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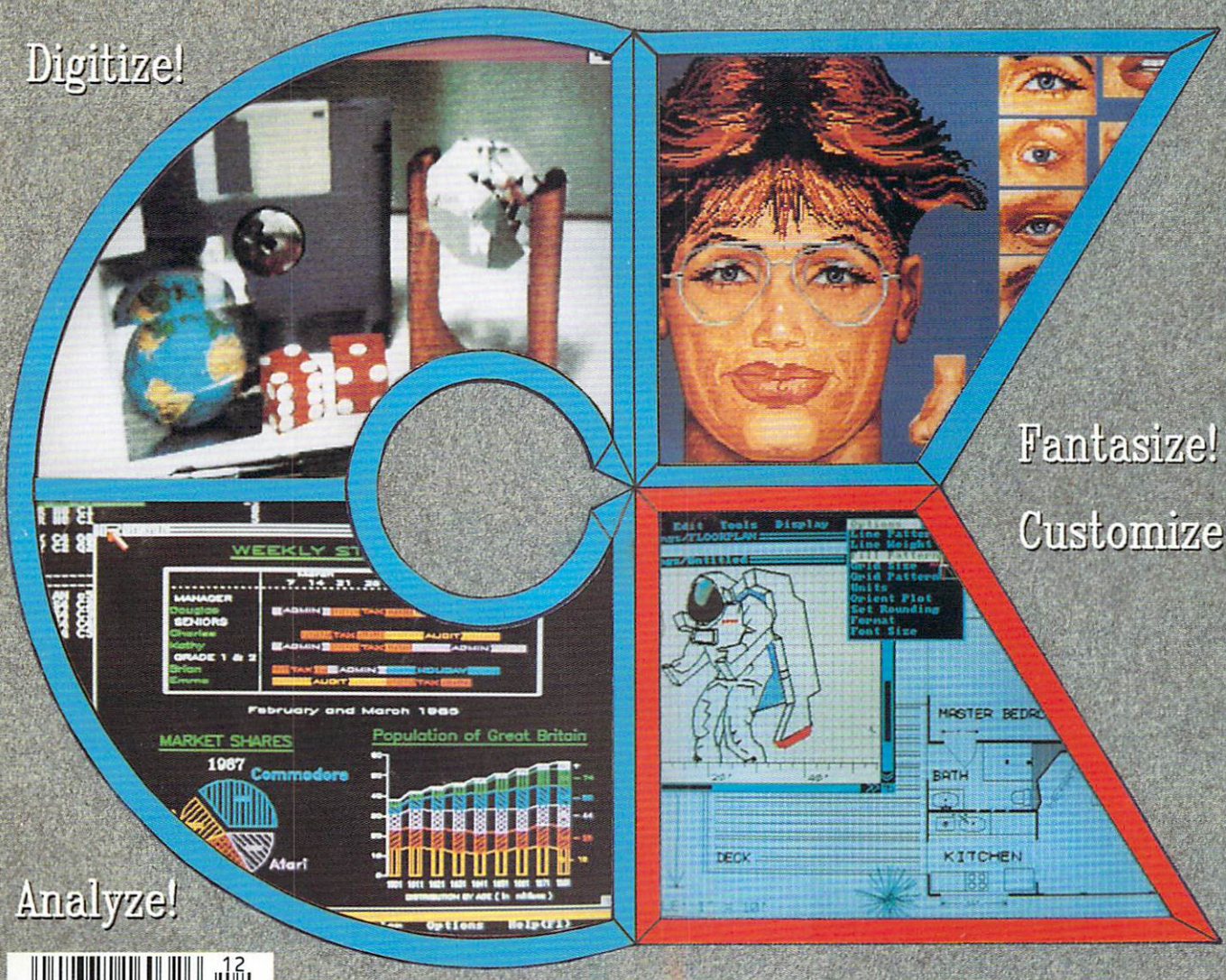

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*Commodore's Microcomputers Magazine, independent reviewers, rated the original Pocket Writer 128/64 and Pocket Planner 128/64 software the "Annual Best of 1986" in the productivity category.

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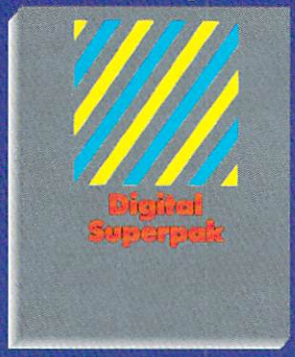

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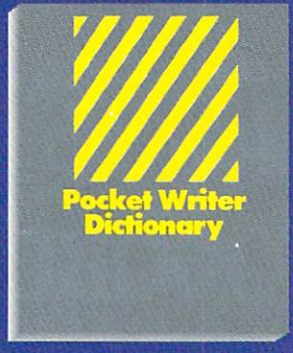

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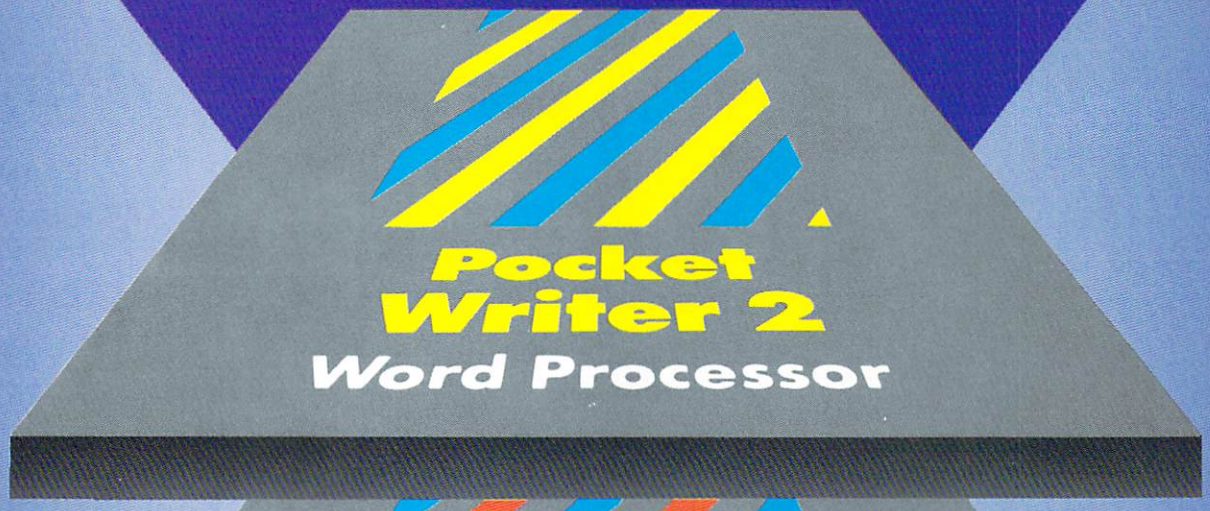

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SENIOR EDITOR, TECH. EDITOR, features, reviews, photos, illustrations, trivia, backup phones, percussion.

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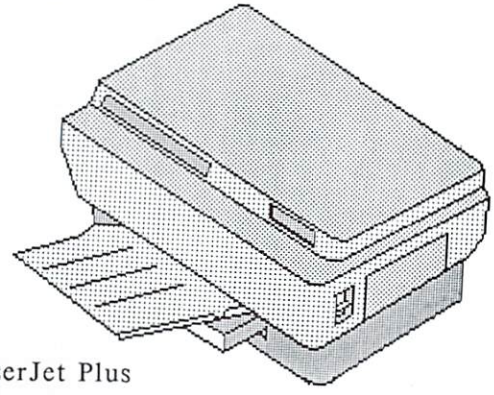

HP LaserJet Plus

INFO #12

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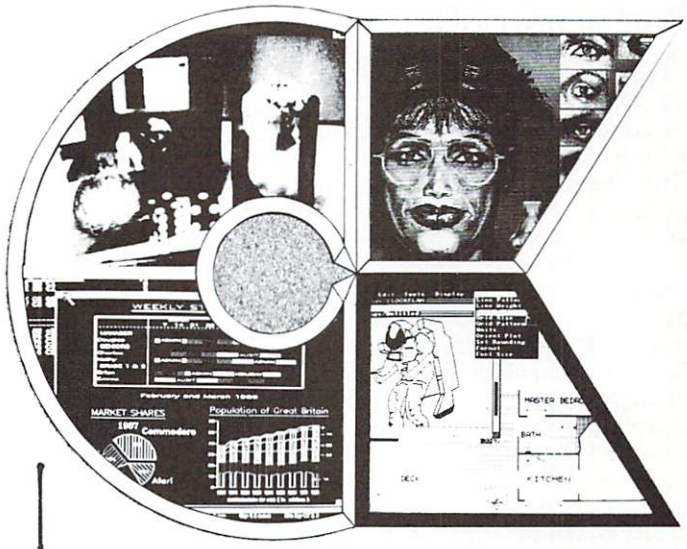


ABOUT THE COVER

Peeking out from the four windows of the familiar symbol above are screens from four of the most exciting new products to hit the personal computer scene in years. Clockwise from the upper left are displays generated with; Newtek's *DIGIVIEW*, Electronic Arts' *DELUXE PAINT II*, Aegis Development's *DRAW PLUS*, and Progressive Peripherals' *LOGISTIX*. These four titles are each landmark products in a new age of super-graphics made possible by the Amiga computer. In our feature report on graphics this issue we look at the important graphics products for all of Commodore's machines.

By the way, the cover was produced with a variety of graphics products being used together: *LOGISTIX* plotted the large black serif labels on the ROLAND DXY Plotter, the window outlines were drawn using *DRAW PLUS* and also plotted on the ROLAND, the *INFO* logo was created with *DELUXE PAINT II*, and smaller text was printed on an HP LaserJet Plus being driven by *VIZAWRITE*. The graphics screens were shot directly off a SONY KV-1311 analog monitor with a PENTAX P3 slr camera using Kodak VGR 100 speed film.

the EDITORS' PAGE

PERSPECTIVE

In the past we've done our best to bring you all the latest news and developments in the Commodore computing arena, including that which the other magazines would not print. Our *News & Views* section has covered the industry from new companies to new ideas, and *New Products* has let you know what's hot and what's not. Our *Reader Mail* section has been devoted not only to questions about programs, products, and programming, but to issues like piracy and truth in advertising. *Copy Corner* has focused on the topic of copy protection and commercial copy programs, a controversial but necessary part of the whole computing scene. The *Magazine Index* has told you when our friendly competitors have written something worth taking a closer look at...and when they've fumbled the ball. Peggy Herrington and Ted Salamone have done their level best to keep you up with the latest in music, telecommunications, and business. We hope that our product reviews have been unbiased, fair, and helpful. INFO's biannual *Product Roundup* has established itself as the last word in product information for all three Commodore computers. And from the first day of publication, we have been committed to producing this magazine entirely on Commodore computers, not because we couldn't afford IBMs but because we wanted to *show* what Commodore computers could do, not just talk about it. That's what INFO is all about.

EVOLUTION

Over the next few issues we'll be extending and refining what INFO is and what we do between it's covers. We'll be covering more 'hot' topics with an investigative eye. There are many stories in this industry that deserve to be told: programmers who have had their programs stolen, others who have not been paid promised royalties, people who have been ripped off by dealing with large companies in good faith, and companies that have not delivered on promised goods.. We'll be gathering the facts and reporting on these stories and others in upcoming issues. And there are companies and individuals who have gone the extra mile or overcome great odds to do the right thing, and you'll hear those stories, too.

We are also working hard to bring in new writers who are experts in their fields. We want to give these experts an open forum for their opinions and observations, a place where they can tell you what's really going on in the computer industry, and what that means for Commodore computing.

With the next issue, **R.J. Mical**, the developer of Intuition for the Amiga, will join INFO as a regular contributor. R.J.'s column will allow us to look at the world of the Amiga through his knowledgable eyes. Though he is no longer an employee of Commodore/Amiga, R.J. is now an independent consultant working close to some of the hottest Amiga projects going. His intimate association with the Amiga gives him a valuable insight into the computer and it's capabilities, and we're proud to welcome him aboard.

Beginning in issue #15, **Richard Immers**, the author of *Inside Commodore DOS*, will be taking over INFO's *Copy Corner* column. Dick is by acclamation the world's foremost living expert on Commodore drives and copy protection. He'll be keeping you up to date on the latest protection schemes and copy programs for all three Commodore computers. We don't think you'll be able to find better information on this topic anywhere than in Dick's column.

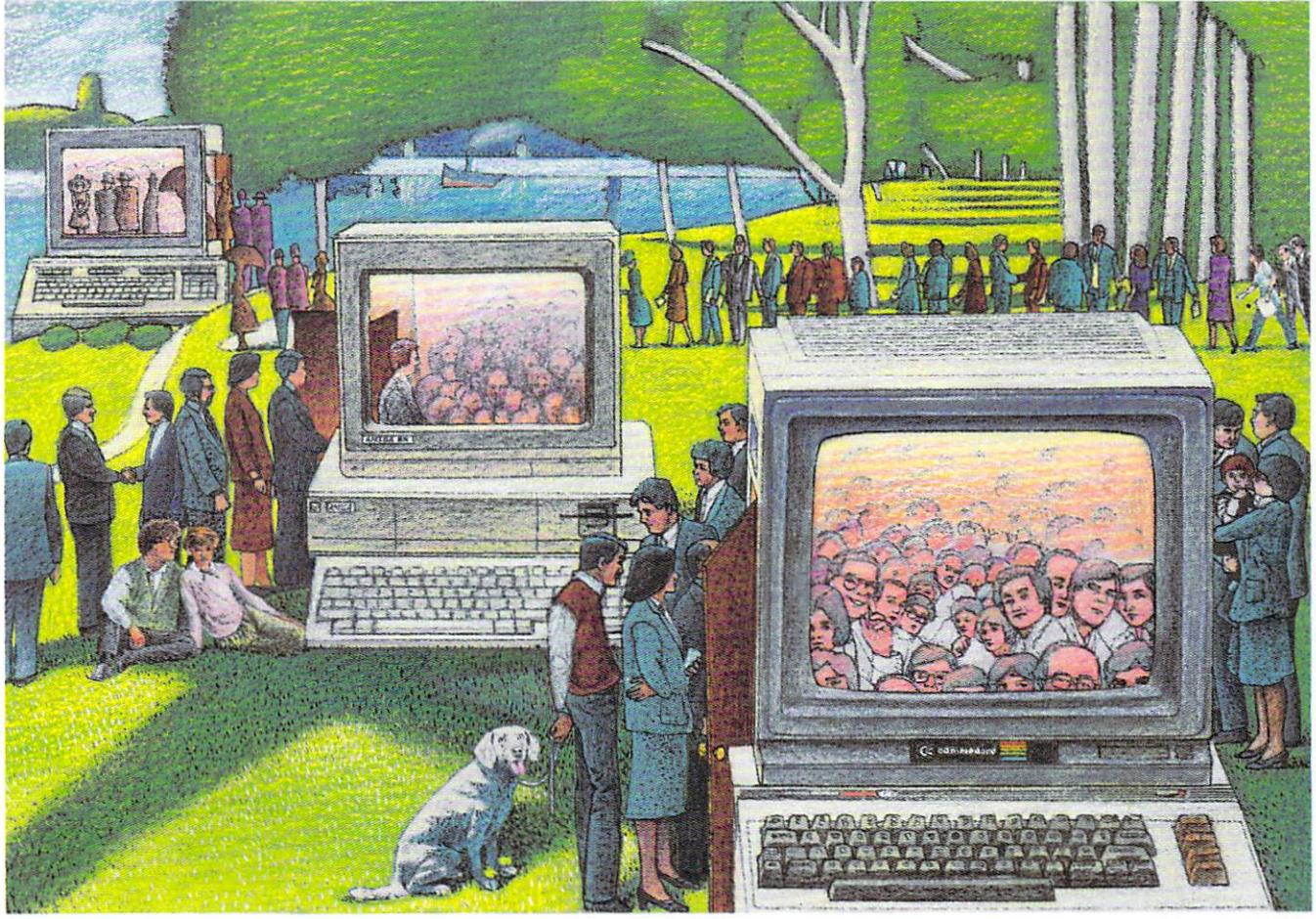
We'll also be welcoming some new contributing writers to our pages in future issues of INFO. Some are names you may recognise from elsewhere. Others are brand new, but are talented writers with expertise in Commodore computing. All bring a users-eye-view to their articles and reviews.

THE FUTURE

We hope you'll like the additions. They're all a part of our efforts to bring you the latest, most honest, and most accurate information in the industry. We will continue to be on the lookout for ideas to make INFO more useful to you. Don't be afraid to share your thoughts with us.

We're changing. We're growing. But we are also staying the same. Thanks for reading.

--Benn & Mark



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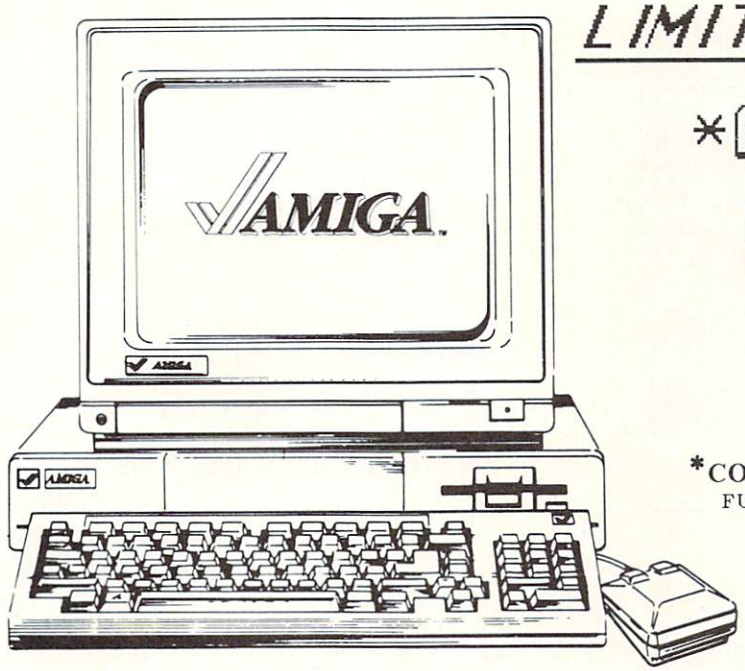

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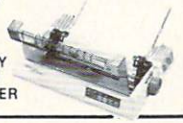

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Mail From: Music ManJ
Date: Wednesday 20-Aug-86 19:48EDT

Ok INFO....You are my last and final hope. Please tell me what's going on with **PC/ET**! What's the specs? Should we wait for the **Sidecar** or order this product? Also a small suggestion: Download your graphic covers to Qlink. They are awesome!!

Thank you

A dedicated reader....
Music Man(JJ)

The $70 **PC/ET** *software IBM emulator from SofTeam is still getting the kinks ironed out of it. We are supposed to get a copy for review when it is ready, sometime this Fall. SofTeam says* **PC/ET** *will allow the Amiga to run almost any MS-DOS program, and certainly many more than Commodore's own* **Transformer** *software, including programs with color graphics. They are claiming speeds equivalent to the Transformer, or about 70% of IBM/PC speed.* **PC/ET***'s other advantages are that it runs in its own window as a multitasking application, does not require a DOS disk to run, and allows transfer of files from MS-DOS to AmigaDOS. It will work with both 5.25" and 3.5" drives.*

Commodore's **Sidecar** *will be a much more expensive product ($500-$800), but it will provide excellent PC-compatibility, full IBM graphics, and 100% of IBM/PC speed, plus allowing you to run two MS-DOS programs at once in separate windows (one color, one monochrome). The Sidecar also serves as an IBM/PC-slot compatible expansion chassis for the Amiga.*

-Mark & Benn

Dear INFO,

I am a retired handicapped individual who loves the Amiga, however I recently discovered some important information regarding my Amiga which I would have thought would be common information long before now. I have never seen this fact acknowledged in **any** periodical up to this time. I recently went to purchase a RAM board upgrade to increase my memory from 512K to ???? Imagine my astonishment when the manufacturer of the board informed me that I could increase the memory of the Amiga up to 8 megs, however there was **no way** to increase the **graphics or sound** capability past the 512K! I purchased this computer with the color graphics and sound being paramount in my thoughts and needs. To say the least, I am terribly disappointed.

Why has this never been mentioned in any article anywhere? Is the information correct? And if so is it taboo to print? Your thoughts would be greatly appreciated.

Irving Spivak, Ph.D.
Chula Vista CA

Rest assured, if any information was "taboo to print" you would read it here in INFO! This is a limitation of the Amiga that has been reported, but generally only in technical articles on the inner architecture of the Amiga. That's because it makes very little difference in the operation of the machine. Though only the first 512K (called Chip RAM) is **directly** *addressable by the sound and graphics chips, additional memory can be used in sound and graphics applications by simply swapping the information in quickly from the additional RAM. Most graphics and sound software will take care of all this for you automatically.*

Outboard expansion memory (called Fast RAM) adds another immediate benefit to Amiga graphics and sound. If you have 512K of RAM or less, graphics, sound, and programs all have to share the same memory space. The system occasionally slows down while it manages the shared RAM. When you plug in additional RAM, the system allocates the first 512K **entirely** *to the graphics and sound chips, and the extra RAM is used for program storage and execution. So you will get plenty of graphics and sound benefits from adding outboard RAM even though the chips can't address it directly.*

--Mark & Benn

(continued on pg. 28)

INFO Special:

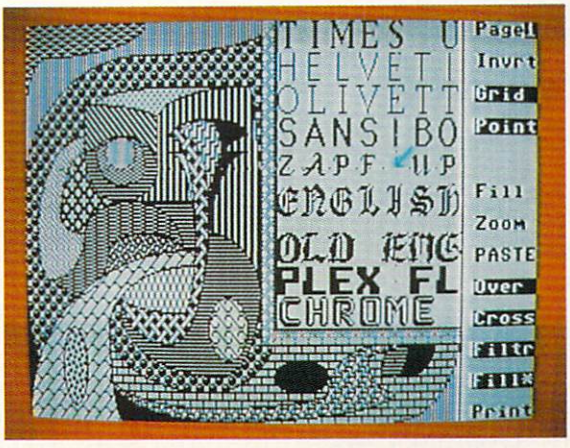
GRAPHICS REPORT

For pleasure, productivity, or just that old timeless urge to create- your computer can unlock the power of graphics for you! INFO's look at the state of the ART:

C-64 Painting & Drawing

FLEXIDRAW

Flexidraw ($99.95 from Inkwell Systems) is great mostly because it includes the most advanced drawing instrument ever made for the C64, the Flexidraw Light Pen. The pen is accurate enough that you can even use Flexidraw to produce very acceptable technical illustrations. The Flexidraw software is a hires monochrome drawing program with two selectable screens, each slightly narrower than the C64 display because of the menu bar which runs down the right side of the screen. The two screens can be linked together under software control to provide a double-wide or double-high virtual screen. The software has been continually updated and improved since its introduction, and the latest version (5.0) includes almost every feature you can think of. It copies rectangular screen areas, produces rectangles and circles, draws lines, "rubberbands", fills enclosed areas with a variety of patterns (including custom), undoes all drawing function errors except freehand drawing, and edits in a zoom mode that displays a lifesize mobile cameo picture of the area being edited. Flexidraw even includes features like flexible curve drawing and multiple text fonts. All functions are lightpen-selected from the onscreen menu. The disk includes utility programs to colorize monochrome Flexidraw pictures, edit and animate sprites, and send and receive pictures via modem. Font editing and graphics conversion support programs are available separately. With its flexibility, accuracy, and ease of use, Flexidraw is quite simply the finest hires drawing package available for the C64.



