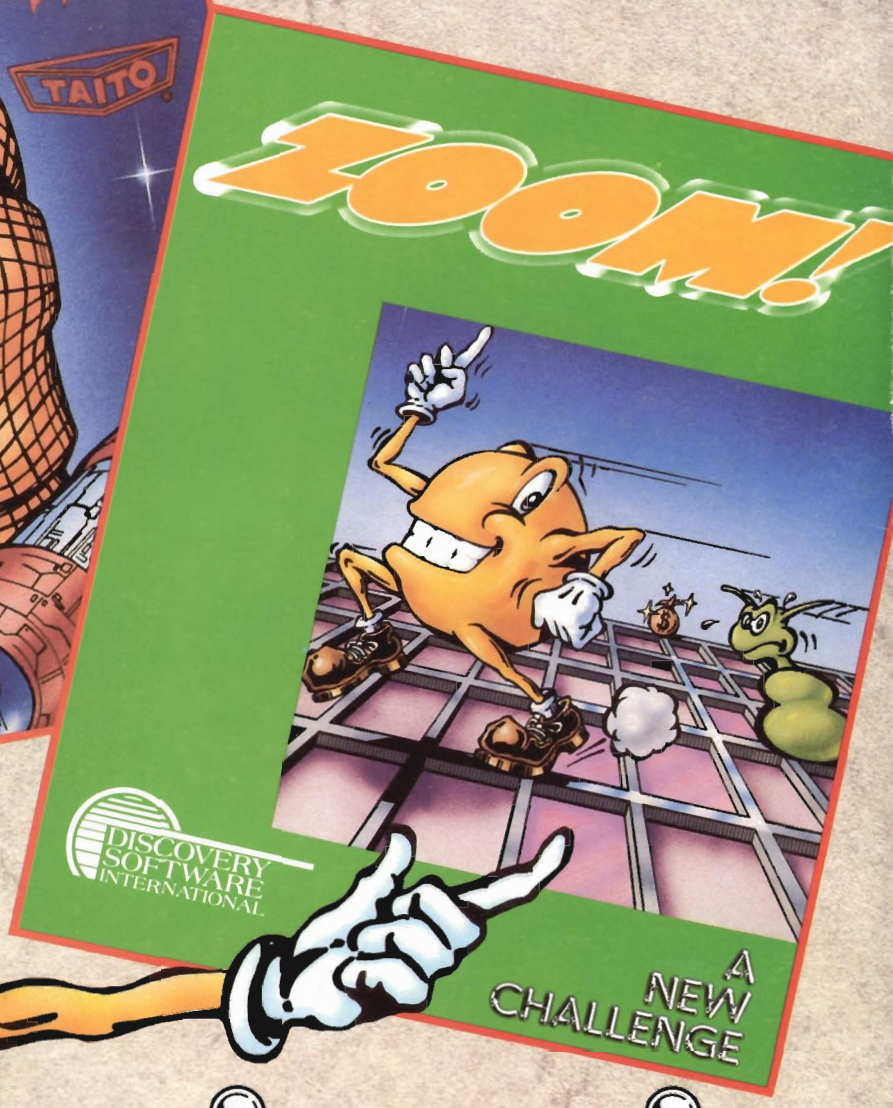
Your Amiga Specialists

37 Staffern Drive, Unit 3,
Concord, Ontario, Canada L4K 2X2

(416) 738-2300

This ad was entirely created on an Amiga 2000 system, using Professional Page software and our Linotron 300 for all design, typesetting and final four-colour process film.

ONE GREAT GAME DESERVES ANOTHER



33 NEW LEVELS

DISCOVERY SOFTWARE INTERNATIONAL

ARKANOID

- The best just got better
- Reviewers agree: unparalleled arcade quality
- Upgraded to 66 knockout levels!
- Twice chosen as arcade "game of the year"
- 30-day unconditional money- back guarantee

ZOOM!

- At last, a dynamic new game concept
- A mesmerizing combination of action and strategy
- 50 levels. 1-2 players or 2 players at once
- She'll love it too, so will the kids!
- 30-day unconditional money-back guarantee

Discovery Software International products are available at your favorite retailer.
Call 1-800-34-AMIGA for details. Arkanoid. $29.95. ZOOM! $29.95. Prices may vary.
Discovery Software International, Inc., 163 Conduit Street, Annapolis, MD 21401. 301-268-9877.