DOODLE!

Doodle! ($39.95 from Crystal Rose Software) was among the first really impressive software titles for the C64, and it has withstood the test of time well. It's a hires color drawing program controlled by a joystick, though true Doodle! aficionados know that the best way to use this program is with a WICO trackball. Doodle! lets you draw with lines, boxes, and ellipses, and features a zoom editing mode. All modes are controlled by the function keys.

Text mode lets you type in any of four orientations in many text sizes. There is a grid function which lets you count pixels for accurate drawing. Doodle!'s copy feature was the first to allow you to rotate, shrink, or enlarge the copied area. For copying smaller areas or for simulating pattern fills (which Doodle! does not directly do) there is "rubber stamping". Many special effects are available, including inverting, flipping, and clearing areas of the screen. The "Op Art" option is spectacular and is found in no other drawing program. If you forget any of Doodle!'s commands, help screens are just a keypress away. Though it lacks a true undo function, Doodle! has a swap screen you can periodically save your picture to, which you can then restore to the screen if you mess up. The print function dumps pictures in two sizes to the half dozen or so most popular printer types. The manual even includes a short BASIC listing which allows you to load Doodle! pictures from your own BASIC programs. Though it lacks some advanced features like curve drawing and multiple fonts, Doodle! is the best hires drawing program for those who prefer a trackball to a lightpen.

MICRO ILLUSTRATOR

Commodore's **Micro Illustrator** ($29.95) is the "official" multicolor drawing program for the Commodore 64. It has been with us in one incarnation or another almost as long as the C64 itself. In its Commodore version Micro Illustrator supports either joystick or lightpen, though a lightpen-only version was shipped with Tech-Sketch's lightpen. The **KoalaPaint** program shipped with the KoalaPad is also essentially Micro Illustrator with a few modifications. Besides drawing in all sixteen C64 colors with ten different brushes, Micro Illustrator features sixteen additional textured color patterns. Features include box copy, fill, the drawing of circles, rectangles, and polygons, line and "ray" drawing, and four-way mirror. A zoom pixel editing mode lets you edit detail. It is not possible to erase anything on the screen; instead, you correct mistakes by painting over them with background color (like using "whiteout" instead of an eraser). The undo feature undoes the entire last screen session (for example, a series of fills of the same color). All features are accessed on a separate menu screen that you get to by toggling with the space bar. There is no provision for adding text to a Micro Illustrator screen. And, although you can load and save pictures to disk, there is no way to send them to a printer. Many third-party and public domain programs exist to do this. Micro Illustrator is a good multicolor drawing program with some shortcomings and omissions, most of them a result of its having been conceived in a less sophisticated age.

GRAPHICS MAGICIAN

It is difficult to know how to classify **Graphics Magician** ($29.95, Polarware). It has more appeal for programmers that it does for budding artists. Graphics Magician lets you construct pictures a step at a time using lines and fills. You can then edit the sequence of drawing steps to modify the picture. It is less interactive than any other paint program, and the results are generally stiffer and less appealing. There are no shape drawing functions, and sophisticated drawing tools are totally absent. You cannot even draw freehand. What it does give you is line drawing, brush "stamping", and fills. Sixty-four color textures are available, mixed from a palette of four foreground and four background colors. Coordinate readouts assist you in making accurate drawings, and at any time you can edit your sequence of drawing steps to delete errors or add details. Why would anyone want to use such an awkward drawing system? Disk space. Graphics Magician includes a runtime module that can be linked to BASIC or m/l programs to load and display GM pictures. Since these pictures are saved as a series of drawing steps, not as pixel maps, the file size of a saved GM picture is very small. This allows you to save *dozens* of pictures to one disk, rather than the usual ten or twelve. This feature has made it popular for developing illustrations for graphic adventures. Its unique file format even makes it possible to transfer picture files between different makes of computers. Though it's not much good for just doodling around, Graphics Magician is a nice development tool.

PICASSO'S REVENGE

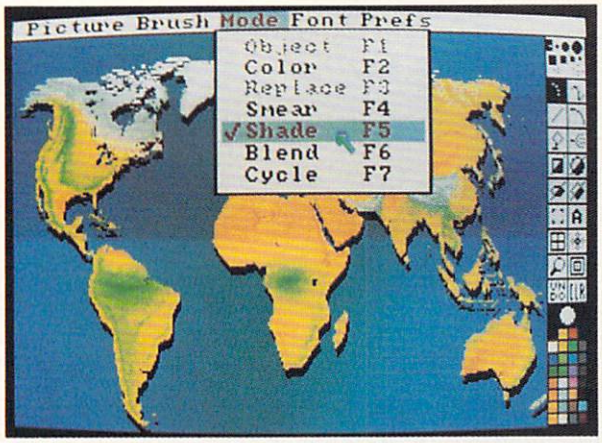
Picasso's Revenge ($59.95 from Progressive Peripherals) is a multicolor lightpen drawing program with many features, and it comes with its own lightpen. As one of the latest drawing programs for the C64, it has a couple of sophisticated features not found on older programs. Picasso's Revenge is menu-driven with the lightpen via onscreen menu bars at the top and bottom of the screen. Features include geometric shape drawing, text, four-way mirror, block copy, fill, and a zoom

editing mode with scrolling. The fill function will not let you fill an open-ended space, which will keep you from spilling all over the screen. Unfortunately, it will also not allow you to fill an enclosed area with "paint" of a different color than the outline. You can type most text to the PR screen, but six keyboard characters must be menu-selected, which is awkward. By far the most impressive feature of Picasso's Revenge is its unique outline copy/move function. This allows you to pick up single-pixel outlines and move or copy them. You click near an object and the program analyzes the object's outline and allows you to transfer it to a new location, all automatically and without picking up a "copy box" which might move extra garbage along (though that form of copying is available, too). It's strange, it's unique, and it's wonderful, and it's a feature we haven't even seen on Amiga paint programs. Picasso's Revenge lets you print your finished picture in greyscale on most dot matrix printers. The system disk even includes a utility program for translating other multicolor drawing program pictures to PR format. It's a very nice multicolor drawing program.

Amiga Paint Programs

DELUXE PAINT

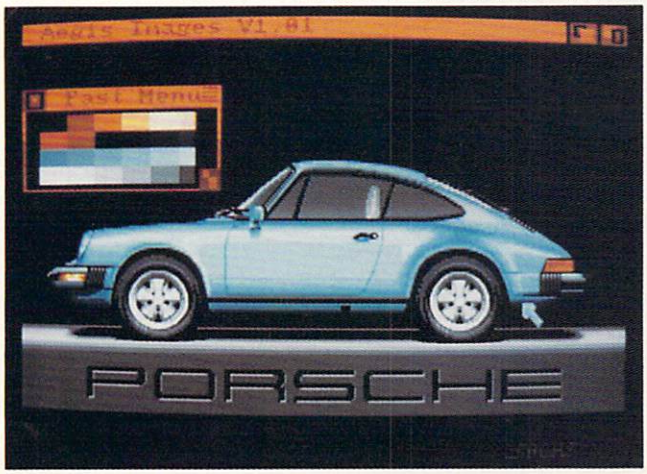
Deluxe Paint ($99.95, Electronic Arts) gives an incredible amount of control over the Amiga's graphic screen. DPaint uses the mouse to draw on the lo, medium, or hi-res screens. You can draw freehand with any number of brushes, which can be objects captured from the screen. These can even be saved independently to disk to form a brush library. You can draw geometric shapes, use an adjustable airbrush mode, choose a grid mode that locks you into a regular drawing pattern, and use a programmable multi-plane mirror mode. A coordinate readout is optional. DPaint also does a nice rubberband line or curve. You can type text to the screen in any Amiga-compatible font. The copy function is implemented as the brush-capture drawing mode we've already mentioned. There is error undo for your last action. You can cycle the colors in any of three independent color ranges in three speeds for some spectacular effects. The color controls allow you to copy colors and to spread colors over a range for fine color shading. But DPaint does not do pattern



fills or gradated fills, and it won't do dithering to smooth the effects of curve drawing. Ellipse drawing is limited to vertical or horizontal axes, though any object can be lifted off the canvas and rotated through any angle. In fact, you can also dynamically size objects and "bend" them. DPaint automatically configures itself for low-memory situations by loading features in from disk as needed, eliminating the swap screen, and cutting down on the number of colors in the palette. DPaint files can be used with Deluxe Video Construction Kit to produce sophisticated videos. Electronic Arts is about to release an update of Deluxe Paint that takes care of its few shortcomings. Even without the changes it is a world-class drawing program.

AEGIS IMAGES

Though this paint program works only in lo-res and med-res modes, **Aegis Images** ($79.95) has many powerful features. Besides the usual array of drawing tools, including line drawing, geometric shapes, fills, etc., AI also offers pattern fills, shaded fills, dithering, a pop-up "fast menu", and a watercolor "wash" effect, and color cycle animation. You are equipped with a set of 20 brushes, a palette of 32 adjustable colors and 16 user-definable patterns. Copying is done with a capture window which



has its own sizing and rotation gadgets associated with it. Though you can freehand draw with windows, they cannot be used in the drawing of geometric shapes. Windows can be saved to disk independently. Magnify is also implemented in its own mobile window with a sliding magnification gadget. Ellipses can be drawn in any orientation, parallelograms "pulled" in any direction, and regular polygons drawn with up to 19 sides. Erasing anything is a bit awkward with AI since you have to pick it as an option off a pull-down menu. Undo undoes the last entire screen update session, such as drawing a series of circles, or filling several areas with red. AI saves files in standard IFF file format, which means its pictures are cross-compatible with DPaint and other Amiga graphics programs. Aegis Animator works with Images picture and window files to produce excellent animated video sequences. Aegis Images is also being revised to include many new features. But the original is a powerful graphics tool in its own right.

GRAPHICRAFT

Graphicraft from Commodore was the first, the "official" drawing program for the Amiga. It is a simple program, offering only freehand, line, and box drawing, plus fills. You are allowed a full range of 32 colors out of 4096, and have a set of 16 brushes. These are redefinable. There is a magnifier for fine editing and a variable mirror mode for drawing symmetrically. A cycle function allows you to animate a single range of colors. If Graphicraft existed on the Commodore 64, it would be an awesome program. But on the Amiga, it simply misses too much of the computer's graphics potential. You can do some amazing things with Graphicraft if you are very patient, but more advanced drawing programs give you many more features and will save you a lot of time. Graphicraft is actually very similar to **NeoChrome** on the Atari 520ST, which Atari gives away free with the machine. If you could get Graphicraft for free, it would be a nice thing to get. As it is, it is a plain vanilla program competing against programs in fountain flavors.

C-64 Graphics Tools/Utilities

FLEXIFONT

Flexifont ($29.95, Inkwell Systems) is an extremely useful tool for those who have driven **Flexidraw** to the limit. With it you can produce your own Flexidraw-compatible fonts and fill patterns. There are 33 fonts on the disk *plus* a Font Capture program which can be used to capture the custom fonts used by your favorite programs! Of course, Flexifont uses the Flexidraw light pen for editing.

ICON FACTORY

Icon Factory (from Solutions Unlimited) converts almost any C64 graphics format you can think of to almost any other. You can swap pictures from Flexidraw, Doodle!, Billboard Maker, Newsroom, Print Shop, KoalaPaint, and almost any other format. Yes, it even converts multicolor to hires and vice-versa! You can also swap icons and graphics images among Newsroom, Print Master, and Print Shop. You can also pick part of a full-size graphics screen and save it as a small format graphic. You can also enlarge, stretch, and smooth images if you want to go the other way. This is only one of many graphics conversions programs, but it is definitely one of the most versatile.

GRAPHICS INTEGRATOR

GRAPHICS INTEGRATOR ($29.95, Inkwell Systems) converts between Flexidraw, Doodle, and Multi-color graphics files. It also has a routine for creating graphics files which can be merged and printed with some wordprocessing programs (PaperClip for sure; inquire about others supported now.)

GRAPHIC CONVERSION C64

GRAPHIC CONVERSION C64 ($20, High-Tech Graphics) Converts files between Koala, Doodle!, Print Shop, Flying Colors, CADPAK 64, UltraBASIC, B/Graph, and HES Graphic Basic.

Amiga Graphics Tools/Utilities

ART PAK 1

Art Pak 1 (Aegis) is a library of impressive pictures and windows you can use in your own Images or DPaint pictures and Animator scripts. There is even a sample animator script on the disk which uses many of the images. Included are buildings for building cities, tanks and jeeps, airplanes, dinosaurs, animals, heads, and more. All are highly realistic.

GRABBIT/ANYTIME

Grabbit ($29.95, Discovery) is a nifty little utility for your Amiga that lets you dump any screen, anytime, to your printer, or save it as an IFF-compatible file. This means you can load it into your favorite paint program and play with it. It's nice to be able to capture those great images from commercial programs and use them in your own creations. We have a good time grabbing Mandelbrot screens and doing color cycle animation on Deluxe Paint. (It is also fun to grab somebody's Workbench screen, load it up on their machine on DPaint, and turn off the menu bar. When they come back and try to click on something, they find themselves drawing on the Workbench screen instead! A barrel of laughs.) **Anytime**, which is included on the Grabbit disk, is a popup palette that lets you change the system colors anytime you want. No longer are you stuck with the awful default colors some programmer picked for his program! We use this one all the time to improve the contrast and color for screen shots for the magazine.

DPAINT ART & UTILITY

The Deluxe Paint **Art & Utility** disk (Electronic Arts) includes some tools you wish you had long ago. A Slide Show program strings together IFF pictures in most interesting ways, complete with sidescrolling, fades in and out, and timed delays or advance via mouse button. The Screen Dump utility will print any Amiga screen. There's a version of Polyscope that lets you print or save screens. And there are drawers full of brushes, with dinosaurs, birds, science fiction geeks, and facemaker parts by the dozens.

C-64 CAD & Drafting

CAD-3D

The **CAD-3D** package ($39.95 from IHT) for the C64 offers three-dimensional wireframe model design in an effective 256x256x256 point grid, with a display of 256x192 points. You can define objects in hires or multicolor modes. Multicolor mode gives you the option of using three line colors. Using either a joystick or the keyboard, you manoeuver a pair of cursors on-screen, keeping track of your X,Y, and Z positions on the status line at the bottom of the screen. The points you plot are stored as a sequence which can be displayed by moving through the coordinate list. You can edit the sequence by adding or deleting points. The process is not painless, but it's not too hard to

get used to, and it works well. The system can store up to 2000 lines.

The display options make CAD 3D pretty versatile. From the Edit mode you have the option of displaying your drawing in perspective or orthographic views. The program also offers two other viewing modes, Translation and Rotation, which allow you to move objects. Though the speed is not adequate for real-time animation, most objects take only a second or two to move, and the move itself is very quick once the calculations are done.

You can perform Edit, Translation, and Rotation on the complete Design Matrix in memory, or you can designate a range of point values. This allows you to, for example, lift off the top story of a building, rotate it by 90 degrees, and drop it back into place!

Pictures can be merged by opening an Operative Field at the end of your Design Matrix in memory and simply loading the picture you want to merge. You can also save your designs in Doodle!-compatible format to allow further detail work with that excellent drawing program. This format is also compatible with Commodore 128 BASIC hires graphics, and can be used with your own Commodore 64 programs with little extra effort. Machine language and BASIC sample programs to load and display CAD pictures are included on the system disk. However, the CAD-3D system cannot itself load these F files back in, nor can it load Doodle! files to work on.

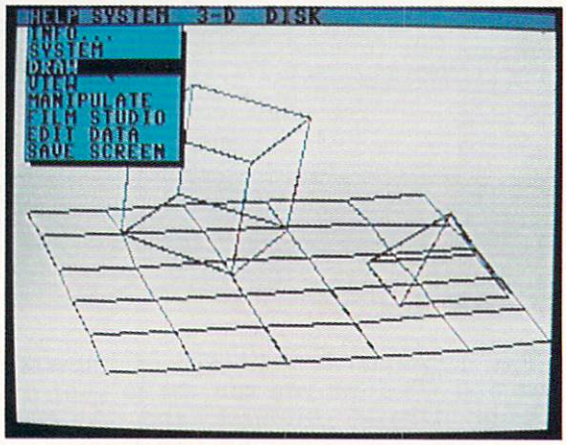
CAD-3D supports hard copy on the 1520 plotter, which lets you print out three-color multicolor designs. It also supports the MPS 801, 802, and 803 printers from Commodore. If you have another printer, you must have an interface that gives you 100% Commodore compatibility in order to get hard copies: there is no way to configure the program for non-Commodore printers.

The manual is pretty slim--only 22 narrow pages long. It will get you started, but you'll have to play around with CAD-3D to develop a real feel for the program. The disk includes a half-dozen sample files to play with.

All things considered, CAD 3-D is ok. Its major faults are a lack of third-party printer compatibility and relatively small size of field. CAD 3-D is a very nice entry-level system. It 'feels' good and gives you some nice displays with a minimum of effort. It's not sophisticated enough for any serious work, but seems to be well-suited for teaching the fundamentals of CAD, or for playing around with at home.

PERSPECTIVES II

We initially looked at **Perspectives** ($59.95, Briwall) from Pioneer Software way back in issue #5. It was the first 3D wireframe CAD system for the C64, and we were impressed with its capabilities. Now it's new, it's improved, and it is being distributed by Briwall.



The improvements consist mainly of added software drivers which interface to many graphics input devices (KoalaPad, Space Pen, lightpens, etc.), and a drop-down-menu user interface called G.U.I.D.E. (Graphics Users Interface Development Environment).

The drop-down menus give you access to all of Perspective II's functions, from changing the input device to manipulating finished drawings. Many menu selections open up windows or boxes with additional choices or instructions. Anyone who has used a computer with a mouse-and-menu operating system will feel right at home with G.U.I.D.E., though this type of environment is not particularly well-suited to use with a lightpen, which tends to get in the way of the menus.

This package offers considerable range in its drawing field. Each coordinate can be in the range of +/-32767. Within the 32Kx32Kx32K point environment you can rotate or translate objects and shift your point of view at will. You can even view your design in a 3D stereo image, discernible with 3D video glasses (not included).

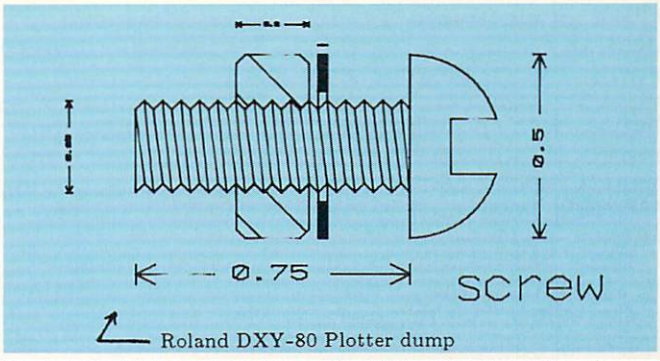
You can draw objects using combinations of three different line types, dotted, dashed, and solid, and there is even an option for automatic hidden line removal. You can store any object you create to a disk file and merge

it with any number of other objects at any time. You can also enlarge or reduce an object to scale.

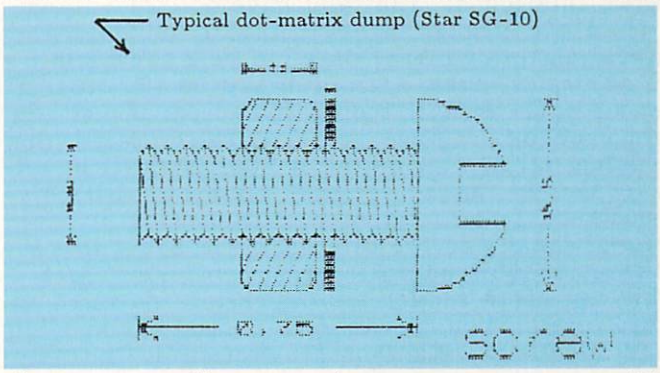
But by far the most interesting and fun feature of Perspectives II is its Film Studio. It lets you snapshot 3D frames and play them back in sequence, giving you in effect a 'real-time' animation capability that would be impossible with actual real-time calculations on an 8-bit machine. The Film Studio gives you full editing control over your finished 'filmstrip'. With automatic disk-loading of sequences, you can create animated 3D shows up to 15 minutes long.

Besides all this, there are instructions and routines for including 3D drawings and full filmstrip animations in your own programs. Perspectives II offers printer support for many different brands of dot-matrix printers and most popular printer interfaces. The manual is clear, well-organized, and just plain good. The only feature missing from Perspectives II is the capacity to save drawings in a format compatible with other drawing programs.

Perspectives II is unarguably the most powerful 3D CAD program available for the Commodore 64.



Roland DXY-80 Plotter dump


Typical dot-matrix dump (Star SG-10)

Amiga CAD & Drafting

AEGIS DRAW

(not copy protected!)

AEGIS DRAW ($199.00 / Aegis Development) is Aegis' entry-level computer-aided drafting package. Written with obvious (and deserved) pride by William Volk, **DRAW** is designed to run on a minimum system of a 512K Amiga with one external drive and a plotter (tho all Workbench printers are supported, the resulting screen dumps are not really suitable as finished hardcopy). Several leading pen-plotters are supported, including Roland, HP, Huston Instruments, and Epson plotters (we used the Roland DXY 980 in our tests with excellent results).

Fitting any kind of useful graphics-intensive program into a 512K Amiga is an impressive achievement in itself, and the fact that **DRAW** has been delivered with as many features as it has, along with first-class documentation and extreme ease of use establishes Aegis as a solid, early leader in an applications area which we expect will rapidly become crowded with contenders

While **DRAW** does not claim to be a professional grade CAD package (Aegis is working on one for 1st Qtr. '87), it has enough features to allow casual users to create a wide range of useful, accurate drawings very quickly and very easily. **DRAW** is more than adequate for planning furniture & equipment layouts, doing preliminary architectural studies, producing various types of schematics, and producing some simpler types of mechanical drawings. We would not, however, recommend **DRAW** for professional architectural drawings or renderings, serious circuit design, or complex mechanical drawings. One of **DRAW**'s most valuable roles may very well prove to be as an inexpensive training tool (schools- take note!) for introducing and familiarizing aspiring CAD operators to many of the concepts, techniques, and terminology of CAD in an extremely friendly and forgiving environment. Indeed, if you purchase **DRAW** now, you may upgrade to **DRAW PLUS** or **PRO DRAW** later for a fraction of their regular price- a policy which we applaud.

Just a small sampling **DRAW**'s features include: multiple drawing and zoom windows / creation and storage of parts libraries (a very powerful feature) / automatic shapes / automatic dimensioning in both English and decimal units / numeric readout and entry options / 250 layers (very powerful feature) / rotation, distortion, and modification of elements / variable grids / grid and data snap / and pallete control of 16 colors. One especially unusual feature of **DRAW** is "smoothing" which

is like an electronic "French Curve". "Smoothing" turns any series of more than 2 endpoints into a smooth curve passing thru each point (thus a rectangle becomes "tv-screen" shaped, and a "V"-shaped line becomes a "U"!). This ingenious approach allows the efficient creation and manipulation of complex shapes that would normally need to be drawn in the very memory-hungry freehand mode.

Draw has its weaknesses: One of the trade-offs in fitting this program into a 512K machine is the 600 X 200 resolution which makes detailed drawings and small text into a fairly crude representation of what you have actually drawn. While the display has nothing to do with the actual accuracy of the drawing (you can zoom in to accurately draw a grain of salt on the deck of an aircraft-carrier!), seeing your crisp curves and precision angles turn into jagged stairsteps and blotches takes some of the joy out of drafting on-screen. A more serious flaw is **DRAW**'s insistance on sizing dimension text proportionally to the dimension (ie: the 4 in a 4' dimension will be half the size of the 8 in 8'): this can often render the dimension too small to read, even when plotted (see accompanying plot and printout). Another frustration is the way pattern fills are limited to simple closed polygons and circles: there is no feasible way, for instance, to draw a hollow, cross-hatched section of pipe. One last important ommission is that of a mirror or "flip" function to aid in drawing symmetrical parts (most mechanical parts have some degree of symmetry).

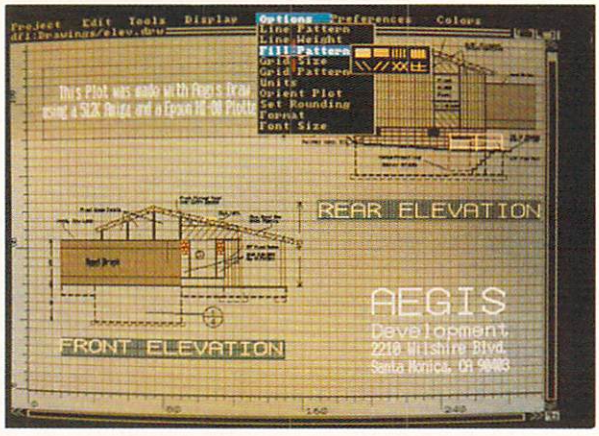
These shortcomings notwithstanding, **DRAW** is a remarkable piece of work, and deserves the highest marks for ease of use and learning.

AEGIS DRAW PLUS

(not copy protected!)

AEGIS DRAW PLUS ($259.00 / Aegis Development) is being added (by end of November) as an intermediate product with price and performance somewhere between **DRAW** and **PRO DRAW** products. **'PLUS'** requires a full megabyte of RAM, and operates in either 600 X 200 or 600 X 400 (interlaced) display modes. Drawings from **DRAW** can be loaded into **'PLUS'** (as well as **'PRO'**), providing a smooth path for those wishing to upgrade later.

The shortcomings of **DRAW** are largely addressed in **'PLUS'** (except for the above-mentioned section-fill problem), and many powerful functions have been added making **'PLUS'** much more capable than its forerunner. The highlights: dramatically increased drawing speed / extensive status display bar / natural units option (feet,inches,fractions) / 8-way



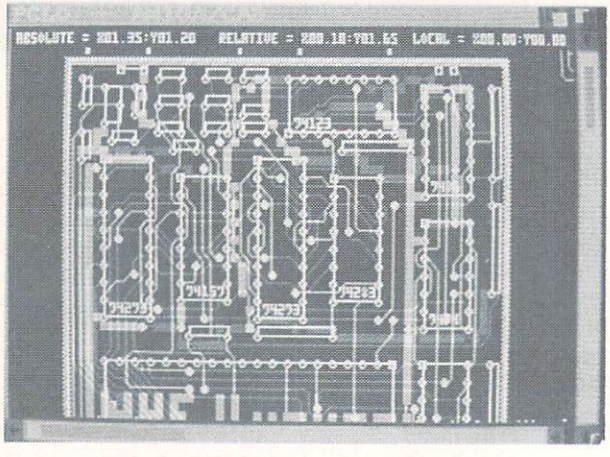
mirror / adjustable text size for dimensions / rotatable ellipse / hook tool (this very powerful addition allows extensive modification of existing objects) / function key tool selection / arrays (numerically-controlled multiple replication of objects- especially handy for drawing gears etc.) / numeric editing / plotter spooling / parts list creation / and near-plotter-quality printer drivers.

If you've got the RAM, **'PLUS'** is definitely worth the extra $60! If you don't have the RAM, here's one of the best reasons yet to get some!

PCLO

(not copy-protected!)

PCLO ($1024 from SoftCircuits) is a *dedicated* CAD system for the Amiga. It is configured



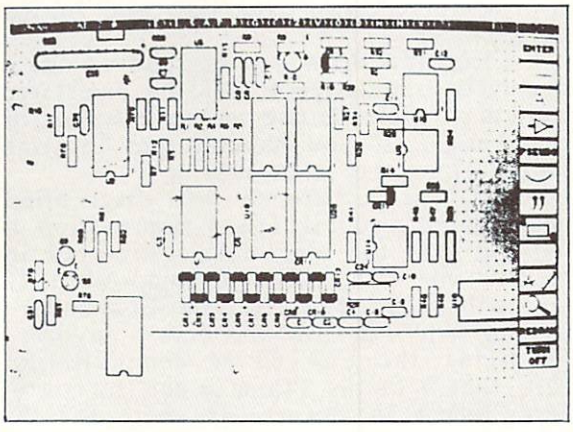
specifically for printed circuit board layout and design. The program is completely Amiga-tized, incorporating the mouse and pull-down menus for almost all of its functions. Single-key selection from the keyboard is used to select specific functions and options. This system lets you simply and quickly design double-sided pc boards. (You can design multiple-layer boards, too, but the system will only display two layers at a time.) It will also handle a silk-screen design at the same time. Putting down pads and traces is merely a matter of pointing and clicking with the mouse. **PCLO** *automatically*

sets down the traces by the shortest possible route. If for some reason you need to place a trace in a specific space, you can do so manually. The system will also set down DIP pads and pad arrays for you automatically. The operation of **PCLO** is pretty intuitive. With just a little help from the manual it is very easy to begin designing your own boards. At $1024, it is not for the average hobbyist, but companies which find themselves designing more than a board or two a year should certainly be able to justify the expense. If you want to check out the program, you can get a functional demo which includes everything but the ability to save your work for $75, creditable towards purchase. Weaknesses? Lack of an UNDO function and support for only the HI DMP-52 plotter (though you can make trial dumps on an Epson dot-matrix printer) come to mind. But the strengths of **PCLO** are legion, and anyone who has to make pc boards regularly will probably love it.

DynamicCAD

(not copy-protected, free updates for 90 days)

DynamicCAD ($499 from Microillusions) is finally shipping to Amiga Dealers (as of Oct. 10). **DynamicCAD** is a 2-D object-oriented drafting and design package requiring a 512K Amiga, 2 disk drives, and a plotter.



DynamicCAD's strong points include: hi-res display, careful attention to industry and military specifications, ability to group complex parts into grouped objects (pseudo-symbols), a large library of pre-drawn pseudos, and database functions.

DynamicCAD's most immediate weakness is its difficult user-interface and command structure (come on, programmers, this is the AMIGA, not some Soviet Bloc vacuum-tube mainframe: let's see a little finesse!) Indeed, part of the problem seems to stem from **DynamicCAD**'s mainframe ancestry which has left it with a plethora of cryptic keystrokes that must either be memorized or repeatedly discovered in the manual (there are a few help screens available, but they mostly tell you how to start a command sequence, and not how to continue or complete it). At the very least, a reference card is needed to summarize all commands and sub-options.

Significant omissions or problems include: no flip or mirror function, inability to cross-hatch other than solid rectangles (can't fill circles, triangles, hollow shapes, or even 'L's), inadequate control of arcs, only 3 line and hatching styles, and awkward zoom & pan controls. Sadly, even the parts-handling concept (potentially one of **DynamicCAD**'s most powerful features) is severely hampered by an unnecessarily difficult file-handling approach (which, rather than using the familiar scrolling 'click on what you want' requestor boxes, requires that users perform an exhausting series of 'manual' DOS-level file manipulations). Lastly (& because it is so easy to do something you didn't want to do) **DynamicCAD** is badly in need of an "UNDO" feature.

While circuit designers may find the auto-hookup and net list features of **DynamicCAD** a significant contribution to their efforts, mechanical and architectural designers will find **DynamicCAD** too limited to offer any clear benefit to their disciplines. In any case: **try before you buy.**

C-64 Desktop Video/Animation

MOVIE MAKER

Interactive Picture Systems' **Movie Maker** (distributed by Electronic Arts) was one of the first computer animation packages for Commodore computers. The animation tools it provides you with are surprisingly sophisticated. The drawing package includes zoom editing, block moves with sizing, text insertion, etc. Animation is performed via graphics windows and can be quite complex. Sound effects and music can be added to a completed animation. Scripts can be edited and tightened up, and there is a "smooth" function that automatically takes out the jerks for you. There are a multitude of examples on the disk, including a couple from Gahan Wilson, though my favorite is the Dancing Toast cartoon by Yvette Kaplan.

CYBER VIDEO

Cyber Video ($39.95, Touchstone) is the latest animation package for the C64, and is also the first product from Touchstone. It uses the KoalaPad as its control device, though they are working on a mouse interface. Cyber Video is

continued on page 86

In an industry that's powered more by rumors than by truth, more by hot air than by electricity, what you hear is seldom what you get. At INFO, we've had our ears to the ground. Besides dirty ears, here's what we've gotten for our auscultation this time around:

--> **Ashton-Tate** is rumored to have Amiga product under development. Of course, the most likely title for Amiga translation is their most popular MS-DOS program, **dBase III**. Ashton-Tate will not comment, though word is they *may* show up at the World of Commodore show in December.

--> **MicroSoft** categorically denies that they are working on a version of **MicroSoft Word** for the Amiga, though they *do* say they wrote a version for the **Atari ST** which is to be marketed by Atari itself.

--> **Lotus Development Corp.** is also said to be "close" to releasing a version of **Lotus 1-2-3** for the Amiga. Our only question is: Yes, but will it be "Amiga-tized" to take advantage of the mouse, graphics, and memory capabilities of this advanced machine, or will it suffer from *MS-DOS Conversionitis*?

--> The latest Silicon Valley rumors are still saying that there will be *two* new Amiga models *sometime* after the start of the year. The rumored specs, price, and introduction dates of these machines change on a *daily* basis. We think it's just another case of Commodore throwing out ideas to see which ones are popular. Until they get lots more feedback, we don't think you'll see final specs on these machines, though it is almost positive that there *will be* both a cheaper and a more expensive Amiga machine. In the meantime, there are plenty of great deals on the Amiga 1000, so go out and buy one!

--> The **GenLock** is rumored to have been available in Europe since July for about $500/U.S. FCC hangups will probably delay U.S. shipments until November.

--> In the meantime, according to one large graphics software developer at least two third-party genlock devices will probably beat it to market.

TRUE FACTS

--> The World Of Commodore show in Toronto this December will have an **Amiga Business Section**, due to popular demand by dealers and vendors. We doubt they will have any problems filling booth space.

--> Though the Amiga *is* most definitely going to mass distribution, the transition will apparently be slow and measured. Commodore will be picking very carefully who gets it and when. Don't look for it at K-Mart under the blue light for a long, long time.

--> Commodore has reinstated their $500 discount Amiga system package deal that they ran earlier this year. The discount applies on systems comprised of an Amiga, 256K RAM expander, and Amiga monitor.

--> Electronic Arts will be sending out a quarterly newsletter to all the registered owners of their Deluxe software series for the Amiga. If you haven't sent in your registration card, do it *now!*

--> At the insistence of disgruntled dealers, the Federal Trade Commission is looking into the long delays involved in making the Amiga IBM/PC compatible. If you will recall, the FTC hit Commodore with a stiff fine for the delays involved in giving the C64 CP/M compatibility. Now that both the Transformer (software) and Sidecar (hardware) are here for the Amiga, we would hope that the FTC would forget about it.

--> The latest word as we go to press is that the **Sidecar** has passed FCC approval. Demo units should be at Commodore dealers by the time you read this.

--> Yes, folks, it's true! **The Guide**'s new computer columnist is indeed none other than Dr. Timothy Leary.

INFO News & Views

MARCA SHOW

Though the MARCA show is dead, individual clubs and subgroups continue to sponsor regional events. The New England member groups of MARCA are sponsoring the First New England All-Commodore Computer Faire from 10 am to 8 pm on Saturday November 15 at the Best Western Hotel in Marlboro Mass. Besides the usual seminars, booths, and public domain software, there will also be a concert of computer-assisted music. Call president Frank Ordway for additional details. 617/485-4677.

SHAREWARE

For $11.95, the COMAL Users Group, 6041 Monona Dr., Madison WI 53716, will send you not one but *two* COMAL shareware disks. One contains a program called **HazMat** for the COMAL 2.0 cartridge that is a complete Hazardous Materials identification and control system for educational, police, and fire department use. You enter the hazardous materials id number from the sticker on the truck or container in question, and the system tells you the emergency treatment, firefighting, and evacuation procedures for that chemical. Walk around town and write down some numbers, then go home and key them in. It's a real educational experience.

DFC is a Diskette File Copy program for the C64. It handles all file types, including REL, and can be used with one or two drives. It also lets you list files to the screen in BASIC, ASCII, or screen code format. The user interface is fantastic, and includes help screens and function-key-driven menus. The manual is on the disk and ready to print. It is free for the copying, or can be had for a $25 donation from: Layton Berry Software, 573 Merriewood Dr., Lafayette CA 94549. Thanks to Dennis Schliebener of Mt. Washington KY for telling us about it.

64C CAPABILITIES

Perhaps the most scathing editorial comment on the C64C to date is in the Sears Christmas Catalog, which does *not* list the 64C. Instead, under the Commodore 64 listing it says: "(identical in all functions to Commodore 64C)" What can we add to that?

NEW APPLE NO CONTENDER

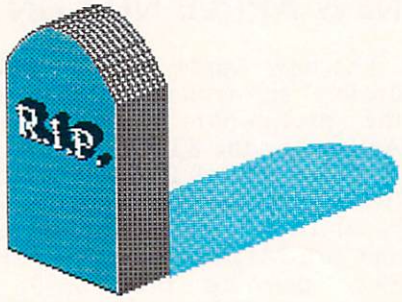
The new **Apple //GS** should be in the Apple dealers' showrooms by now, and judging from the preliminary specifications, neither the Amiga nor the ST has anything to worry about. A clockspeed of 2.8 MHz, native RAM of 256K (with a maximum capacity of 8 Mbytes), the capability to run "90%" of Apple // software and use Macintosh peripherals, coupled with a $999 pricetag plus $299 for an Apple-compatible 5.25" drive, ought to keep all but the hardcore Apple owners away from the //GS. The major movement to this 65816 computer may come from Apple //e owners, who can upgrade by swapping motherboards for only $499. Even Apple management says this machine is for "enthusiasts" (translate: Hackers) only. They still expect the $940 Apple //c to remain the top-selling Apple. While we're sure the Woz did a bangup job on the design of this pup, 8/16 technology is just a step behind what's already available.

ASHTON TATE UNPROTECTED

In a surprise move, Ashton-Tate, publisher of **dBase III** and one of the major publishers of MS-DOS software, has announced that they are removing all copy protection from their software line. Though they do not yet publish any Commodore titles, the move is expected to have a wide-ranging effect throughout the entire software industry. We applaud Ashton-Tate's pioneering move, and hope that other software publishers will follow their example.

MINDSCAPE/SCARBOROUGH

In the latest in a series of industry takeovers, Mindscape has acquired the product line of Scarborough Systems. Included is Scarborough's best-selling **MasterType**. Mindscape said the takeover was aimed at broadening their base, increasing their holdings in the educational market, and improving their product line for the IBM/PC & clone market. Not included in the buyout is Scarborough's Lifeboat Associates division, which produces programmers tools, languages, and utilities.



PDI CALLS IT QUITS

Faced with the rising popularity of local users groups and their free public domain libraries, Public Domain Inc. has decided to close its doors. We'll miss the gang at PDI, who provided a valuable service to the Commodore community at a reasonable price. They still have a stock of disks left over, which can be had for $10 each postpaid from George Ewing, 725 Grant St., Troy OH 45373.

TPUG STOPS PUBLICATION

The Toronto PET Users Group has suspended publication of **TPUG Magazine** effective with the June issue. Beginning in October, they will have an insert section in **Transactor**. Members will receive Transactor in place of their TPUG Magazine subscription. With the cost of publishing a magazine being what it is, we sympathize with TPUG, and are glad they found a solution which does not leave their members out in the cold.

SUPRA PICKS UP CARDCO

Cardco did not stay dead for long. Supra Corporation, mostly noted for their Atari ST hard disk drives, has acquired the Cardco name and product line. They will be distributing Cardco printer interfaces, **Freeze Frame**, and other Cardco products under the Supra/Cardco name. Only the products being marketed for the C64/C128 at the time Cardco's doors were locked were involved in the deal. Supra says they will not only distribute the leftover Cardco products, but will continue the manufacture and support of those products. Contact Supra Corp., 1133 Commercial Way, Albany OR 97321, 503/967-9075.

C LTD.

In the meantime, the principals of the old Cardco have formed their own company to produce the Amiga products that Cardco had under development at the time they folded. **C Ltd.** is currently shipping the **aMega Board** 1 meg memory board for $549.95. It is expandable to 2 megs with additional chips. In the works are an SCSI hard drive (20 megs, less than $1000) and a six slot ZORRO architecture expansion box at less than $500. They will sell only through dealers. C Ltd., 723 Skinner, Wichita KS 67211, 316/267-6321.

XETEC PICKS UP DRIVE

The Fiscal Information Systems hard disk drive, which slid into the Twilight Zone temporarily when Cardco shut down, has been picked up by Xetec, renouned manufacturer of Commodore printer interfaces and such stuff. In the process, the price has been reduced considerably. The company says it should be able to deliver a product out the door by year's end for less than $899 in a 20 meg configuration. Contact Xetec, 2804 Arnold Rd., Salina KS 67401, 913/827-0685.

ARE THEY SIRIUS?

They may not be Sirius, but Carnival House has picked up the warehouse full of software that Sirius left behind when they went out of business. Almost all of Sirius' old titles are available, including **Way Out, Repton, Turmoil, Fast Eddie, Type Attack**, and **Blade of Blackpoole**. They are $5.95 each postpaid, with special deals on larger collections. As always, we're glad to see these classics made available. Call Carnival House at 603/547-6466.

NEW COMMODORE VP

Commodore has appointed Michael C. Brenner as Vice-President of Software. We wish him luck at his new position. He comes to Commodore from Zenith, which recently won a major PC-laptop computer contract from the U.S. Govt., right out from under IBM's nose. We hope that Mr. Brenner brings that kind of market savvy to his new post.

COMMODORE POSTS PROFIT

For the first time in six quarters, Commodore Business Machines has posted a quarterly profit. For the quarter ending in June Commodore posted a profit of 1.2 million dollars, compared to a loss for that quarter last year of 124 million dollars. The June quarter also ended Commodore's fiscal year, for which they posted a 128 million dollar loss. While their annual loss is greater than the 114 million dollar loss they posted the previous year, we think the important figure is the small profit in the last quarter. Much of it can be attributed to solid C64/C128 sales coupled with good sales of the Amiga, due mainly to the free monitor promotion they ran through May. Net sales were up 58% over the same quarter a year ago. We hope Commodore has learned that a good price on the Amiga can insure their continued success.

Coupled with the good sales are the cuts in backstocks, capacity, and workforce at Commodore in the last year. Though these have hurt, we think they'll pay off in the long run. Commodore may just have turned the corner financially.

QLINK ADDS CHARGES

QuantumLink has begun charging a $3.60 hourly premium to use the Post Office functions. Sending or receiving EMail will get the charge assessed to your account. This means that doing almost anything *worthwhile* on QLink will now cost you $3.60/hr. additional. But it's still cheaper than most of the others.

While we're on the subject of QLink, where in the heck is *Habitat*? This live-adventure online environment was first announced at CES in June, and it still isn't up and running. We hope that means they are working out all the bugs before it goes up.

The new online GEOS forum now includes free downloadable input drivers for the KoalaPad and Flexidraw lightpen, as well as some new printer drivers. QLink will soon be offering GEOS graphics dumps on an Apple Laserwriter laser printer via file upload and return mail.

C.H.U.M.P

Our INFO chapeaus are off to editor Don Romero and the members of the Western Indiana Commodore Users Group for the summer parody issue of their user group newsletter **Word Rap**. This parody of Commodore computing magazines, called **CHUMP** (Commodore Hardware Usurpers, Maladroits, & Pundits), lampoons most of your favorite mags, including INFO. The cover proclaims "The Amazing C-64C! New Style Case! New Higher Price! No New Features!" and takes off from there. Our favorites? The letters section (letter: "...I know there's no way you're gonna print this..." response: "Shows what ozone bozos like you know!..."), table of contents (*Easy ML Explained Simply by Jim* Butterball), and the ads. The **DisasterSoft Games** ad is a classic ("Loads really fast because the code is so short!"). Thanks for the sore sides, Don!

USER GROUP NEWSLETTERS

We really treasure all the user group newsletters we receive. Since INFO can't be everywhere at once, we consider you all our "field correspondents". If your user group is not currently sending us your newsletter, please put INFO on your mailing list. Our address is: PO Box 2300, Iowa City IA 52244.

On the other side of things, we get a lot of requests to reprint information from INFO in local user group newsletters. We're more than happy to allow nonprofit user group publications to reprint information and quotes from our magazine. We only ask that you credit INFO as your source, and send along a copy to us. And please don't reprint whole articles; we'd like people to have an excuse to buy their own copies! If you'd occasionally pass along INFO subscription information to your members, that would be a nice touch, too.

THINGS WE'D LIKE TO SEE

-->An Amiga drawing program that would let you work on a large virtual screen, up to at least 1024x1024 pixels, and preferably up to the limits of memory. A dynamic drawing area that would autoadjust itself to the size of your drawing would be nice. (It looks like

Deluxe Paint 2 will come close to our wish.) Printer dump routines that would let you dump the output in any size required, including billboard-size dumps in sections, and plotter support would also be appreciated.

-->With all the wordprocessors available for the Commodore 64, none works like **WordStar**. Since the C64's memory limitations are similar to those of CP/M we would have thought that *somebody* would have thought to come up with a wordprocessor that works with a text window onto a disk file, as WordStar does, rather than having to contain the entire document in memory. That way you could edit documents with a maximum length of 170K, rather than 30k-40K.

-->How about some real-world digitized sound effects for Amiga games? We need some realistic, mood-setting sounds like squeaky shoes, screams, footsteps, and such for mysteries, and card shuffling, dice rattling, and roulette wheels spinning, for casino games. The crowd sounds in the background of **One On One** are the best example of this to date on the Amiga; let's see more!

NEW PRODUCTS

FLIGHT INSTRUCTOR

The Flight Simulator Book lays out dozens of simulated flights for you to try with SubLOGIC's **Flight Simulator II**. It is almost like taking a full flight course from an instructor. Included in the book are all the flight maps and details you will need to step yourself through almost everything you need to know about flying an airplane except the proper prayers. Whether you are frustrated by all the times you've crashed, have logged too many hours and need a new challenge, or just wish you could actually learn how real pilots fly, this book is outstanding. The author, John Rafferty, has done an excellent job. $19.95 + $3 shpg. from: En Route Books, 6408 W. College Dr., Phoenix AZ 85033, 602/846-6737.

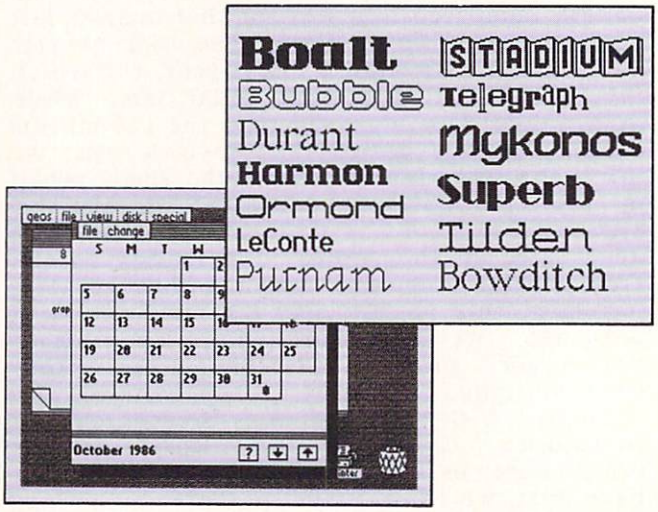
SEXY JOYSTICK

Epyx has brought over a sleek new joystick from Europe called the **500XJ**. It is curved to fit in the palm of the left hand and has the fire button on the base where it can be triggered by the left hand trigger finger. The shaft is heavy and the microswitches click when they hit so you know where you are without looking. The feel of this stick is really different, and it looks to be one of those things you will either really love or really hate. From Epyx, 600 Galveston Dr., Redwood City CA.

C-64

WRITER'S WORKSHOP

Berkeley Softworks will soon be shipping a much-enhanced version of **geoWrite** called **Writer's Workshop**. This wordprocessor will include all the font and typestyle functions of geoWrite, but will also include many more powerful wordprocessing commands, such as search and replace and block move and copy.



There will also be a utility on the program disk to convert files from other wordprocessors to GEOS format. Also new from Berkeley are a collection of 20 Macintosh-style fonts for GEOS called **FontPack 1** ($29.95) and **DeskPack 1** ($34.95), which includes several new desk accessories. The Calendar is a calendar, of course; the Graphics Grabber lets you convert Newsroom, Print Shop, and Print Master graphics to GEOS format; the Icon Editor lets you edit your screen icons; and, when even those accessories bore you, there is a Blackjack game with graphics and sound. Berkeley Softworks, 2150 Shattuck Ave., Berkeley CA 94704, 415/644-0883.

Postscript: The folks at Berkeley say to look for GEOS for the C128 in late November. Don't get all excited about an 80-column GEOS, though: it will have some enhancements over the C64 version, but it will still operate in 40 column mode.

C64 SOUND SAMPLER

The **Sampler-64** digital sound sampler lets you record sounds, mix in other sounds, add echo & reverb, and play your new sound over a two octave range under keyboard control. The sequence can record and store your compositions onto disk along with your sound samples. You can create complex sounds by using the looping, sound dubbing, block editing, and other features of Sampler-64. This package includes a unit that plugs into the user port, a microphone, and a cable, as well as the Sampler-64 software on an unprotected disk. The SID chip is *not* ever used for sound generation. Also available is **Com-Drum**, a piece of software that turns the Sampler-64 into a dedicated three-voice drum unit. Sampler-64 is $89.95 plus $3.50 shipping. Com-Drum is $14.95 when purchased with the Sampler-64, or $29.95 when purchased alone, from Micro Arts Products, PO Box 2522, Philadelphia PA 19147, 215-336-1199.

FLIGHT PACKAGE

If you're a flight freak, then Microprose's latest flight package for the C64 may interest you. They have bundled their classic flight action games **Mig Alley Ace, Hellcat Ace**, and **Air Rescue** together in an economy-priced package they call the **Top Gunner Collection**. $24.95 now buys the works, complete with 30-page manual. Microprose, 120 Lakefront Dr., Hunt Valley MD 21030.

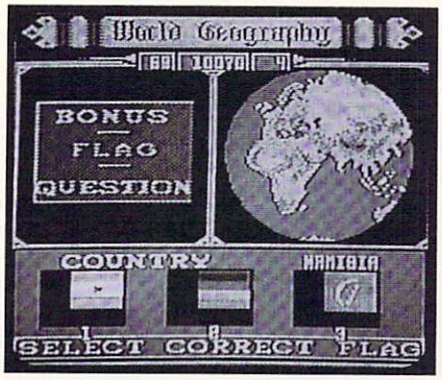
MORE PSYCHOSTUFF

How To Succeed With Love And Money is a computerized version of the self-help book *Everything You Should Know About Yourself*. This C64 program analyzes Money and Career Potential, Love Life and Personality through a series of psychological quizzes. Retail price is $39.95. **The Celebrity Cookbook** features the recipes of many movie stars and celebrities. Included are recipes from Ronald Reagan, Princess Diana, Joan Collins, Cheryl Tiegs, Lauren Hutton, Bob Hope, Linda Gray, Frank Sinatra, and more. Also included is a special recipe filer, a wine and bar guide, party tips and a quiz for your guests. The cookbook is priced at $19.95 **The Sexual Edge** is billed as being able to enhance your lovelife. The program features a special 'Love Zodiac' and a section for couples only. The program also features music and graphics. For adults only, $19.95 **The Dream Machine** lets you analyze, interpret, and log your dreams. Includes the book 'Beyond Dreaming'. $29.95 All from Merrill Ward Designerware, 1625 South Sunrise Way, Palm Springs, CA 92262, 800-637-0118.

PRINTER CREATIVITY

NEBS, 500 Main St, Groton, MA 01470, has a new printer creativity program for the C64 called **Instant Press**. This one lets you construct sale signs, flyers, greeting cards, window banners, letterheads, invitations, newspaper ads, show cards and more. It features several type styles in various sizes and outline, solid, and 3D, as well as dozens of ready made graphic designs (and a graphic editor) and several border styles. Cost of the C64 version is $49.95 plus shipping.

WORLD GEOGRAPHY



World Geography from Bobco is one of the few pieces of educational software we've seen that's loosened our socks a bit. This C64 geography program features a nicely detailed spinning globe. Countries are chosen by the program at random from a continent you pick, and the map and flag of that country are loaded onto the display. You are asked to identify the country, capital city (which blinks), currency, language, and population of the country from multiple-choice answers. It's not only challenging, but colorful and fun as well. Even the fonts are nice. If you've been looking for a good educational program for the kids to run on their C64, this is it. $24.95 + $2 shpg. from Bobco, 200 7th Ave., Suite 111, Santa Cruz CA 95062, 800/331-4321.

LINCAD

Sofcad Electronics Inc, PO Box 21845, Columbus, OH 43221 has a new linear circuit analysis and design program for the C64 at a price of $49.95 plus $3.50 shipping. It's called **LINCAD**. LINCAD features interactive design, circuit optimization, graphics, and more. You just sketch your circuit, number the nodes, enter it into **LINCAD** and then make any measurements or changes you wish. All types of transistors can be modeled. Circuit gain, input and output impedances, DC and wide range frequency analysis can be performed just as in a lab.

C-128

TERMINAL

Fear of writing term papers is seldom terminal, but hopefully an innovative idea in software will help to alleviate some of the tension in the future. Activision will soon be releasing **Term Paper Writer** for the C128 under its Personal Choice label. This integrated package combines notetaking, outlining, and wordprocessing all in one package. It also handles automatic footnotation and the compilation of bibliographies. Because the program cross-references across sections, any changes to references are automatically updated on the document's footnotes. The card file portion of the program provides elementary data manager functions, the outliner section provides the same function as an idea processor, and the wordprocessor portion includes such features as block moves and full control over underlining and bold text. Sounds like a marvelously well-organized way to approach writing a term paper (or almost anything else factual). Papers produced with Term Paper Writer are limited to 20 pages in length. $59.95 (tentative) soon, from Activision, PO Box 7286, Mountain View CA 94039, 415/960-0410.

PRG SOFTWARE

PRG Software, 22371B 119 Avenue, Maple Ridge, BC V2X 2Z2 Canada, is offering two programs for the C128. **Money Master** is a home accounting package with over 30 functions. It operates in 80-column mode. **Source Linker** is a BASIC programming utility that lets you reuse parts of your programs, link them, compress and expand code, rename variables, renumber lines, etc. Either program disk is $9.95, and the manual for each is available separately at $19.95.

AMIGA

AMIGA APL INTERPRETER

Spencer Organization Inc, 366 Kinderkamack Rd, PO Box 248, Westwood, NJ 07675, 201-666-6011 has released a new APL Interpreter for the Commodore Amiga. This is the MicroAPL Ltd. APL.68000 Interpreter, which is also available for the Atari ST and Apple Macintosh. APL.68000 on the Amiga is available in both standard APL character set and regular keyboard versions. It uses the standard Amiga user interface and features a built-in full-screen function editor and VT100 terminal emulation. It runs as a multitasking application with full pull-down menu support and Workbench interface, with full support for Amiga graphics and system functions.

AMIGA DISKWIK

Tigress, PO Box 665, Glendora, CA 91740, 818-334-0709, is offering **DisKwik**, a disk utility package and repair kit for the Commodore Amiga. Diskwik has features for the novice and advanced user, including restoring deleted files and eliminating disk errors. The *info* option displays block type, filename, bytes in file, protection status, and more. The documentation clarifies how Amiga data is stored, how the directory works, and Amiga file formats. DisKwik lets you edit sectors in hex or ASCII, copy blocks to the same or another disk, reformat tracks, correct checksums, etc. And it's mouse-driven. Retail price is $49.95

KWIK SPEAK I

Eclipse Data Management Inc, 312 1/2 Lafayette St, Gelndale, CA 91205, is offering **Kwik Speak I**, a tutorial course in Spanish that uses the Amiga's built-in speech synthesis. (I sure hope they've come up with a good Spanish-to-Amiga-phoneme conversion routine. I can

just picture a whole generation of American tourists speaking Spanish with an Amiga accent...) The program is based on the Kwik Speak method developed during World War II.

NANCY SPELLING CHECKER

Nancy is a spelling checker with a compressed dictionary file of over 80,000 words. It lets you use of up to 4 separate supplemental word lists, and up to 4 automatic correction lists. Nancy will check an average document at the rate of 20 lines every 90 seconds. Nancy provides online help and can pronounce words not found in the dictionary or word lists. It is not copy protected. $60 from The Computer Club, 4843A South 28th St, Arlington, VA 22206.

TEXTURE MIDI SOFTWARE

Texture, a MIDI software program which was to have come from Cherry Lane Technologies, is now being handled by Musicsoft, PO Box 274, Beekman, NY 12570

AMIGA ADD-ONS

Ameristar Technologies Inc, PO Box 415, Hauppauge, NY 11788, has several new expansion products for the Amiga. **AC100 Expansion Chassis** ($699) provides 5 slots for full sized cards with room for 2 full or 4 half height drives and supports the "official" Amiga expansion architecture. The Amiga sits on top of the expansion chassis and is connected via a shielded ribbon cable. Disk drives are powered by the built-in power supply. The system allows auto-configuration of all components. A hard disk controller card which will drive up to 2 hard disks and 2 floppies is available for $999 additional. It will operate low cost IBM PC compatible disk drives. A two meg RAM board is also available for $899. A prototyping card and extender card are available for the technically gifted for $49 each.

MULTIPORT CONTROLLER

Component Systems Inc, 778-A Brannan St, San Francisco CA 94103. 415-861-1345, has developed a multiport asynchronous RS232C/RS422 port controller for the Amiga. The 10 port CSI Model 800 controller provides local area network, printer buffering and sharing by multiple hosts, host buffering and sharing for multiple printers, local RS232C/RS422 data concentrator with programmable controller functions, timed dial-up and message transfer with stand alone modem, and point-of-sale network systems. Call for specifics and pricing.

AMIGA ETHERNET

Ameristar's **AmeriNet Ethernet Controller** gives your Amiga *IBM-network-compatible* Ethernet capabilities for $699 (plug-in board) or $749 (stand-alone). This pup uses the LANCE Ethernet chipset and their brocures say it provides all the bells and whistles you could possibly want in a network environment, including 32K of on-board transceiver buffering. Their compatible **ANet-NFS** software ($149) is a complete implementation of the SUN Network File System (NFS), and allows automatic machine-to-machine file updating. They also have available an ANSI remote terminal emulation package. Ameristar Technologies Inc, PO Box 415, Hauppauge NY 11788.

68881 UPGRADE

Netch Computer Products, PO Box 645, Monroville CA 91016, 818/334-1002, has developed a 68881 math coprocessor piggyback upgrade board for the Amiga that seems to be the least expensive of its kind thus far. The cpu replacement chip is a 68010 instead of the more expensive 68020, with transparent interface emulation software to bridge the gap between the two. The coprocessor is capable of asynchronous operation under the control of its own crystal clock at speeds up to 18 MHz. An assembled unit complete with math chip runs $459, though kits are available for less. Software support libraries are included for Lattice C double-precision floating point operations, Aztec C floating point, and 68881 opcode assembly in standard 68000 assembly listings for Amiga or Aztec assemblers.

COMPACT MEMORY

Alegra is a half-meg (512K) external memory expander for the Amiga. It is physically smaller than any other memory expansion unit for the Amiga, but can still be upgraded to 2 megs in the future by swapping chips. The

price is $379. The unit autoconfigs under version 1.2 of the Workbench. Benn has had one plugged into his Amiga for a couple of weeks running **Logistix** with huge spreadsheets, and has had no problems so far. Access Associates, 4901 Aldo Ave., Santa Clara CA 95054, 408/727-0256.

CALC CONSTRUCTION KIT

We are always pleased to see one of our "Things We'd Like To See" items become reality. Quicksilver Software has filled one of our requests with **The Amiga Calculator Construction Kit**. This $49.95 program lets you put together your own custom calculators by dragging the keys you need into the calculator window. You can select algebraic or reverse polish (Hewlett-Packard) notation, and work in any of a number of different number bases. There are over 80 functions to pick from. If you are an engineer, banker, student, surveyor, or anyone with special calculation needs, this construction kit should let you (finally!) put together the calculator of your dreams. The calculator you build can be copied onto any of your Amiga disks, and runs as a multitasking application. Quicksilver Software, 418 W. 7th, Sioux City IA 51103, 712/258-2018.

SONIC SPEAKERS

If you've got an Amiga, you need good stereo sound. If you don't have a thousand-dollar sound system located close to your computer, you can get by quite nicely with a pair of self-amplified speakers. Lots of people have tried the Bose speakers, but they are over $225 a pair. At $89.95, a pair of **Sonic 2 Speakers** is a little more reasonable. I've had a pair hooked up to my Amiga for a month now, and I'll miss them when they're gone. The bass is good and the sound quality is just fine. The only problem you may have is with the wall-plug power transformer, which is about twice as big as most; it may get in your way. Mid-Kansas Computers, PO Box 506, Newton KS 67114, 316/283-0208.

Reader Mail continued

from page 10

Mail From: Texas Star
Date: Friday 22-Aug-86 19:47 EDT

As a novice computer user, I have one question--when loading computer programs what difference does the 1 make in the LOAD command? (**LOAD "*",8** versus **LOAD "*",8,1**)

Thanks.

LOAD pulls data from the disk drive and puts it into computer memory. With the **,1** *added to the command, LOAD puts the data right back into the same memory locations it came from when it was saved. Machine language programs, graphics screens, and most other types of computer code will only work properly if loaded in this way. A* **LOAD "*",8** *on the other hand, relocates whatever is loaded to the start of BASIC program memory, wherever that may currently be in the system. You can load only BASIC programs in this manner.*

-Mark & Benn

Mail From: Nat E Dred
Date: Sunday 24-Aug-86 16:43 EDT

I liked issue #11.

Do you accept subscriber's reviews of unrated software?

Dennis Schliebener
Mt. Washington KY

Obviously, with 1600+ products to look at, we can't possibly rate all of them ourselves. In issue #8 we printed a Reader Concensus form for readers to submit their opinions on any unrated programs. Though we don't take any one reader's opinion and use it as the sole basis for a rating (just in case someone has an ax to grind), we will take a concensus from several readers and use that as a basis for rating a product. If you would like to participate in this process, use the form in issue #8 or send your brief comments about a product along with the title, company, and category, your rating, your name and qualifications, and the names of similar software you may have used. This sounds like a lot, but you can keep it short. We just want to be sure that any opinions we pass along to our readers are informed and worthwhile. After all, **you** *rely on the information in INFO. We want it to be correct.* *--Mark & Benn*

(continued on page 64)

IDEA PROCESSORS

An outline, or idea, processor lets you make outlines of projects, scripts, stories, or anything else, and then reshuffle and manipulate the information until it resembles something that makes sense. The finished project looks just like the story outlines Miss Prunejuice made you do in the fifth grade.

I like the idea of an outline processor. I've been using one on the C128 for a couple of weeks now to work on a short story outline and to help organize the flow of materials around the office. It really helps you get your ideas organized. It's easy to trim out the deadwood and put the necessary thoughts or steps into a logical order.

Here's an example: Let's say you have a lot of work to do next Saturday. You boot up your outline processor and come up with this work schedule:

```
Yardwork
  Front Yard
    Mow Lawn
    Trim Weeds
  Back Yard
    Weed Flowerbed
    Hoe Garden
Garage
  Sweep Floor
  Sharpen Lawnmower Blade
```

Looking at the list, you realize that it makes more sense to sharpen the mower blade before you mow the yard, so first you move the "Garage" heading up before "Yardwork":

```
Garage
  Sweep Floor
  Sharpen Lawnmower Blade
Yardwork
  Front Yard
    Mow Lawn
    Trim Weeds
  Back Yard
    Weed Flowerbed
    Hoe Garden
```

Notice how the subheadings "Sweep Floor" and "Sharpen Lawnmower Blade" moved right along with the parent heading "Garage"? Looking at those two particular tasks, you realize that it makes no sense to sweep the floor until you're done working in the garage, so you move that job to the end of the "Garage" section.

```
Garage
  Sharpen Lawnmower Blade
  Sweep Floor
Yardwork
  Front Yard
    Mow Lawn
    Trim Weeds
  Back Yard
    Weed Flowerbed
    Hoe Garden
```

Now the whole thing makes more sense, and you can print out your list of things to do in the proper order. Scheduling a big corporate project requires the same sort of manipulation, only on a bigger scale.

You can also use an idea processor for the more traditional plotting of stories, plays, novels, and magazine articles, of course. Like Miss Prunejuice always told you, it really does help you to keep your thoughts organized.

Now that we've looked at what an outline processor is, let's examine one for each of the Commodore computers, including one for C128 CP/M mode.

Flow is the first idea processor available for the Amiga. It's strong suit is the manipulation of the parts of an outline once they are put down. By simply clicking the mouse you can move a heading up and down or in and out. You can also collapse or expand portions of your outline with a double click, to see the "big picture" or the tiny details. All of the point-and-click mouse functions have equivalent pull-down menu selections. For keyboard fans, there is a function key for each mouse function. But it's the mouse that makes restructuring an outline easy and intuitive.

In addition to mouse manipulation, Flow's sort option will sort headings in ascending or descending alphabetical order. It will not, however, sort numbered headings in proper multiple-digit numerical order.

There is a find function, but no search-and-replace. The find function only works on displayed headings; it will not find a match for a search string in an undisplayed line. This can be an advantage or a disadvantage depending on what you are trying to do.

The print option allows you to print the outline in its entirety, or the displayed portion only.

Flow's weak link is in its text capabilities. It works only with headings, not with body text. I've found outline processors to be much more useful when they allow you to insert body text under the headings. You cannot use Flow to produce a finished document from its outline. There is also only a single (albeit fairly long) line allowed for each header.

The default text entry mode is insert, though text can be overwritten by highlighting it with the mouse first. There are cut, copy, and paste functions for header text, but a disastrous bug appears if you try to paste anything into a full line. Not only does the pasted text not appear, but everything to the right of the cursor disappears. Even a normal paste operation pads the pasted text with a space at either end.

Though Flow is multitasking, and you can have two or three outlines in separate windows at the same time, you cannot cut and paste headings from one to the other. This would be a very powerful feature, and one I'm sure we'll see in later, more advanced, idea processors for the Amiga.

Flow's great strength is in header manipulation with the mouse. It's weaknesses and limitations are in entry and editing with the keyboard.

Flow, $99.95, New Horizons Software, PO Box 43167, Austin TX 78745, (512) 280-0319.

BrainTrust is a package which includes **BrainStorm**, an idea processor, and **BrainPower**, a wordprocessor which integrates with the idea processor's outlines.

Mark Jordan, the developer of **BrainStorm**, published a simpler C64 version of this idea processor in the November 1985 issue of RUN magazine. The commercial C128 version is much more powerful, and integrates with an included wordprocessor based on **Archetype**, which was published in Commodore Microcomputing.

The major feature of **BrainStorm** is it's free-form entry of ideas; this is a true *idea* processor. In the first phase, you enter your thoughts one at a time, without regard to outline form. The second phase takes you into a matching-up process which actually builds a raw outline for you from your ideas. You edit and expand on this outline in the third phase of the program. The "brainstorming" section of this idea processor is very natural and very powerful. You are limited to 100 initial ideas which must be expressed in lines of only 64 characters. The matching-up phase lets you organize your ideas into a maximum of nine groups.

The outlines themselves are also limited to nine subheadings per level. There are four levels (I.,A.,1.,a.) allowed in an outline, so you are limited to about 6600 headings. (The matching-up phase organizes your ideas into A.,B.,C., etc., subheading under untitled I., II., III., etc., main headings.) These limitations are not overpowering, but you must be aware of them when using **BrainStorm. It is surprisingly easy to exceed the nine subheading limit with some subtopics.**

Cleaning up and expanding on the outline is very simple. There is even an "auto-pilot" mode for those of us who have forgotten how to do an outline. In this mode, memory-resident help screens step you through the process painlessly.

When you are done with your outline, you can save it to disk and press on to creating your document by loading BrainPower, a full-featured 80-column wordprocessor designed specifically to work with BrainStorm outlines. There is an alternate text area into which you can load your outline and flip back and forth between it and your text at the press of a key. The top line of the status display also continuously displays any selected line of your outline, and you can even scroll back and forth through it as you compose your document.

The wordprocessing features of **BrainPower** are as good as any mid-level wordprocessor, and include search-and-replace functions, block operations, and embedded formatting commands.

The brainstorming session, auto-pilot outlining, and wordprocessor integration of **BrainTrust** are the premiere features of this package. The menus and pop-up help screens make this software very easy to use. You will find that the sublevel constraint of **BrainStorm** is the only limitation that may sometimes hold you back.

BrainTrust, featuring the **BrainStorm** idea processor and the **BrainPower** word processor, is $21.95 from: Country Road Software, 70284 C.R. 143, Ligonier IN 46767, (219) 894-7278. Unprotected.

OUT-THINK

As with most C128 CP/M programs, the first thing you will want to do if you buy the **Out-Think** idea processor from Kamasoft is to transfer the program and it's associated files from the Osborne double density format disk you bought to a native 1571 format CP/M boot disk. Not only will the program and its associated data load faster, but you will be able to boot and run without swapping disks.

This program is very disk-intensive, as are many CP/M programs. Expanding an outline or moving into the text leafs causes a disk access, as does asking for one of several help screens. It seems as though there are a million control and escape key combinations that take you from one option to another. Cursor and editing control are extensive, but the use of all those keys is made somewhat easier by the help screens and the handy quick reference card. Prompt menus also pop up on the bottom status line when you choose an option, with a list of the sub-options available. The leaf and branch editors incorporate many Wordstar-like key commands, but if you are already using Perfect Writer you can specify PW-like control keys.

Out-Think is an outline processor with text processing capabilities. Associated text is stored as *leafs* off to the side of the main outline. Each text leaf is associated with a heading in the outline. Though the leaf editor is not a full-featured wordprocessor, it does offer such advanced features as block moves, boilerplating, automatic word wrap, and search-and-replace. When it's time to print you can print the full outline with text, text leafs only, or headings only. There are a multitude of print formatting commands. Because of the way CP/M is implemented on the C128, you will have to use a Commodore-compatible printer or interface to print normally.

Out-Think is a very versatile, if somewhat disk-intensive, outline processor. It is nice to work with, with lots of options, editing features, and output format control. The manual and quick reference card are top-rate. In our humble opinion, **Out-Think** is one of the best reasons for booting up CP/M we've seen to date.

Out-Think, $50.00, from: Kamasoft, PO Box 5549, Aloha OR 97007, (503) 649-3765.

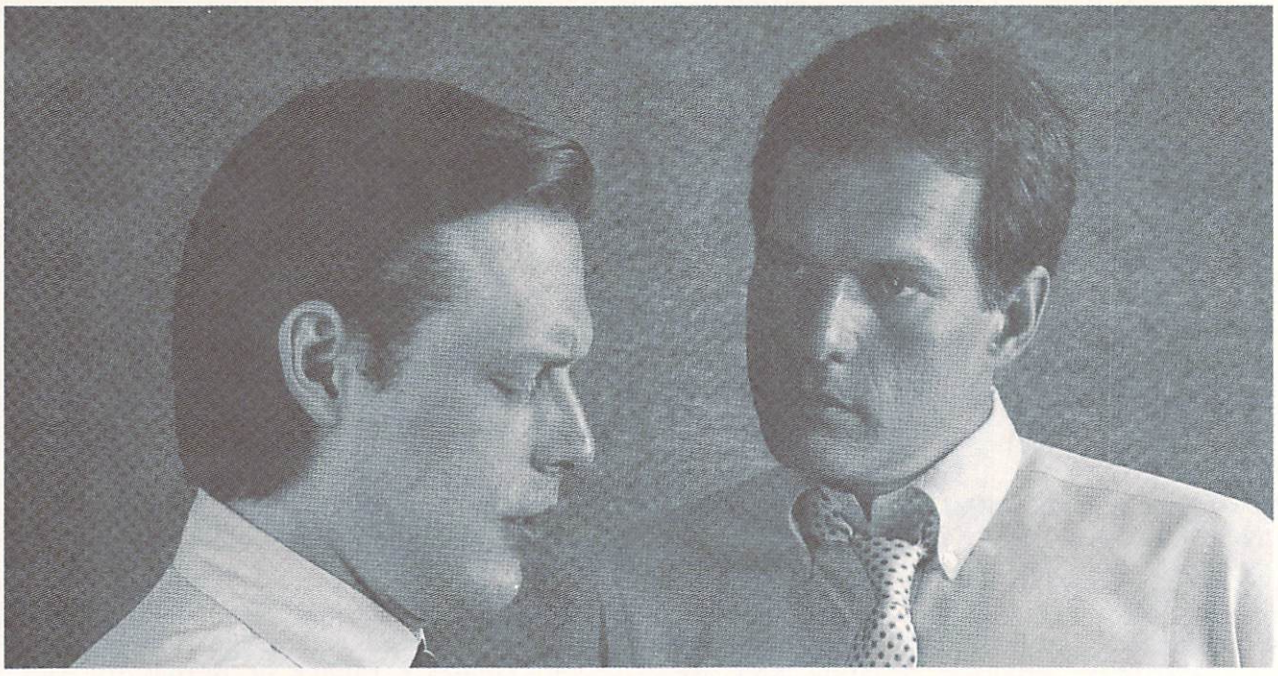
Postscript: How To Play *Jeopardy* with **Out-Think**. (1) Put the *Jeopardy* answers into topic headings. (2) Put the *Jeopardy* questions into the associated text leafs. (3) Use the Flashcard option by pressing **F** then **T**. You'll get a series of randomly selected answers to which you can supply the questions. Press **Y** to advance.

THE C64

Well, idea processors seem, at least for the moment, to be in rather short supply for the C64. There's a version of BrainStorm for the 64 that we assume is similar to the C128 version, though we haven't seen it. You might want to get in touch with Country Road if you're interested in the C64 version. And in the back pages of INFO is an ad for an idea processor called **Thoughtform** that sounds marvelous. It offers up to 200 levels of indentation, editing of outlines longer than the C64's memory (!), and text leaves up to several screens long. Though it is "close" to delivery, we could not get our hands on a copy in time to meet our printing deadline. Hopefully we'll be able to follow up with a report on Thoughtform in the next issue. For now, be assured that C64 owners are not going to be left out when it comes to idea processors.

Thoughtform, $35.00 from: Thoughtform, 45828 Emerson St., Hemet CA 92344.

"When we agreed to let you paper your room, we didn't expect it to be this noisy."



"What's wrong with copying software?"

"I use a lot of programs on my personal computer, and I copy them all the time."

"I'm a programmer. Every time you copy one of my programs, you're taking away my income—I depend on *sold* programs for a living."

"Oh, come on. I bought it: I have a right to copy it."

"You *do* have a right to make a back-up, that's true. But when you start copying programs for your friends and co-workers, that's breaking the law."

"What law? Any copying I do is in the privacy of my own home."

"It doesn't make any difference where you do it. Every time you copy a program without permission from the publisher, you're committing a federal offense."

"That's all right, I won't get caught."

"You're missing the point. The issue isn't "What can I get away with?"—it's "who am I hurting?"

Remember, lots of people worked hard to produce every program you use: designers, programmers, distributors, retailers, not to mention all the people who support users. They have a *right* to be compensated for their efforts, and their major compensation is through software sales."

"Well, I don't mean to hurt all those people—or anyone, really."

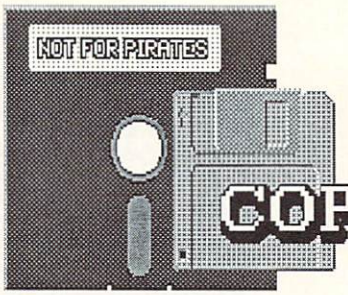
"Unfortunately, that's what copying does: it hurts people. And, ultimately, it hurts people like you, who want new and innovative software."

Do you copy software? Think about it.

The unauthorized copying of software is a crime.

SPA Software Publishers Association
Suite 1200
1111 19th Street, N.W.
Washington, D.C. 20036

Created by Halcyon Associates, Brooklyn, New York.



COPY CORNER

Copy Notes: Check *News & Views* for a bit of good news about copy protection and Ashton-Tate...Some adventure games are now unprotected, but occasionally will ask you to type in some random key like "the ninth word in the tenth line on page 73 of the manual". While this is effective copy protection, the interruption in the flow of the adventure is extremely annoying...We just got Version 2.0 of **Superkit** from Prism and it looks hot! Look for a review next issue...Prism's first parameter disk (due soon) will have parms for Pocket Writer and the rest of the Pocket series...**Super Clone 1571** is the first copier delivered to our door with backup capabilities for *two* 1571s. We'll take a closer look in a future column...Compumed is now selling a version of **The Mirror** for the Amiga. It's an automatic swap-and-go copier for one or two drives that is supposed to be 100% effective to date. ($49.95).

MEMORY SNAPSHOTTERS

Most copy programs concentrate on duplicating disks. They produce absolutely faithful copies of the originals, right down to the copy protection. Memory snapshot cartridges take a different approach. They make a copy of a running program directly from the computer's memory. Since the original disk is not involved in the process, the copy is unprotected and copyable.

Memory snapshotters reside on cartridges and rely on some kind of *phantom cartridge* technology. This lets them sit unnoticed in the cartridge port until a reset button (located right on the cartridge) is pushed. This kicks the cartridge in, which takes over the computer. At this point the snapshotter analyzes what's in the computer's memory and saves all pertinent data to disk, along with a boot file that will reload the program properly.

Since a snapshotted program is unprotected, it can be loaded with a fastloader, and it will load from third-party disk drives and can even be stored on hard disks or transferred via modem!

When you reload the snapshotted program, it will be *exactly* as it was when you saved it. If it was halfway through playing the theme song on the title screen, it will start again in midsong. If you saved a game in progress, you will come back to the game in exactly the same spot with exactly the same score. It will be as if you had never left your computer.

What are the limitations? Well, some shapshotters are more phantom than others, for one. Some programs just won't tolerate having them in the cartridge port.

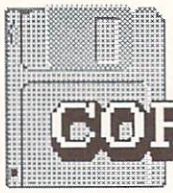
There are also some programs which do not reside entirely in memory, but are modular. Since the snapshotters only copy what's in memory, you will miss part of the program. Sometimes you can get around this by snapshotting the main (protected) module and then filecopying the supplemental (unprotected) modules to your copy disk.

Let's take a quick look at four of the most popular C64 snapshot copiers.

Isepic, from StarPoint, was the first of the snapshotters. It does not reside entirely in ROM, but uses some disk-loaded code, too. Since it is not completely cartridge-resident, Isepic has more compatibility problems than some of the later snapshotters, though it generally works pretty well. It has an option to add its own fastloader to snapshotted programs, and also includes an integral machine code monitor for examining a program in memory.

Snapshot (formerly **Codebuster**) from Marshview Software is the easiest snapshotter to use. You press the button and hit a function key to clear memory, load and run your program, insert a disk into the drive, and hit the button and another function key to save the program to disk. That's it. Do it once and you never need to look at the manual again. There is even a function key overlay to remind you of which keys to hit. It is also very, very, effective. For advanced tinkerers, Snapshot has a Code Inspector option that displays important register and system information and will let you inspect memory in hex or load in an m/l monitor.

Capture from Jason-Ranheim is the most sophisticated of the snapshot copiers. It lets you not only snapshot a running program to disk, but will also let you burn it on a custom cartridge! It can also save an additional file with the contents of drive RAM, which can overcome some sticky copy protection schemes. It saves a program as a multitude of files, all neatly labelled as to where they came from. This makes it very easy to load them into memory and analyze and change them with an m/l monitor. The I/O file it creates is also easily modified to change VIC, SID, and cpu register status. Capture is the most effective and the most useful pro snapshotter of the bunch.



COPY CORNER

continued

The Power Cartridge is the new kid on the block, and is not strictly a snapshotter at all. It's a utility cartridge with snapshotting as just *one* of its functions. Additional functions include hires and lores screen dumps, disk and tape fastloading, BASIC programming extensions, system reset, and an m/l monitor. Quite a lot of power for one cart! The Power Cartridge is one of my favorite toys on the C64, since it has so many capabilities. We use it for C64 screen dumps for the magazine, and since it's usually plugged in anyway, I try it first for snapshot copies. It usually works fine. If you are the type who likes a lot for his money, The Power Cartridge is about as good a deal as you can find.

Those are the four best snapshotters, and each has its own strengths. Pick the one that suits your own personal needs.

Next time Copy Corner will focus on parameter copiers, what they do and which ones are hot.

SOFTWARE SOURCES

N/R **The Mirror** (Amiga, $49.95), Compumed, PO Box 6939, Salinas CA 93912, 408/2436.

***+ **Isepic** (C64, $64.95), StarPoint, 122 S. Broadway, Yreka CA 96097, 916/842-6183.

**** **Snapshot** (C64, $50.00), Marshview, PO Box 1212, Sackville NB Can E0A-3C0, 506/536-1809

****+ **Capture**, (C64, 39.95), Jason-Ranheim, 1805 Industrial Dr., Auburn CA 95603, 916/823-3284.

****+ **The Power Cartridge** (C64, $59.95), KCS, 655 John Muir Dr., San Francisco CA 94321, 415/239-5357.

Note that this rating is based on overall performance, and not just on The Power Cartridge's snapshotting capabilities.

INFO's Guide to the Best From the Rest

The May/June **Amiga World** featured a tutorial on doing fill patterns with Deluxe Paint, plus a first look at the IFF file standard, and the start of a four-part series on C programming. The July/Aug issue had *three* articles by Peggy Herrington on the Amiga's sound capabilities. Then, just when it was starting to look like they were getting more informative, along came the Sept/Oct issue filled mostly with fluff interviews, pictures, and chat. Digital Canvas has even lost its glow since they went from printing screen shots to a direct-to-print color separation technique. The art's still great, but the color suffers. Compare their "Island" picture on page 80 of the July/Aug Amiga World to the cover of INFO #10 to see what we mean.

Computer Shopper had a review of the Laser 128 Apple compatible in the June issue (they liked it). June also saw the debut of a regular C-128 CP/M column by Cheryl Peterson (lots of good info). The July issue features a shamelessly positive review of the Amiga Transformer software by Ervin Bobo (who writes regularly for Commodore Magazine). In August Computer Shopper got a new glossy cover and went from being stapled to being perfect bound. We want to thank Ted Drude for his kind words about INFO in his *Inside Commodore* column in this issue. The September issue has a comparison of two new hard disk drives (both serial) for the C64/C128

The June issue of **Run** announced GEOS, July the 64C, and August the additions and changes to QuantumLink. These issues all looked like Commodore catalogs. The September issue was thin on any real information, too. Personally, I think Run is more of a house magazine for Commodore now than **Commodore Magazine** is.

Speaking of **Commodore Magazine** (which isn't its name yet, but will be in January when **Commodore Power Play** and **Commodore Microcomputing** merge into a single monthly), this magazine has come up a long way. It's thick, it's informative, it's up-to-date, and even

cont'd

though it still tows the company line, it manages somehow to have less company flavor than either **Run** or **Compute's Gazette**. The June issue of **Commodore** included the first of what will be a quarterly Amiga Buyer's Guide put together by Redgate Publications, the folks who do the Macintosh Buyer's Guide. July featured three full-color pages of the winning entries in their computer graphics contest. Roger S. Macomber had a surprising technical look at self-replicating code in the August issue, which also featured a timely examination of the legal issues involved in software rental and a comparison of C64 chess programs by Ted Salamone. September updated the Amiga Buyer's Guide and took an initial look at the Genlock. Louis F. Sander, who ran Run's Magic Column from its inception, moved lock, stock, and computer to Commodore Magazine in September to run their new *Tips & Tricks* feature. (Commodore, by the way, does not just give you a crummy T-shirt for your tips, but will pay you cash money: up to $50 for each.) Peggy Herrington reports on Deluxe Music Construction Set in the October issue.

Compute! is covering so many different machines that the few pages actually devoted to Commodore computers are not even worth talking about. Charles Brannon, longtime Program Editor for Compute! and the author of *Speedscript*, left after the August issue.

Compute's Gazette is almost all type-in programs. Many are in machine code now and we hear many reports that the listings are often inaccurate and will not run until two or three "bug fixes" have been published over the next couple of months. And, truthfully, most are rehashes of programs that are available free in the public domain. (Shoot-em-up games, BASIC renumberers, disk utilities, etc.) I earnestly tried to find something worth noting in the July through October issues and couldn't find a thing.

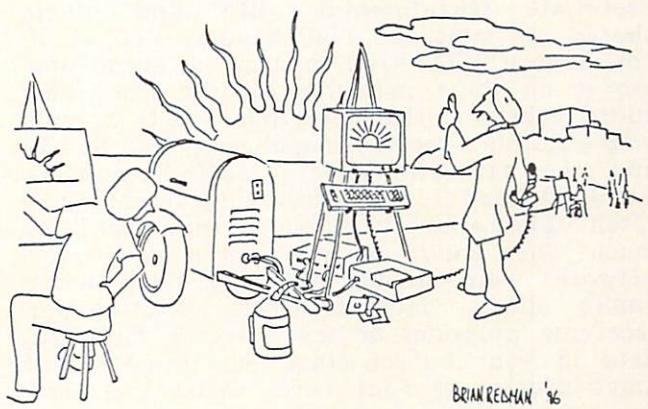
Ahoy!'s programs are generally more worthwhile and tutorial, though they've disturbed me by printing some rather long hex listings in the last few months. Debugging BASIC on the C128 is Dale Rupert's topic in the June issue. Morton Kevelson dissects his new Amiga, with gory color photos of Amiga guts, in the July and August issues. Rupert covers C128 windows & viewports in Sept., and Kevelson dissects a Mimic Spartan Apple][+ emulator. This issue also has one of the *longest* BASIC type-in programs ever printed; over 20K of code. It's a graphic dungeon adventure called *The Vault of Terror* by Cleveland M. Blakemore.

Byte continues its excellent 68000 coverage in the June issue with reviews of the Mac Plus and Atari 520ST. There is a very fair review of the C128 featuring benchmark comparisons against the Apple][e and IBM/PC, in the July Byte. The August issue focuses on object-oriented languages, which should be of interest to all icon fans. September features a look at the 68000 microprocessor family. There is an Amiga vs. Macintosh comparison by Bruce Webster (the Amiga wins, five to one!), an article on Amiga animation, and a close look at the 68000 itself. Of course, each issue also contains the Best of BIX with lots of Amiga information.

We wish Bob Lindstrom good luck in his new position as Associate Editor at **The Guide**. Most of the best stuff in the latest issue was his, which bodes well for the future of this magazine.

If you need a good reason to get good and mad, check out the comparison of the Amiga and the Atari ST in one of the latest issues of **Consumer Reports**. Even though the Amiga consistently comes out on top in the point-by-point comparison, the author picks the Atari over the Amiga because it's "a better buy". What did you expect from a magazine that picked the Radio Shack Color Computer over the Commodore 64 a year ago?

As for the others, if you are a language freak you need to read **Computer Language**, if you program the C64/C128 you need **The Transactor**, if you program the Amiga you need **Ami Project**, **Amazing Computing** prints all the stuff you wish **Amiga World** would, COMALites should subscribe to **COMAL Today**, and **The Midnite Software Gazette** is just plain required reading.



Modems Across the Board...

By Peggy Herrington

A modem provides the connection and determines the rate at which information is exchanged between two computers connected by telephone, whether they're C64s or a personal computer and a commercial network or university mainframe. Among other things, the PC's terminal software governs the modem's hardware speed, the rate at which information is sent and received, which is measured in bits per second (bps) but more commonly called the *baud rate*. Using a terminal program set for 1200 baud with a modem that's only capable of 300 baud will *not* let you communicate at the faster rate, however, because the hardware in the modem can't handle it. You can, however, successfully use a 1200 baud modem at 300 baud with appropriate software.

Having 1200 baud available doesn't necessarily mean you'll want to do everything online four times faster than 300 baud because there are two situations you can get into: 1) transferring data such as previously stored text files or programs, and 2) talking live with people online at the same time you are. This distinction is important when you're paying by the minute for connect time on a network or when you're using long distance phone service to access a Bulletin Board System (BBS) in another city. Although it's changing, 300 baud used to be the standard and most networks charged more for using a faster rate. But these days, **Delphi, GEnie, American PeopleLink, ProtoCall, QuantumLink, BIX** and others charge the same for 1200 baud as 300, so if you have a 1200 baud modem, go ahead and use it on these networks all the time. (An added benefit is that over time, you'll increase your reading speed.) **CompuServe, The Source** and other networks, however, still charge more for 1200 baud -- and while that surcharge is often substantial it is never four times as much. When you're on one of these surcharged networks you should use 1200 baud when you're doing data transfers, sending or receiving programs or text files or capturing data in your buffer since the transfer will move everything four times faster and save you time online, which in this case, is money. Same goes, of course, for long distance transfers. But always use 300 baud when you're chatting with other users on a surcharged network since a good deal of what's going on is analog typing time and it won't happen faster even if you're paying the 1200 baud premium. Unfortunately, you can't switch baud rates once you've established connection with another computer so if you want to change it, you'll have to sign off, change it, and sign back on.

C64/128 AND AMIGA MODEMS

In the world of Commodore telecommunications, there are two kinds of modems, those with the Commodore Business Machines brand name and others, most of which are Hayes-compatible (meaning they will respond at least in part to an elaborate set of commands developed by Hayes which are useful for sending commands to the modem through your computer). Commodore did a great thing a fews years ago when they introduced the **1600 VIC Modem** (300 baud for under $100, which, incidently works fine with the C64 and C128 in either mode) but don't rush out and buy a Commodore modem now just because of that. All of them (models **1600, 1650, 1660** and **1670**) will work *only* with C64s and C128s; without additional hardware (which is not available retail at the moment) they won't even work with Commodore's Amiga. Commodore's **1670** modem will operate up to 1200 baud and is Hayes-compatible (unlike the other Commodore models in both respects) but for the same amount of money or less you can get an independent brand of modem that will (with appropriate interface or cables that *are* available retail now) work with just about any computer, including the C64, C128 and Amiga. And unless you have a crystal ball, you have no way of knowing when you'll want to use your modem with another computer.

You can't buy a 1600 or 1650 modem retail these days because Commodore doesn't make them any more. Although the 1660 is available, the carrier-detect hardware in it is backwards, meaning that you'll have trouble establishing contact with some systems. (Once you've got the carrier tone from the other computer, you can sometimes flip the Originate-Answer switch on the side of the 1660 to overcome this.) Then too, the vast majority of both commercial and public domain terminal programs won't work with the 1660 (they were

written for the earlier models), a major exception being **BobsTerm Pro** both C64 and C128 versions. Both Commodore's 1660 and 1670 modems have speakers that produce annoying hums when they're connected and you're offline, and the 1670 has problems with the auto answer function which is automatically enabled. Not only will it attempt to answer incoming calls whenever it's connected and your computer is turned on, it will try to answer while you're online. That will disconnect you from the other computer and if you're halfway through a long program transfer, you'll be anything but pleased since you'll have to start all over again. (For a software method of disabling 1670 auto answer, see INFO #9, page 39.)

Commodore announced they would market an Amiga modem way back when (for $295) and I saw what was purported to be a prototype early this year. It was 300/1200 baud, had a speaker but no LEDs and it's most notable features were an independent power supply and built-in cable with a pass through RS232 connector that allowed a second device (such as a MIDI interface) to remain connected to the Amiga, although only one such device could be operated at any given time. I understood it was to be built by U.S. Robotics but have not been able to track an availability date.

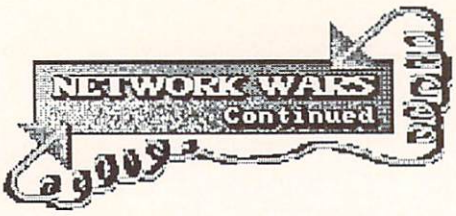
HAYES-COMPATIBLE MODEMS

Despite everything, though, there is one advantage to using a Commodore brand modem with a Commodore computer: it will plug directly into the RS-232 port and function fully without any additional hardware. Conversely, in order to use a non-Commodore modem with a Commodore computer, additional hardware is almost always required. With a C64 or C128, you'll need an RS232 interface; I use one from **OmniTronix** that retails for under $50. With the Amiga, you'll need a special cable since its RS232 pin connections are definitely not standard. You can probably purchase an Amiga cable where you buy the modem but in case you can't, you can have one made connecting *only* pins 1 through 8, 12, 20 and 22 directly to their numbered counterparts (1 to 1, 2 to 2, etc.). In addition to the cost of the additional hardware, 1200 baud modems (Commodore or not) are more expensive than 300 baud. But if you download (transfer to your computer for the cost of connect time) very many public domain files or programs from the networks, you won't regret spending the extra bucks upfront since it won't take many sessions online to recoup your investment.

Just as computers are not created equal, there are modems and then there are modems. I recently used the following five Hayes-compatible modems with the Amiga and the C128 (on **PlayNet** and **QuantumLink** in C64 mode). Sorry, folks. Although I used and loved my C64 sometimes 8 or 10 hours a day for over two years and have every reason to believe these modems with perform with it, going back to typing on it after the C128 felt like cruel and unusual punishment so I didn't test all of them with it.

AVATEX 1200 from E+EDataComm (2115 Ringwood Avenue, San Jose, CA 95131, 408/288-8880). The price is right on this little hummer, around $100 retail depending on where you buy it, and you could do worse than get it as a starter modem. It doesn't respond to the full Hayes command set (you must, for instance, turn it on/off and break an online connection with one of 3 manual switches on its front panel) but it does have 8 LED's that inform you visually of things like low (300) or high (1200) baud rate, terminal ready status and ring indicator for incoming calls. The documentation with it is minimal. It worked on the local BBS's I called as well as networks but I was not able to establish connection directly with an Amiga across the country although I hasten to add that that machine was equipped with a different modem and terminal software from what I was using, either of which could have been responsible. It doesn't have a speaker.

PASSWORD 1200 from U.S. Robotics (8100 North McCormick Blvd., Skokie, IL 60076, 800/DIAL-USR). This one has a suggested list price of $449 but like the others mentioned here, you can often find it for less. It is fully Hayes-compatible and has a speaker (something you'll not want to do without once you've become accustomed to it) and good documentation. It doesn't have any LEDs, sporting only a power light on the top of the housing. I had some problems getting it to do what I wanted occasionally but to this day, I don't know why. The cable on the Password is permanently affixed and provided you get the



other settings on it just right, it will work with both Amiga and the C128/64.

CTS 2424ADH Datacomm from Micro-Systems Software (4301-18 Oak Circle, Boca Raton, FL 33431, 800/327-8724). This 2400 baud Hayes-compatible modem is available in a $429 package deal from M-SS, which includes an Amiga cable and their terminal program **Online!** Although far from perfect, Online! is the terminal program I still use after trying 10 or 12 others, both commercial and public domain. The modem is equipped with a speaker and the standard 8 LEDs, and the documentation with it is quite good. 2400 baud communication is great for business use and machine to machine transfers and is available on some networks, usually with a hefty surcharge.

SmartTEAM 103/212A from Team Technology, Inc. (MOrrison & DEMpsey communications, 19209 Parthenia, Suite D, Northridge, CA 91324, 818/993-0195) This one has the best price/performance ratio of all the modems I used. It, too, has a suggested retail price of $295 but, by shopping around, can be had for less. It is housed in a steel casing they claim you can stand on, has good documentation, is guaranteed 100% Hayes-compatible, has 8 LEDs and a speaker and, for me, performed flawlessly.

Novation 2400 Professional from Novation, Inc. (Computer Resources, 5680 South Syracuse Circle, Suite 118, Englewood, CO 80111, 303/771-8930) If you're looking for the top of the line, this is the modem for you. It operates at speeds up to 2400 baud and has all the bells and whistles you'll ever want, as it should for $795. It even plays a cheerful little melody on powerup as it automatically cycles through test mode. Fully Hayes-compatible, with 6 touch-sensitive LCDs that give you status reports in English rather than the usual symbols, it is functionally and visually beautiful, and the documentation is extensive. This baby, unlike the others, worked without problem despite the Amiga hardware failure I describe in the next paragraph.

ONLINE WITH AMIGA

When I first took the Amiga online, I had a consistent problem getting one modem after the next to dial calls reliably. It turned out to be a problem with the computer rather than the modems, and with terminating a call properly rather than dialing, and I got a lead on it from a programmer in England via BIX (Byte Magazine's network). If you find yourself in a similar situation, have your Amiga dealer check the amount of time the signal stays down on pin 20 of the RS232 after you send a disconnect or hang-up command from your terminal program. If it flashes back up in the blink of an eye, you probably need a new 1488 Quad Line Driver (which is a big name for a readily available, inexpensive little chip). Have it installed with a socket rather than soldered in, as this chip has a reputation for being less than reliable in some circles. This procedure has been approved by Commodore Service.

XMODEM UP/DOWNLOADS

During program transfer, all commerical networks and many BBSs use a method of error checking or protocol called Xmodem to guarantee accuracy during transmission. Xmodem pads the end of all files to build the final block of data out to exactly 128 bytes. With most computers this isn't a problem but since the Amiga checks for an End Of File marker, and that marker is buried by the padding, it refuses to run a padded program by informing you that it's **NOT AN OBJECT MODULE**. There are a number of ways around this. Several public domain utilities will strip this padding (notably **CHOP** and **FIXOBJ**) but besides the fact that you must have one of these utility programs and know the correct file length of the program you want to fix, the process requires an additional (and to me, unnecessary) step after downloading. Another method is to condense one or more programs into a single file with a public domain program called **ARC**. This presupposes that you have ARC in order to expand the file back to its original state after it's transferred. Yet another way around it is to use a terminal program that strips the padding as the program is received by your computer, and there are several of these programs in the public domain (**COM1.21** and **AHOST**, for example). And finally, if you're downloading from CompuServe using their B protocol, provided the program was uploaded with B protocol rather than Xmodem in the first place, it won't be padded at all.

If downloading the programs you need (some of which have to be stripped themselves which, of course, can become a Catch-22) is more than you care to fool with, send me a blank disk and $5 for return postage and handling (1032 Forrester St. NW, Albuquerque, NM 87102) and I will send it back with the latest public domain telecommunications stuff on it -- an assortment of Amiga terminals and utility programs all stripped and ready to go. Please be sure to send a double sided, double density (DSDD) disk and, of course, your return address.

Don't even *think* about downloading Amiga programs from a commercial network at 300 baud -- they are simply too long and will cost you a fortune in connect time at that rate. You'll save connect time charges whenever you do download, by directing Amiga programs to the internal RAM: drive as they come in rather than to disk. (It's much faster.) Where a program is stored as you receive it is determined by the name you give it for your computer. By preceeding the name with RAM: (like this, **RAM:ProgramName**) rather than **DF0:ProgramName** or DF1:, that's where it will go, and you don't have to set up the RAM: drive first. (But be sure you don't reset or turn off your Amiga with anything you want still in the RAM: drive. Also, to keep a CLI open, start your terminal program by typing **RUN ProgramName** from the CLI rather than clicking on its icon). After downloading the programs or files you want to RAM:, sign off the network and then transfer all your downloads from RAM: to a disk in one fell swoop from the CLI by typing **COPY RAM: TO DF0: ALL** (or TO DF1: ALL for the external drive if you have one). After that you can clear out the RAM: drive by typing (again from the CLI) **CD RAM: DELETE #?** -- Neat, huh? See you online!

Down to Business

the Conclusion of Ted's 2-Part Report on 8-Bit Wordprocessors.

by Ted Salamone

WORD WRITER

Timework's Word Writer stands alone or interfaces with their **Data Manager** series, **Electronic Checkbook**, and **Swiftcalc**. It provides reliaability at at price most can afford.

The user's manual is comprehensive and well written. About 50% of it is dedicated solely to the word processor, the balance used to explain interface procedures. A sample document is provided on the program disk. It is a useful learning tool since you don't have to worry about corrupting your data or losing something valuable.

Two keyboard overlays are instrumental to the operation of Word Writer. One explains Function key usage, the other displays the functions produced by the top row of keys in conjunction with the COMMODORE and the CTRL keys. Function key combinations are used to advance the cursor to tab settings, set or clear tabs, and alter text, prompt and background colors. They are also used to save or load files and send the cursor to the top of the next page or the last page.

The CTRL and COMMODORE keys are used in conjunction with the top row of the keyboard to allow you to delete characters, lines, and words, perform searches, replace characters, insert lines and returns, reset the program, print documents, catalog the disk, and right align the document. Other combinations allow you to set the range and location of move and copy functions, format and highlight text, invoke limited disk commands, exit to BASIC, set margins , move the cursor and set margins. Convenience is what it's all about.

Reading the manual is almost unnecessary. I basically loaded the program and followed the overlays. Word Writer worked like a charm. The manual does explain error messages and includes several informative appendices and a truly useful glossary. A functional index is a needed addition.

Though Word Writer is a smooth running, hard working program, it has some omissions. Primarily, it lacks header/footer capabilities. Global search and replace features, a true "what you see is what you get" option, or an 80 column preview mode would be nice. Word Writer is an excellent midrange wordprocessor.

EASY SCRIPT

Now we come to Easy Script, the Commodore distributed program written by Precision Software Ltd. of England. Though old by software standards, and never updated as far as I can tell, Easy Script works like a charm.

This had been my personal 64 word processor of choice for several years because of its ease of use, advanced features and flexibility. While there are others available which now supersede its cost effectiveness and raw power, none play music as well. (A certain keystroke combination brings out the band. Experiment if you don't already know, perhaps you'll find another skeleton in the code).

The manual is set up as a tutorial and a comprehensive reference guide. After a thorough run through examples of all major functions, a boiled down version is provided for those who do not have the time to wade through excess text. Lack of a separate reference card is a problem, as it would be with any command key driven program of this magnitude and power.

ES uses the function keys in conjunction with others to activate commands. This works smoothly, providing an escape from incorrectly selected or unwanted operations. (Merely press F1 until the function about to be performed is aborted).

Easy Script uses imbedded format commands, so status lines, usually placed at the beginning of a document, are used to specify document name, output format (justification, spacing, headers, etc.), and any other pertinent information. Additional control (status) lines can be inserted anywhere to accomodate margin changes, special printer commands, etc.

Basic disk access features are supported: disk directory and formatting, save, load, delete, copy and rename files. Vertical and horizontal tabs can be set, viewed or removed. There is even a provision for formatting decimal numbers.

Easy Script makes it easy to perform auto pagination, make single line headers and footers, adjust margins, alter line spacing, force the end of a page (handy for chapters in a book), and insert or delete text.

The block manipulation operations permit range setting from/to any point in a document. Not being limited to the beginning or end of a line of text is a true demonstration of flexibility and user convenience. These blocks may be saved, moved, copied, or deleted. Speed of the process is, of course dependent on the size of the block being manipulated. The same caveat applies to search and replace operations.

Even though Easy Script allows creation of a healthy size document, it also allows easy file linking. Chain documents together to your heart's content, or until you run out of paper. The program also has mail merge capabilities for creation of "personalized" mass mailings. (I often use the latter function, without problem).

A spell checker, Easy Spell, is available. Unlike others, the 64 does not have to be rebooted to load it. Easy Script loads Easy Spell, meaning you can directly access the word processor after the spell check operation is completed. Easy Spell supports dual disk drives, provides hard copy or video reports on the total number of words, number of unique words, number of paragraphs, and the average word length. Unrecognized words are then pumped out, complete with a tally. Each word in the document can be listed (and printed) along with its number of occurrences. This is a great feature for style editing and revision. The 20,000 word dictionary disk has room for additional entries, approximately 12,000 by my reckoning. Alternate dictionaries are available, all can be edited to provide maximum effectiveness. Options include the ability to correct misspelled words, add new words to the dictionary, ignore unrecognized (but correctly spelled) words, learn new, correctly spelled words temporarily, and save the edited file to disk. Function keys are used exclusively to direct the action.

Both Easy Script and Easy Spell are less flexible printerwise than the rest of the programs in the heavyweight category. Most of the current printers weren't around when these programs were written. Naturally they work with Commodore units, Epson and Diablo. Others, including RS232 printers are also supported.

The list of features mentioned does not come close to exhausting the program's resources. There are nuances which come into play only after all the basics have been mastered.

WORDPRO 64

Another heavyweight wordprocessor is the

evolutionary WordPro 64 from Pro-Line Software. This wordprocessor has been continually upgraded since its original release for the Commodore PET computer, back in 1978.

The slim user's manual is chock full of information on text entry and manipulation, operating the program with non-1541 disk drives, the output specifications of the various printer drivers, and clear explanations of the advanced functions. The manual includes a brief tutorial to familiarize users with the sample letter on the program disk. What the package does not have is a detachable reference card. The commands are summarized in Appendix C, but that is not enough.

Like the other high powered word processors, WordPro 64 makes extensive use of the Commodore logo key (in conjunction with other keys) to drive the program. WP 64 is command oriented, not menu driven. Once familiar with WP 64, users can speed up some of the operations by using the Function keys. For example, F3 accesses the disk directory function, F7 performs data recall and insertion, F4 performs data merge duties by filling variable blocks with data. These operations are normally performed by a more complicated, though not confusing, series of keystrokes relying on the Commodore logo key.

With WordPro 64 the first step is to save your system's configurations to the disk. Choose from a multitude of printer drivers, use the default ASCII setting, or, for the advanced user with an unusual printer, send for information and assembly language source code to write your own. Screen colors and disk drive setups (one to four devices) can also be entered as a disk file for immediate access upon subsequent starts.

Direct disk commands include formatting disks, scratching files, renaming files, initializing and validating and reading the error channel. However, there is no open channel to DOS; therefore only pre-programmed commands can be sent.

All the basic text editing and cursor movement features are available. Text manipulation is available as copy, move, local and global search and replace functions. A simple hunt option is useful when merely trying to locate a word. Boldfacing, underlining, setting graphic tabs, super and subscripts, as well as special screen characters can be produced with just two keystrokes. WordPro is as foolproof as a one car funeral procession.

You have complete control over headers, footers, margins, justification, alignment (vertical positioning too) and spacing. Headers and footers can be printed on alternate pages, an ideal avenue for producing professional quality hard copy.

Though text entry and editing are limited to the 40 column mode, output can be viewed on-screen up to 160 columns. At this width actual characters are not displayed. A graphic representation of the document's flow is the best you can hope for. Like other programs which use this type of display, the output needs a fair amount of interpretation to be useful.

One of the most unusual, and powerful features of WordPro 64 is its pre-arranged ability to produce double sided hard copies. Page 39 of the user's manual describes an easy method to print on both sides of your paper. The program can output all odd or all even pages. Then you go through the same procedure again, merely reversing the odd or even output status.

A warm start (restart) is available. Linking files is near effortless, and there's even a case sensitive search option. Full form letter/data merge capability is included. Another tremendous feature is the double column output. Instead of listing the details, let's say the procedure has 5 straightforward steps. Multi-column work with numerical data, flyers and newsletters loses its nightmare status.

There is a lot more to WordPro 64, but I think you get the picture. And I haven't even told you about the excellent spell checker (sold separately). Like other spell checkers, SpellPro 64 has all the standard features. In addition, its dictionary can include over 40,000 entries. Character, background and border colors may be altered to suit individual tastes; the dictionary can be edited or printed. In use it is fast and reliable. These two make a formidable team.

FLEET SYSTEM 2

Professional Software has a Commodore 64 word processor that's tough to beat. It appears as if they studied all the good products in the marketplace before bringing Fleet System 2 to market.

A quick overview of the advanced features

will give you an inkling of the power residing on both sides of the program disk (program on one side, dictionary on the other).

Text entry and editing can be done in 40, 80 or 120 column (horizontally scrolling) modes. Those who like a moving text window can now have it their way. An 80 column preview mode, without additional hardware, provides a reasonable "what you see it what you get" capability.

A buffer holds commonly used words, phrases and even complete paragraphs for easy recall and insertion. Math functions (addition and subtraction) are built into the columnar capabilities; word count is an integral function, as is the 70,000 word spell checker. You don't even have to exit the text entry and editing mode to perform the spell checking. Like Easy Spell, the checker also provides data on the number of sentences, number of occurrences per unique word, the average number of words per sentence and the average number of sentences per paragraph. Thousands of new words can be added, the dictionary can be edited and its data sent to a printer for non-electronic review.

As I said, Professional looked at the other advanced word processors and noted that most of them lack a pullout quick reference card. Fleet System 2 has one, a very good one. All function, format and output commands are included, as well as general commands such as file access and hard copy output.

FS2 makes use of F1 in conjunction with other keys unlike WordPro 64, which uses the Commodore logo key. So much for the fine points of product differentiation. Actually there are functional differences between the two. Size of the spell checking dictionaries, the paragraph manipulation capabilities of FS2 (division and concatenation), and a global copy feature all add up to enhanced versatility.

Fleet System 2 provides numerous features and incredible power at a low price point. Everything functioned as described, no problems occurred throughout the entire review session. Another winner.

SUPERSCRIPT

Precision Software has released a title which goes far beyond the capabilities of their Easy Script program. Unlike its predecessor, Superscript is not marketed by Commodore, but by Progressive Peripherals & Software. Precision recently closed its US offices, arranging for PP&S to handle sales and support. You can still feel good about buying Superscript because PP & S is a solid, reliable company.

Superscript not only begins where Easy Script left off, but it even reads Easy Script files. Now you can have a state of the art (1986) WP that's compatible with all your files. This is more than a mere upgrade to ES, it's a complete rewrite with an eye towards the large installed base of ES users.

Compatability is limited to files however, as Easy Spell, the Easy Script spell checker, does not work with Superscript. Though this sounds like bad news, it's not. Precision thoughtfully included a user maintainable 30,000 word spell checker on the program disk. You merely make a working copy for actual operation.

Superscript is, without a doubt, the most extensively documented Commodore 64 word processor. The wirebound user's manual gets very high marks for its tutorial and reference sections, but falls short in one area - lack of a separate reference card.

While the printer driver selection is not as diverse as those found in other heavyweights, SS accomodates every "industry standard". Commodore, Epson, NEC Spinwriter, Diablo, Qume and Juki are pre-set. Unusual printers can be used by redefining the existing drivers. Instructions are included!

SS has a tremendous edge over all the other programs reviewed in this article. Novices can access every nuance of Superscript by flipping through menu after menu, activating selections along the way by merely hitting RETURN. Beginners or experienced users can also access the functions by pressing the first (unique) letter of each command in the menu bar after hitting F1. You are not limited to searching through multiple layers of menus to get the job done. Experienced or power users can press the CTRL key in conjunction with others, or the Function keys to activate the same, vast series of options. Such attention to the needs of end users is almost unparalleled in 64 software. SS demonstrates that it's ready to grow along with you.

Because of the superb command structure you can literally use every aspect of SS without referring to the manual. Not many programs can live up to that boast. An on-screen tab/status line identifies the current activity as well as identifying the function of highlighted,

but not selected, choices. The line also displays tab settings when it's not busy playing functional tour guide.

SS provides multi-line headers and footers, permits file linking, variable insertion and mail merge. Flexible search/replace and exchange functions are included along with a veritable host of cursor movement and text erasure commands. The latter two are among the best available. Area commands allow fast and foolproof block (range) moves, copies, deletions, repetitions and case changes. Print commands are just as diverse, allowing you to designate starting point, pauses, output of odd or even pages (for double sided printing) and more. Layout commands include all the basics plus complete header and footer manipulation, including, but not limited to, creation and output of alternates.

An internal calculator handles addition, subtraction, multiplication and division within tables, lines or columns. Percentages and chained calculations are a snap.

Super and subscripts, underlining, boldfacing, shadow, enhanced and condensed printing are integral. Other print commands can be designated at will.

If all this seems overwhelming, there is in-depth, on-screen HELP available with just a few keystrokes.

I cannot say enough about Superscript. The program is powerful, flexible, easy to use, and, as far as I can tell, bug free. Even the spell checker worked without problem, providing much the same information as Easy Spell.

POCKET WRITER 64

Just when you thought it was safe to choose, along comes another unique WP. Digital Solutions, Inc. has an impressive entry titled Pocket Writer 64. (Formerly Paperback Writer).

A slim user's manual provides adequate, but not comprehensive information. For that you must rely on the two-tiered HELP function. Press F7 once to avail yourself of summary information concerning specific operations; another keystroke performs a disk access for detailed information on the same subject.

Extensive color change capabilities are included, as well as the basic text manipulation (insert, delete, reformat layout, etc.) and cursor movement features.

Ranges can be defined for move, copy and delete operations. Within this function, lists can be sorted and numbers summed.

Fundamental disk commands like formatting and validating are included along with scratching and renaming files. File types, program or sequential, can be altered. Files can be linked or merged, variables can be inserted where specified.

Text formatting commands range from margin setting and release, centering, alignment, and spacing to headers, footers, printer offset and forced pages. However, it is not as strong in the cursor control and text formatting areas as some of the other programs.

With Pocket Writer 64 the real fun begins when you select either 40 or 80 column text entry and editing mode. The 80 column mode is, without a doubt, the finest 80 column display I've seen without requiring additional hardware. My 1702 monitor never looked so good!

All the advanced programs offer integral underlining, boldfacing, etc. PW 64 is no exception, though it offers these features in a rather unique manner. Once your text has been edited, enter the commands for desired effects (superscripts, subscripts, italics, boldfacing and underlining) and then check out the screen.

Underlining appears on-screen! Boldfaced text turns white, superscripts yellow, subscripts green, etc. It's simply amazing. Pocket Writer 64 is the finest Commodore 64 example of "What You See Is What You Get."

Though it is flexible and relatively powerful, it is lacking some of the really advanced features. The exceptional screen display, on-screen help, and ease of operation are Pocket Writer's strong points.

BANK STREET WRITER

Broderbund's Bank Street Writer has been available for some months in an enhanced and updated version. This latest version provides additional functionality at a price most users can afford.

Completely compatible with files created by the original BS Writer, the upgrade's features include a Help screen, forced page and copy commands, the ability to pre-define and use up to 16 hard copy format commands, and on-screen display of the (carriage) RETURN symbol for easy identification of paragraph endings.

Multiple copy output is now possible without having to run through the entire output setup sequence. Of even more value are the ability to append files while accessing the disk and the increased cursor movement flexibility.

Besides the word processing application, the program disk (and the bundled backup) includes a five item tutorial and a utility routine for changing default parameters.

The tutorial is the only routine which continually accesses the disk. Its five lessons cover topics ranging from text entry and cursor movement to command options like erase, unerase, move, moveback, find and replace.

These lessons are constructed to provide general BS Writer information while covering the specific topic selected. Sample exercises make certain you understand exactly how to use each function.

Combined with the concise Help screen, it is entirely possible to operate BS Writer without opening the user's manual once. I recommend you use it though, if for nothing more than its comprehensive reference data.

The utility program allows you to set new default parameters for screen colors, disk drive and printer numbers, the number of lines per page, margin settings, headers and auto pagination. Form and line feed generation, carriage return display and audible keyclicks are additional setup values which can be altered at will.

Memory and disk space available checks let you know how many words you are limited to. Approximately 12 double spaced pages of text max the memory capacity after BS Writer is loaded.

One of the more unusual, though potentially useful features is the file level password protection capability. Every time you save text to disk, you can enter a password to prevent file access by unauthorized personnel. (In case you forget passwords, there is a program option which reveals all passwords, on a disk by disk basis).

Besides the easy to use copy, move, moveback and erase features, the unerase option provides a quick way to restore mistakenly deleted text. The find command is case sensitive; that is, a search for "Ready" will not find "ready".

In addition to the standard cursor keys, advanced cursor movement is possible through combinations of the COMMODORE key and B(eginning of text), E(nd of text), U(p less than a screenful) and D(own less than a screenful).

Pre-set indent parameters, which affect entire paragraphs, are limited to 8, 16, 24 and 32 spaces. The text entry screen does not provide cursor location information, nor is it possible to set tabs.

On a more positive note, step by step prompts inform you about the currently selected activity, its status, and the next step (if applicable). Options which delete text from memory or disks have fail safe prompts which force you to make a second response before the destructive action can be carried out.

Bank Street Writer, in its newest incarnation, lives up to the reputation of its illustrious predecessor. In fact, it should earn more than a few laurels of its own.

Related to BS Writer is an entirely different program from Broderbund, Bank Street Mailer. The similarities between the two programs are many, including a tutorial and the parameter changing utility routines.

Other similarities range from screen design, the Help screen, and a virtually identical menu interface to move, copy, centering, headers, and new page commands. The advanced cursor movements and pre-set, user definable printer format commands are exact copies. Lack of a tab function is the only undesirable similarity.

Unlike its older sibling, BS Mailer works on the letter level, not files or documents. Passwords can still be applied whenever text is saved to disk. The letter and/or data file currently being worked on is identified on-screen.

Bank Street Mailer does not have Writer's draft print option, not its unerase, find, moveback, erase or replace functions.

On a more positive note, it does have advantages especially designed to facilitate mass mailings, form letters, creation of mailing labels and envelope addressing.

Multiple, pre-definable openings and closings make it possible to quickly tailor letters to specific audiences. Complete rewrites have become a thing of the past.

The special mail merge/database functions are accessible by hitting the RETURN key when the desired selection is highlighted. Options include data file selection, data merge/print, and the ability to dump the entire mailing list for review.

The database portion of BS Mailer is beyond the scope of this article. Suffice it to say that

the entire package works in a straightforward, uncomplicated manner, providing a good return for your money.

We did not have a copy of Bank Street Speller kicking around at the time this article was written. Built around a 31,000 word dictionary, BS Speller highlights incorrect or unknown words. The program suggests as correct spellings of doubtful words. You can either correct the offending word or add it to the data disk, thereby customizing the dictionary to meet your exact needs.

Broderbund, 17 Paul Dr., San Rafael CA 94903, 415/479-1185

Commodore Microcomputers, 1200 Wilson Dr., West Chester PA 19380, 215/431-9100

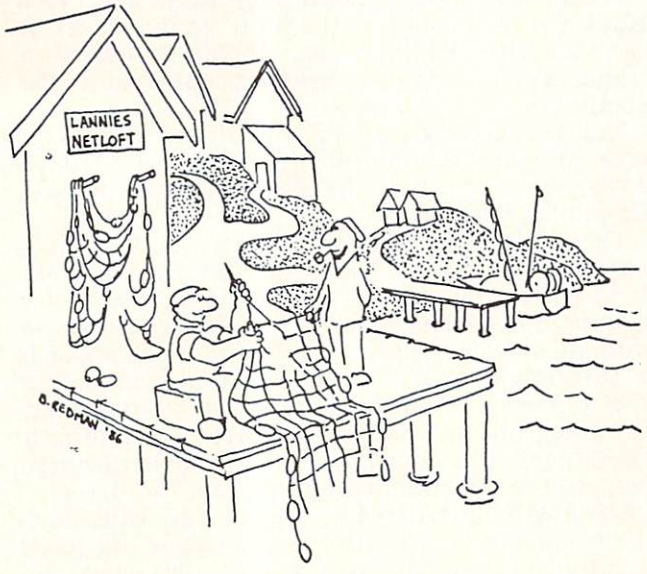
Digital Solutions, PO Box 345 Station A, Richmond Hill ON Can L4B 1B9, 416/731-8775

Progressive Peripherals, 464 Kalamath St., Denver CO 80204, 303/825-4144

Professional Software, 51 Fremont St., Needham MA 02194, 617/444-5224

Pro-Line, 755 The Queensway East, Unit 9, Mississauga ON L4Y 4C5, 416/273-6350

Timeworks, 4444 Lake Cook Rd., Deerfield IL 60015, 312/948-9200



LOCAL AREA NETWORKS

DOS 5.1-The Wedge

The DOS Wedge is on the demo disk included with every 1541 and 1571 disk drive. If you have not yet discovered the wedge, get out the Commodore DOS Ergcard from issue #9 and study the commands. It really is the only easy way to use Commodore disk drives from C64 BASIC.

There are a couple of surprising things that DOS 5.1 can do that often escape people. One is that you can use DOS commands in BASIC programs. Just use quotes around any command strings involved. For example, you can format a disk by typing **@N0:DISKNAME,ID** in immediate mode, but to do the same thing under program control you would need to use **@"N0:DISKNAME,ID"**.

You can get a disk directory using the wedge without destroying a program in memory by typing @$. Of course, in a program you would use quotes around the dollar sign, like this: @"$". The directory command can also be used to select only certain file types from the disk. For example, to get a list of only program files, use **@"$0:*=P"**. Substitute S for sequential files, R for relative files, and U for user files.

You can also use the wedge to save files with a one-digit **version number**, a fact not often documented. Just use this format: **←NAME[n]** where n=0 to 9. The filename will appear in the directory as "NAME n", with the version number right-justified in the fieldname. This is an especially nice feature when you are programming, to save the last several modifications of your program.

COLOR CONTROL

If you're not satisfied with your screen colors (and who is?), a couple of quick POKEs will change them to your liking. Location 53280 controls the border color, 53281 the screen background color, and 646 the current print color. All use values between 0 and 15. This one-liner demonstrates how to use the POKEs, and also gives you a nice color-bar display so you can adjust your TV or monitor.

10POKE53280,0:POKE53281,0:FORX=0TO15:POKE646,X:FORY=0TO39:PRINT"[RVS][space]";:NEXTY,X

The [RVS] means to type CONTROL/9, and of course [space] means a space.

SCROLLWRAP ANIMATION

There are Kernal ROM routines for all kinds of fancy stuff that aren't even used to full advantage by the Commodore 64's operating system. All you generally need to know to use these routines in your own BASIC programs is a PEEK or POKE or two and the proper address to SYS to. You don't have to know any machine language. The C64 knows machine language. The screen scrolling routines are a case in point.

Normally your C64 just uses the scrolling routines to scroll the screen up a line at a time as it frees up space on the last line of the screen for new output. Nice, but basically boring. The Kernal routines involved in scrolling the screen are actually capable of moving any line to any other position on the screen. This short BASIC routine will take whatever is on the screen and scroll it with full vertical wraparound. That is, when the top line scrolls off the screen, it will scroll back onto the bottom. All but the bottom screen line will move. (It will be blanked, so you can just as well leave it blank to begin with...) You can use this routine to develop some amazing moving backgrounds for simple BASIC games using sprite players.

To use this routine, simply PRINT or POKE your background to the screen followed by what we have indicated as line number 80, then GOSUB to the subroutine in line 100 every time you want the screen to scroll a line, as our demo in line 90 does. LIST this routine to the screen and RUN it for a quick demo.

```
 80 FORX=217TO242:POKEX,PEEK(X)
    OR128:NEXT
 90 FORX=0TO23:GOSUB100:NEXTX
 99 END
100 POKE781,24:SYS59888:POKE172,PEEK
    (60656):POKE780,PEEK(217):SYS59848
110 SYS59626:RETURN
```

Of course, this subroutine can be placed at any line number you want. For those who are interested, line 80 resets the screen line link tables, line 100 does the dirty work of copying the top screen line to the bottom screen line via the Kernal routines, and line 110 calls a Kernal routine that simply scrolls the screen up one line.

FSD-1 DISK DRIVE

If you buy anything but a 1541 for your first C64 disk drive you may be in trouble. Some commercial software is so heavily copy protected that it will not load and run on anything but a 100% kosher, late-ROM-revision, 1541 disk drive. Some folks do, indeed, run into problems with their older 1541 drives not being able to load the latest and greatest games. Even Commodore's own 1571 drive will not load some C64 DOS-protected programs. (**Golden Oldies** from Electronic Arts is one example.)

There are two solutions to this problem. One is not to buy any DOS-protected software. Many users feel very strongly about this and absolutely refuse to purchase any protected software, no matter how good the program might be.

The second solution is to somehow bust the program's copy protection, either by making a copy with a memory snapshotter (see Copy Corner in this issue) or with a parameter copier. Copies made in either manner will load in from any disk drive.

Another potential problem if you purchase a third-party drive as your one-and-only drive involves software which expects ROM and RAM locations to be exactly as they are in the 1541. Most of the programs that use these locations are sophisticated copy programs. **Fast Hack'Em** is probably the best example, as it can actually program two drives to act as a stand-alone copier independent of the computer.

Having delivered all the warnings, let's take a look at what is undoubtedly the most faithful 1541 clone to date: the FSD-1 from Emerald Computer Systems.

The FSD-1 is about an inch and a half narrower and a half inch shorter than a 1541. It is enclosed in an off-white metal case (color matched to the new 64C) and incorporates an integral power supply. The drive mechanism is a full-height 5 1/4" unit. On the front are a green power led and a red drive activity led. On the back are two serial port connectors, a fuseholder, the power switch, and a hard-wired power cord (it doesn't unplug from the drive).

Physically, the drive is sturdy and runs cool. It's smaller size fits into your average cluttered desktop more easily than a 1541. We wish the

power switch were on the front, but here they've followed tradition rather than logic. Two dip switches let you easily change the device number of the FSD-1 to any number from 8 to 11. They are rather inconveniently mounted on the bottom of the drive case, but at least you don't have to open the case to get to them.

This is the most 1541-compatible third-party drive we've seen to date. Though we are sure that it would be possible to throw it a curve, none of the software we tested on the FSD-1 failed to load and run properly, including **Borrowed Time**, **Golden Oldies**, and **Fast Hack'Em**. You are taking less of a chance buying this drive as your first drive than you would be if you purchased an MSD, an Indus GT, or even a 1571. As a second drive, the FSD-1 is an excellent value. It's direct sales price is $139.00, $10 less than the best price we've seen on reconditioned surplus 1541s.

FSD-1, $139.99 from: ECI, 541 Willamette St., Eugene OR 97401, 503/683-1154.

GEOS

Unless you've been living under a rock you've already heard of **GEOS**, the graphic operating system for the Commodore 64 from Berkeley Softworks. (For the information of all you rockdwellers, GEOS performs many of the same functions for the 64 that Intuition and Workbench do for the Amiga.) The GEOS disk contains an icon-and-joystick operating system called the **deskTop**, a paint program called **geoPaint**, and a multifont wordprocessor called **geoWrite**. All feature a common user interface, so if you can use one you can use the rest. If you own a Commodore 64 already, you can pick up GEOS for about $60.00. If you buy a new 64C you'll find GEOS included in the box.

DESKTOP

The GEOS deskTop strongly resembles the desktop environments of the Macintosh, ST, and Amiga. It performs similar functions, too. The screen displays a disk icon (or two, if you have two drives) in the upper right of the screen. Use your joystick to point a little sprite arrow at the disk and click on the joystick button once, and a screen window opens up in the middle of the screen with icons representing the files on the disk. (One disk at a time; GEOS is a single-window system.) Point at a file icon and *double-click* the button and the program file will load and run. This user interface is so familiar to anyone who has already used an icon-and-mouse based operating system as to be totally second nature. In almost all operations, GEOS functions exactly as an experienced mouseketeer would expect it to. The only thing he might have trouble getting used to is using a joystick instead of a mouse. Berkeley opted for a joystick for GEOS because they figured that most C64 owners already had one. The input driver is user-selectable from a pull-down menu, and though there is only the joystick driver for now, Berkeley says that mouse, trackball, and maybe even graphics pad drivers are a definite possibility for the future.

GEOS performs all system operations from the deskTop. Pull-down menus let you select the proper printer driver from a good selection on the system disk. A preference manager application is accessible from the same menu. This pops up a window with controls for colors, pointer speed and acceleration, time and date, and even a pointer shape editor. Other menus give you access to disk and file information; you can change a file's name and copy protection status, change the diskname, check disk and file info, etc.

Copying files is accomplished in the same manner as in other icon-based operating systems. With two drives you merely drag the disk icon from the window to the icon representing the disk you want it copied to. Single drive copying is not much more complicated, though it does, of course, involve some disk swapping.

Printing geoWrite and geoPaint documents is a simple matter of dragging the file icon to the printer icon. Deleting files involves dragging them over to the wastebasket.

An alarm clock, notepad, and calculator are at your beck and call from within any GEOS application. You just select them from a menu and they pop up, you use them, and when you click them off they disappear and you are right back where you left off from. Very handy. My only complaint is that you cannot

print notepad notes or send them to geoWrite for enhancement. They are for on-screen use only.

The GEOS user interface looks nice and it works well, but I find the joystick more of a bother than a mouse would be.

The major drawback to GEOS as an operating system is that almost everything you do requires a disk access. GEOS operates using a technique called *overlays*. When you call a new application, whatever you are working on gets a section cut out of it and saved to disk. The new application is loaded into the space left behind. When you close that, the slice that was saved previously is loaded back in and you pick up where you left off. Even though GEOS includes a built-in turboloader for the 1541, the disk delays require more than a little patience.

After dealing with the delays for some time, I've decided that at least some of the aggrevation factor of GEOS comes from having used similar interfaces on 68000 systems, including the Amiga. In all fairness, there is just no way for the C64 to compete with these machines. That's what led me to speculate early on that Berkeley might have tried to do too much with GEOS; that the C64 wasn't up to what they wanted it to do.

But after many days of using GEOS, trying out all of its capabilities, stumbling onto its few bugs, wringing out of it all I can get, I've got to admit I'm impressed. *Considering the limitations of the Commodore 64*, they did a great job. The waits are no worse than they would be in, say, a modular accounting program, or in most CP/M applications. Anyone who has used CP/M knows that everything you do under that operating system requires a disk access. But if you are running the right software, it's worth it.

Is GEOS worth it? Well, if all you are going to be doing is copying files and such, there are better and faster ways to do it. If you already know how use Commodore DOS commands and a commercial fastcopy program, you probably won't want to switch. But a lot more people will *be able to* copy files and perform other similar system tasks under GEOS, because it is so easy to do, and that may be what makes it worthwhile. If it gets somebody to sit down at a computer who was scared to death of them before, I'm for it.

And, too, there is the GEOS interface, the part of the software that hides under everything else and runs the menus and the joystick pointer and the file handling. It is the underlayment beneath all GEOS applications, and this is the code that Berkeley and Commodore are hoping that software developers will hook into. With a common operating system, applications could chain to one another, use each other's graphics and text data, and it would just generally make life easier for everybody. Half the problems with graphics on the C64 to date have been bacause graphics formats are incompatible between programs. Some commercial software companies have demonstrated a similar concept by producing a line of software with a common user interface. Anybody who has used one Timeworks product or a Pocket series program from Digital Solutions knows that he can sit down at another program in the line and run it without looking at the manual because they all use similar commands and menus.

Will GEOS catch on with third-party developers? It's hard to say. Such decisions are usually based on economics, so a lot depends on how many GEOS systems are out there. As near as we can tell with our informal phone surveys, nobody has jumped on the bandwagon yet. In the meantime, let's take a look at Berkeley's own paint and wordprocessing programs.

GEOPAINT

GeoPaint is a hi-res color drawing program (most are either lo-res color *or* **hi-res monochrome: Doodle!** is the major exception). It lets you draw on a virtual screen the size of a regular sheet of printer paper. Your window into this 8.5"x11" world is an area roughly equivalent to 2.5" high by 4" wide on the finished page, so eight windows cover the page. Your drawing tools are all selected from an on-screen vertical menu bar. Some options are on drop-down menus. An alternate menu bar across the bottom of the screen changes with the drawing tool selected. GeoPaint gives you point-to-point line drawing, freehand drawing, pattern fills, and automatic rectangle and circle drawing. You can draw with a single-pixel point or paint with one of 14 brushes dipped into any of the color/fill pattern combinations. You can also type text onto the screen in any of the GEOS fonts. A flexible COPY box lets you copy or move objects, complete with optional inversion, rotation in 90 degree increments, and mirroring. You can also copy rectangular screen areas to the GEOS disk, where they can be transferred to a "photo

scrapbook" for use later.

Like most of the rest of GEOS, all the drawing options required a disk load, though none was insufferably long except sidescrolling the screen, which has to load in the picture information as it goes. All the drawing functions were implemented well, and many are unique to GEOS. I was especially impressed by the text functions, which let you type in any of the available fonts into a window which can be resized and moved wherever you want it. As you resize, it *reformats the text* to stay in the window. It's really impressive. The paint option has you painting on a grid (like **Doodle!**--it's the only way to do it on the C64 if you want hi-res color), which will entail some planning on your part if you want full color drawings. I advise you to draw in black and white and fill in color later, moving objects to appropriate positions as needed. For printer dumps you probably won't need the color at all. Paint lets you change only the foreground, only the background, or both colors at the same time. Nice feature.

The printer dumps on our venerable Gemini Delta 10, using both the Epson MX-80 driver and the Commodore compatible driver with the interface switched to emulate mode, were shy of about 1/4 of the right side of the document. Images were just cut off in midline. The GEOS manual says you need 80 dpi capability for the printer driver to work and the Gemini normally operates at 60 dpi, so I guess that explains it. The folks at Berkeley say you definitely have to use an 80 dpi printer to get a full dump. Otherwise you are limited to printing only the leftmost 3/4 of the virtual screen. This limitation hits you with all GEOS screendumps, so make sure that your printer is compatible if you plan on making hardcopies with GEOS.

GeoPaint is definitely the best of GEOS. It will let you compose **Newsroom**-like pages with less effort than that program requires, though it takes longer than single-screen graphics programs. If you want to mix hires graphics and multiple fonts and be able to work on an entire page at a time, geoPaint is a powerful tool.

GEOWRITE

GeoWrite is a multiple-font wordprocessing program with a minimum of additional features. It lets you set tabs and margins like a typewriter, limiting you to one set of margins for the entire document. You can set page breaks manually, though it will not do them for you. You can cut and paste sections of text using the joystick pointer and the pull-down menus. You can also save text clippings to the "text scrapbook" for later use. You can at any time select a section of text and perform "font magic" on it, redefining the font style and size, underline, boldface, outline, and italic features for that section of text. GeoWrite is the ultimate in "what-you-see-is-what-you-get" wordprocessing, since all fonts and styles appear onscreen just as they will on paper. It is very similar to some of the plain vanilla wordprocessing programs for the Amiga.

One real disappointment of geoWrite is in how it handles pictures pasted into the document. The document is split at the point of insertion, placing the picture centered between the sections of text. You cannot insert a picture so that text appears in the same line as the illustration, no matter how small the illustration is. You just get lots of white space on both sides of the picture. If you want text with a picture, you must enter it into the picture in geoPaint before you clip it for insertion into the document. It will require a lot of careful planning to successfully integrate illustrations into geoWrite documents. If you need to mix a lot of text and graphics, geoPaint will be your tool of choice. If you want reformattable and flexible fonts and typestyles, pick geoWrite.

THE SCRAPBOOK MANAGERS

The text and photo scrapbooks are used when you want to move more than a single text or art clipping to another GEOS text or picture document. The procedure for building and using scrapbooks is tedius. To put one together you have to cut the text or picture you want, call up the scrapbook manager, transfer the picture to the scrapbook, close the scrapbook manager, and repeat the process for the next scrap. A lot of disk time is involved. Picking a scrap out of a scrapbook to use in geoPaint or geoWrite involves the whole tedius process in reverse *plus* having to scan manually through all the clips in the scrapbook until you find the one you want. They are not named, so you can't just pick one from a list. It's too bad that this process could not be more automated.

CONCLUSIONS

I was all set to not like GEOS, but the more I used it the more I mellowed in my opinion. It *is* fun to use, and Berkeley really thought it through, planned it out, and did a nice job on it. So I'm hedging my bet.

It is not the saviour of the C64. Whether or not it catches on and gets a lot of third party and end user support, only time will tell. I'm willing to give it a chance to try.

It is an especially nice operating system for novices and computerphobes, but it will probably not replace the C64's normal BASIC operating system for most of us. GeoWrite is okay, and geoPaint is an excellent program, and they are themselves worth the price of GEOS, though you will exercise your disk-access patience using them.

And, finally, GEOS is copy protected. You can bust it with the latest wave of copiers, but the most you can do with the GEOS copy utility is make a crippled backup, the purpose of which is to try and resurrect your master disk if it should ever go belly up. It is a major mistake to have anything as important as your operating system on a single copy-protected disk. If it goes, your whole system is useless.

If you approach GEOS with your eyes open, I think you'll be happy with it. If you expect a religious experience, you will probably be disappointed.

$59.95 from: Berkeley Softworks, 2150 Shattuck Ave., Berkeley CA 94704, 415/644-0883.

SUPER GEOS

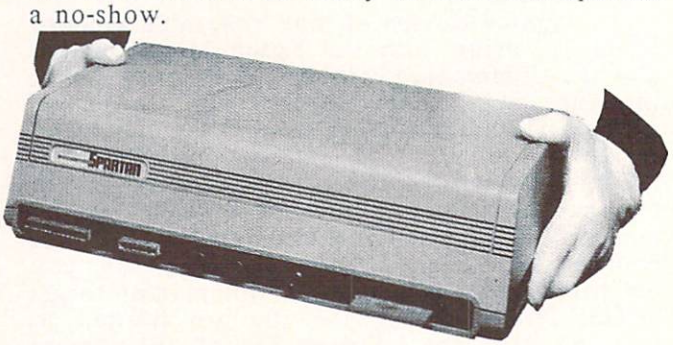
The developers of GEOS are themselves now using preproduction models of both the Commodore mouse and the memory expansion unit. These in-house versions of GEOS use the expander as a RAMdisk, and that's where they keep the GEOS modules. The improvement in speed is remarkable. They say it makes the C64 a whole new machine. I saw a 64C system with this configuration running at the CES show in June, and I've got to agree: with a $350 RAM expander and a $50 mouse, it *is* a whole new machine. Berkeley says they hope that Commodore will be pricing a 256K RAM expander for $100. At those prices, the RAMdisk GEOS would make a nice system. But until then, GEOS running with expansion RAM is just too expensive to even think about.

the SPARTAN Apple II+ Emulator

by Mark R. Brown
Technical Editor

AN HISTORICAL PERSPECTIVE

In issue #2 of INFO (Winter 83/84), we announced the imminent release of an amazing new hardware product: The **AP Modular Pak** Apple][+ emulator from Pioneer Software. The announced retail price was $600. Over the next couple of years, we followed the snail-like progress of this device to market. We gave up on it many times. In issue #5 we reported that a new company called Mimic Systems had been formed to bring the long-awaited Apple emulator to market, and that it was now named the **Spartan**. We were promised a unit for review by issue #6. Mimic started advertising heavily in national computer magazines. And still the Spartan never came. We were more than ready to label the Spartan a no-show.



Imagine our surprise when we began to get reports that people had actually seen *stacks* of Spartans at the San Francisco Commodore Show last winter! A call to Mimic Systems confirmed that they were indeed shipping the Spartan, and that we would receive a review unit soon. It finally came the end of June (after a wait of almost three years), just as our last issue was ready to go to the printer.

But we *do* now have a Spartan, and it *does* really emulate an Apple][+.

THE HARDWARE

How Mimic managed to put a retail price of only $300 (only *half* what it was supposed to sell for originally) on the Spartan is unbelievable. You get at least $300 worth of parts in the thing. It consists of three heavily-

(continued on page 56)

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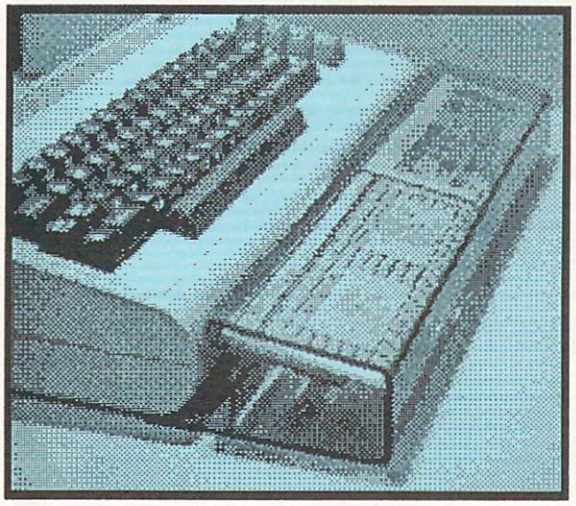

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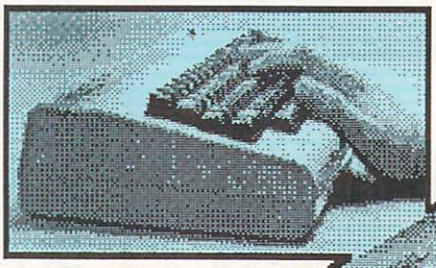

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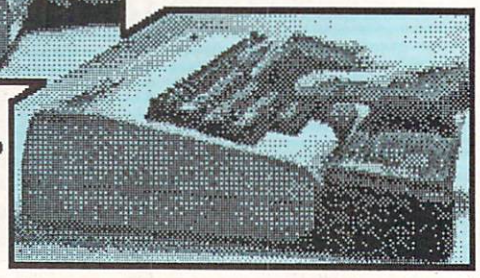
THE SOLUTION → (AHHH!)



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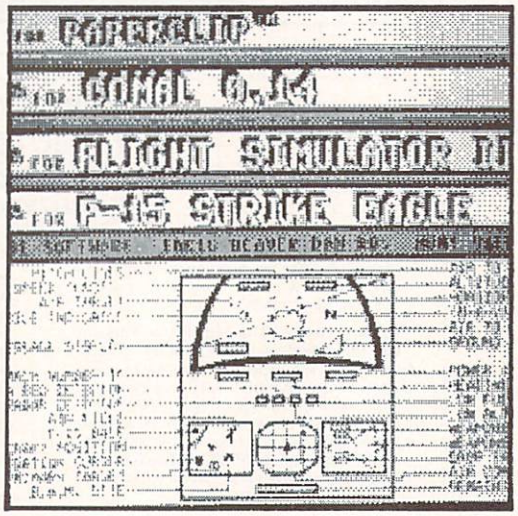

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MONTHLY DISPLAY

ESC	Return To Main Menu
+	Next Month
-	Previous Month
TAB	Forward Six Months
SHIFT/TAB	Backward Six Months
F1	Disk Directory
F3	Load Calendar
F5	Save Calendar
F7	Print Calendar
C	Monthly
D	Daily
W	Weekly
M	Marked Days

DAILY DISPLAY

ESC	Return To Monthly Display
HOME	Top Of Display
TAB	Next Window
SHIFT/TAB	Previous Window
LEFT-ARROW	Delete By Backspace
DEL	Delete Character
C=/F1	Insert A Line
C=/F3	Delete A Line
F1	Pull Previous Day To Today
C=/C	Clear Display

ADDRESS/PHONE LIST

ESC	Return To Main Menu
C=/F1	Insert Record
C=/F3	Delete Record
F1	Disk Directory
F1	Advance
RETURN	Load File
F2	Search
F3	Load File
F4	Sort By Field w/Cursor
F5	Save File
F6	Auto-Dial Phone
SPACEBAR	Talk
F7	Print
A	Addresses
L	Labels
P	Phone List

MEMO PAD

ESC	Return To Main Menu
HOME	Top Of Text
CLR	Bottom Of Text
TAB	Tab Five Spaces
SHIFT/TAB	Tab Five Spaces Back
LEFT-ARROW	Delete By Backspace
DEL	Delete Character
INST	Insert A Space
C=/F1	Insert A Line
C=/F3	Delete A Line
C=/F	Format Text
C=/C	Clear Workspace
^	Protect Text From Reformatting

F1	Disk Directory
F1	Advance
RETURN	Load File
F2	Search Forward/Continue Search
F3	Load File
$	Directory
C=/F	Display Full Directory
F4	Toggle Typewriter Mode
F5	Save File
F7	Print Memo

Button	Call Partner
CTRL Button	Call Partner w/cord in port one
C= Button	Clear Partner Memory
from BASIC:	STOP-RESTORE Disables Fastload

MAIN MENU

ESC	Return to Application
C=/D	Disable Fastload (Permanent)
C=/G	Toggle Character Set
C=/O	Close Open Application Files
C=/DEL	Toggle Delete Left/Under Cursor
C=/L	Load Partner Utility
C=/R	Run Partner Utility
C=/5	Alternate Screen Print
C=/Q	Quit Main Application

CALCULATOR

ESC	Return To Main Menu
+-/*	Arithmetic Operators
^	Raise To Power
=	Calculate Result
:	Change Sign
C	Clear Calculator
E	Clear Display
M	Store Display to Memory
R	Recall Memory
F7	Toggle Paper Tape
SPACEBAR	Advance Paper

ERG-CARD™ FOR USE WITH COMMODORE ASCII & SCREEN CODES

Up Lo	Scr	ASC	Up Lo	Scr	ASC	Up Lo	Scr	ASC	Up Lo	Scr	ASC	Up Lo	Scr	ASC	Up Lo	Scr	ASC	Up Lo	Scr	ASC	Up Lo	Scr	ASC
	@	0	Lowercase	14	Red		28	*	42	42	8	56	56	F f	6	70	T t	20	84	B	66	98
	A	1		15	Right		29	+	43	43	9	57	57	G g	7	71	U u	21	85	C	67	99
	B	2		16	Green		30	,	44	44	:	58	58	H h	8	72	V v	22	86	D	68	100
	C	3	Down	17	Blue		31	-	45	45	;	59	59	I i	9	73	W w	23	87	E	69	101
	D	4	RVS On	18	Space	32	32	.	46	46	<	60	60	J j	10	74	X x	24	88	F	70	102
White	E	5	Home	19	!	33	33	/	47	47	=	61	61	K k	11	75	Y y	25	89	G	71	103
	F	6	Delete	20	"	34	34	0	48	48	>	62	62	L l	12	76	Z z	26	90	H	72	104
	G	7		21	#	35	35	1	49	49	?	63	63	M m	13	77	[	27	91	I	73	105
Disable C=	H	8		22	$	36	36	2	50	50	■	0	64	N n	14	78	£	28	92	J	74	106
Enable C=	I	9		23	%	37	37	3	51	51	A	a	1	65	O o	15	79	]	29	93	K	75	107
	J	10		24	&	38	38	4	52	52	B	b	2	66	P p	16	80	↑	30	94	L	76	108
	K	11		25	'	39	39	5	53	53	C	c	3	67	Q q	17	81	←	31	95	M	77	109
	L	12		26	(	40	40	6	54	54	D	d	4	68	R r	18	82	▬	64	96	N	78	110
RETURN	M	13	[ESC]	27	)	41	41	7	55	55	E	e	5	69	S s	19	83	♠	A	65	97	O	79	111

Up Lo	Scr	ASC	Up Lo	Scr	ASC	Up Lo	Scr	ASC
P	80	112			130	Insert	148	
Q	81	113			131	Brown	149	
R	82	114			132	Lt. Red	150	
S	83	115			133	Gray 1	151	
T	84	116	F1		134	Gray 2	152	
U	85	117	F3		135	Lt. Green	153	
V	86	118	F5		136	Lt. Blue	154	
W	87	119	F7		137	Gray 3	155	
X	88	120	F2		138	Purple	156	
Y	89	121	F4		139	Left	157	
Z	90	122	F6		140	Yellow	158	
	91	123	F8		141	Cyan	159	
	92	124	SHFT/RET		142	Space	96	160
	93	125	Uppercase		143		97	161
π	94	126	Black		144		98	162
	95	127	Up		145		99	163
		128	RVS Off		146		100	164
Orange		129	Clear		147		101	165

Up Lo	Scr	ASC
	102	166
	103	167
	104	168
	105	169
	106	170
	107	171
	108	172
	109	173
	110	174
	111	175
	112	176
	113	177
	114	178
	115	179
	116	180
	117	181
	118	182
	119	183

Up Lo	Scr	ASC
	120	184
	121	185
	122	186
	123	187
	124	188
	125	189
	126	190
	127	191
ASCII 192-223 equivalent to ASCII 96-127		
ASCII 224-254 equivalent to ASCII 160-190		
π	255	

Add 128 to Screen values for Reverse Characters.

C128 ASCII differences: 9 TAB
11 Disable C=
12 Enable C=

Important Memory Locations:

# chars in keyboard buffer	198
last key pressed (none=64)	197
keyboard buffer	631-640
current print color	646
SHIFT(1) C=(2) CTRL(4)	653
enable (0)/disable(128) C=	657
cassette buffer	828-1019
default screen memory	1024-2043
background color	53281
border color	53280
default color memory	55296-56319

ERG-CARD™ FOR USE WITH DELUXE PAINT II™

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BRUSH COMMANDS

F1	Matte Transparent Background
F2	Color
F3	Replace No Transparent Colors
F4	Smear
F5	Shade
F6	Blend
F7	Cycle
-	Brush Smaller
=	Brush Larger
Z	Stretch
h	Halve
H	Double
x	Flip Horizontal
y	Flip Vertical
z	Rotate 90 Degrees

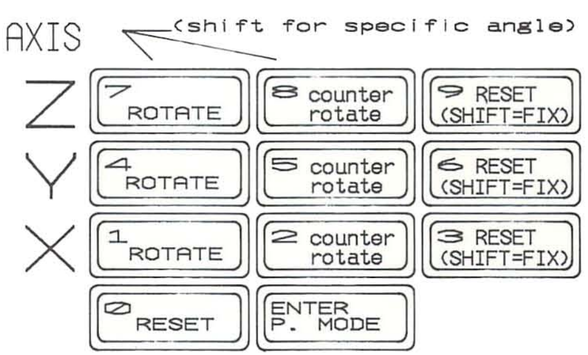
CONTROL PANEL

a	Airbrush
A	Size Airbrush
b	Grab Custom Brush
B	Restore Custom Brush
c	Unfilled Circle
C	Filled Circle
d	Freehand Draw
D	Freehand Draw w/1-pixel Brush
e	Unfilled Ellipse
E	Filled Ellipse
f	Fill
F	Fill Requester
g	Grid
G	Grid Start At Current Position
j	Spare Page
K	Clear
m	Magnify
p	Palette Requestor
q	Curve
r	Unfilled Rectangle
R	Filled Rectangle
s	Draw w/Dotted Line
t	Text
u	Undo
v	Line
>	Zoom In (Magnify Mode)
<	Zoom Out (Magnify Mode)
,	Pick Color
.	One-Pixel Brush
[]	Step Thru Colors
/	Toggle Symmetry On/Off

SPECIAL KEYS

F8	Toggle Cursor Arrow On/Off
F9	Toggle Menu Bar On/Off
F10	Toggle All Menus On/Off
Cursors	Scroll Screen
n	Center Area Under Cursor
SHIFT	Constrain Line/Shape
CTRL	Leave Multiple Images
CTRL a	Memory Check
TAB	Cycle Colors
SPACE	Abort Current Command
S	Show Page
Tilde	Toggle Stencil

PERSPECTIVE CONTROLS



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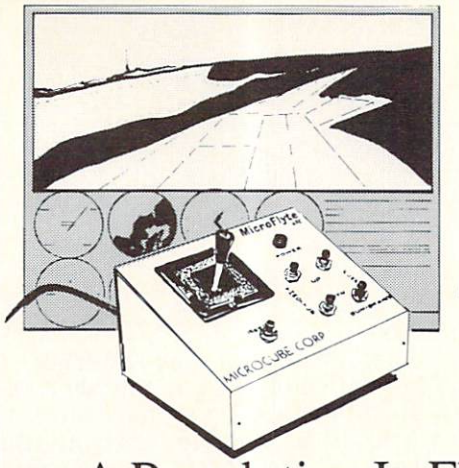

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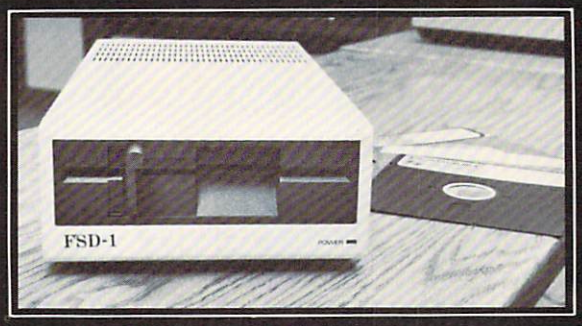

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SPARTAN
(cont'd from pg. 50)

populated pc boards plus a motherboard/power supply in a nice-looking plastic case. It's molded and tinted to mate and blend with your C64. If you have the new 64C it won't look nearly at good.

The main unit looks like a full-tilt Apple][when you remove the case. The 60-watt-peak power supply is in the same spot and is about the same size, the motherboard is about the same size as the Apple's and is as populous, and there are nine Apple-compatible card slots in the back in the traditional Apple arrangement.

There are only two really obvious internal differences. One is the row of three C64 cartridge slots in the front right corner. These allow you to plug in three internal C64 cartridges which can then be selected under software control. (You can also add one external cartridge and even yet another C64-cartridge-type ROM in an internal socket.) The other major noticable difference is the CPU card, which is the reason the Spartan has nine, rather than the ususal eight, Apple slots. Both CPU and memory are right on the motherboard in the Apple. The CPU card plugs into slot "A", just to the left of slot 0, and hooks up to the motherboard via three additional dip jumpers. The 64K of Apple-mode RAM is also on the CPU card.

Besides the CPU card, Mimic also supplies a DOS card, which fits into slot 6, as is standard with Apples. This card can control any two Apple-compatible drives. The third pc card is the weirdest piece of hardware you receive with the Spartan. It is a Jekyll/Hyde card for your 1541 drive. It not only gives your 1541 a split personality, able to read *both* Apple DOS and Commodore disks, but it turns your drive into an ugly monster. The manual says you are supposed to be able to take your drive apart and plug all its internal wiring into the Spartan DOS conversion card, then put your drive back together. Unfortunately, the placement of the connectors and the stiffness of the wiring prevent you from being able to put the thing back together. You have to leave it apart, which is both dangerous and ugly. Since the DOS controller card will control standard Apple drives, I strongly suggest that anyone who is serious about using the Spartan purchase a real Apple drive to use with it. You can save $50 by ordering the Spartan without the DOS conversion card, and a third-party Apple drive will cost you only about $150. There are also some additional reasons for buying an Apple-compatible drive that we'll get into later.

The manual included with the Spartan is concerned mainly with plugging it together and getting it set up, so getting the hardware to work is not much of a struggle. Mating the Spartan to the back of the C64 is an easy task. Everything really does line up well, and the two DIN connections are flexible. The back panel connections are also clearly marked, so it's no chore to figure out where the power, monitor, drive, etc., plug in. I had the Apple parallel cable from the drive to the DOS card reversed for about the first fifteen minutes I tried to boot from the drive, but after I switched that it all worked fine.

APPLE EMULATION

When you turn on the Spartan, you will discover your second reason for wanting to buy an Apple drive. The Apple bootup sequence really beats up on your converted 1541. I've been around Apples for a long time, so I knew that the bootup sequence involved some drive rattle, but I was totally unprepared for the incredible racket this produced on the converted 1541. Apple drives don't sound like *that* when they boot! They make a polite little chatter and go on. A 1541 cannot possibly withstand the head-knocking, stop-banging, and chattering involved in booting up Apple software for long. There is a sheet in the Spartan manual that suggests you have your 1541 adjusted and have the shaft pinned if you plan to run much Apple software It's safer, I think, to just go ahead and get an Apple drive.

Once past the noise, Apple DOS booted up without much trouble. I say "without *much* trouble" because, with the assistance of Murphy's Law, the DOS on my copy of the **Filer** disk from Central Point Software (which is included with the Spartan) was corrupt and would not load. I wasted another half hour checking connections and diagrams before I thought to try an Apple DOS disk from the pile I had waiting to try out on the Spartan. The first disk I tried from the stack booted flawlessly.

I first checked out several public domain program disks. Music, graphics, and games all loaded and ran without exception. The screen prompt was Apple's familiar right-bracket or greater-than symbol, depending on whether Apple Integer BASIC or AppleSoft was in control. I had no trouble at all with either DOS 3.3 or ProDOS disks. All the DOS and system commands worked fine, including

CALLs to low-level machine language routines. I was able to INIT Apple format disks without problems on the converted 1541. Using **Filer** I copied DOS to my new disks, transferred files to them, changed the boot program, etc. Datamost's **Elementary Apple** book, included in the Spartan package, was a big help in jogging my memory for long-forgotten commands and functions.

The keyboard of the C64 was conveniently reprogrammed for Apple BASIC keywords and DOS commands. Commodore/C produced a disk CATALOG, and Commodore/A called a PR#6, the Apple command to reboot DOS. The left-arrow became the ESC key required for so many Apple system functions.

I had mercifully forgotten how primitive the Apple's screen editor was in comparison to the C64's, but it all came back to me quickly. It is emulated 100% on the Spartan, without improvements.

Moving on to a test of arcade games, Ms. Pacman and Zaxxon both booted up and ran as advertised. For these games I made use of the built-in Atari-to-Apple joystick port converter on the Spartan motherboard. This lets you use a standard joystick for Apple games, which generally expect an analog-type joystick.

The most recent title I tried was **Card & Party Shop**, which ran perfectly, too. But it was here that I had my first disappointment. The Spartan would not let me access my Commodore-interfaced printer. To use my printer, I would need an Apple printer interface card plugged into the Spartan. I would have to swap cables to the printer to switch from using it for Apple and Commodore applications.

I didn't even try to run any software that was written for the IIe or IIc. I knew it probably wouldn't work. The Spartan is an Apple][+ emulator, and does not have the additional capabilities of either of those machines. The only improvement on the Spartan over the Apple][is the inclusion of both upper and lower case letters.

As a][+ emulator, I felt the Spartan did admirably well; at least as well as a Franklin. The "monster" 1541 conversion even worked better than I had expected, though booting Apple software on it would beat it to death in a rather short time.

COMMODORE MODE

The Spartan controller ROM maps itself into Commodore memory in the normal ROM cartridge space over the top 8K of BASIC RAM. It wedges into BASIC, giving you additional system control functions and commands, in much the same manner as **Simon's BASIC**. But these commands are all related to the functioning of the Apple emulation and native C64 modes of operation of the Spartan.

The F2 and F4 keys are used to select which mode has command of the keyboard input and audio and video outputs of the system. F6 gives a warm, and F8 a cold system reset of the C64. After a cold reset, the Apple emulation mode is normally inaccessible without powering down the system. On the side of the Spartan case are three pushbuttons which function as Apple reset, C64 reset, and C64 cartridge reset buttons. Some combination of these buttons is supposed to get you out of almost any dire circumstance, though I seldom found it to work out that way.

With the Spartan control ROM kicked in and the Apple converter board installed in the 1541, the C64 effectively lost its ability to run commercial C64 software. With the control ROM kicked out (so that the Apple emulation mode was inaccessible), a few more programs ran, but the 1541 conversion card played heck with any protected C64 programs. They simply refused to load and run. Titles from **Chipwits** to **Fast Hack'em** steadfastly refused to load, and even the **QuantumLink** terminal software would not load, though it is not copy-protected. Depending on what garbage was kicking around in RAM from what had been run before, there were even times when the system mysteriously reset in mid-load to the supposedly locked-out Apple emulation mode! Curious, and curiouser...

The soft-selected ROM cartridge expander did not fare well with anything other than very standard cartridges. Most games ran well, and even **COMAL-80** worked, but **Snapshot, The Power Cartridge**, and other standby "phantom" utility cartridges were useless. While a cartridge is enabled it is, of course, impossible to access Apple emulation mode, though you can reset the C64 and switch back to Apple mode to find whatever program you left running still happily humming away.

WEBSTER SEZ:

SPARTAN
cont'd

spartan: *brave, hearty, stoical, severe.*
mimic: *make-believe, simulated.*

THE OPERATING SYSTEM

The Spartan is supposed to provide an integrated system which runs two separate computers in a mutually controllable environment. The command and control language built into the C64 ROM operating system includes command keywords to &PUT and &TAKE blocks of memory from one machine and transfer them to the other. There is another keyword, &SLAVE, which is supposed to put one machine under the control of the other for the automatic loading and running of programs. None of these commands worked on our review unit.

The documentation of system commands was almost nonexistant. The on-screen HELP screen showed little but a listing of the available commands, but even that was more than the manual told me.

System crashes sometimes resulted in the revelation of old bits of code hidden in the ROMs. I got an obsolete "Version 1.1" reboot message a couple of times, and twice got an older version of the HELP screen with obsolete commands printed on the Spartan screen. There seem to be a lot of bugs in the system yet.

AN OPINION

And, if Mimic does get all the bugs out of the system, what exactly do they have? To perform any really useful work with the Spartan, such as transferring files from Apple to C64 format, you will have to write all of your own software. You cannot run commercial programs in both modes at the same time and have access to both. You can run your own BASIC programs in both at once, but is that really useful? The Spartan will let you plug in two monitors and watch them both at once, but they still fight over the keyboard.

The modifications the Spartan makes to your C64 system actually transforms it into a better Apple][+ than a Commodore. It runs lots of][+ software well, but I found the C64 mode to be extremely touchy.

At $300, the Spartan is the cheapest Apple-compatible computer around if you already own a Commodore 64, and is certainly the least expensive one to offer a full motherboard. But for reasons I've already given, you should buy the Spartan sans the DOS conversion card and get an Apple drive instead, which brings the cost up to $400 ($250+$150). For this price you can get a Laser 128 Apple][c clone with 128K of RAM, a numeric keypad, a built-in drive and built-in serial, parallel, and mouse interfaces, plus a single expansion slot. And, since the Laser 128 emulates a more recent architecture, you will be able to run a lot of the most recent Apple software on it, which you cannot do with the Spartan. And owning a separate Apple-compatible computer will not tie up your C64. If you are really interested in owning an Apple-compatible, the Spartan is simply not your best choice.

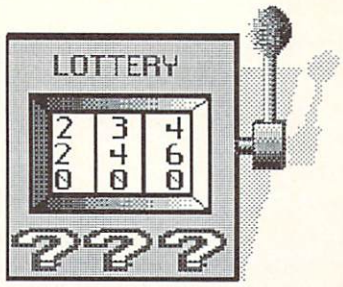
ANOTHER OPINION

On the other hand, If you are a dedicated hardware and/or software hacker I cannot imagine a better present you could give yourself than a Spartan. In the first place, you are getting a good $300 worth of hardware to play with. Second, you get a computer system that has *two* operational 8-bit machines that can, at least in theory, speak to one another. Hopefully there will be ROM updates that will take care of the system bugs, or maybe you are knowledgeable enough about such things to dig into the system and fix them yourself. In any case, if you know what you're doing you could have an infinitely fun time just seeing what you could squeeze out of this system. In spite of all the frustrations and crashes, I had a blast playing with the Spartan!

THE WRAP

Mimic's Spartan is a noble experiment that just plain took too long to get to market. With all the software available by now for the Commodore 64, the Spartan's major purpose is gone. But it is fun to play with. It really does live up to its name. It is both a brave attempt at something challenging and a make-believe kind of device. Don Quixote would have loved it.

The Spartan is $300 from: Mimic Systems, 11-12 Fort St., Floor 6E, Vancouver BC Canada V8V 4V2.



LOTTERY SOFTWARE

Toss a coin. Toss it a hundred times. How many times did it come up heads? Statistically, it should have been close to 50. But in any particular series of 100 tosses, it could have been closer to 70, or even 90, or 100!

If the coin *did* manage to come up heads 100 times in a row, what are the odds that the next toss would also come up heads?

If you answered 50/50, give yourself a firm pat on the back. You have an uncanny understanding of the laws of probability. Most people think otherwise. Depending on their world view, most folks think that heads is *more likely* to come up again because it is "hot", or *less likely* because tails is "due". They believe that, where probability is concerned, the past influences the present and the future. But, by definition, random events are random because they are not caused by anything else. They are self-generated. A team of the greatest mathemeticians on the planet equipped with the biggest, fastest, most expensive computers analyzing a thousand years of reliable data on the tossing of coins cannot predict if heads or tails will come up on the next toss of a coin. Your kid sister's guess is just as good as theirs.

All of which brings us to lottery software. Lottery and lotto software claims to take the past results of a random (*<---key word*) state lottery and, based on those past results, predict the likely winning numbers for present and future lotteries. Can this actually be done? Of course not. If a lottery is totally random, the past does not influence the present or the future. No matter how complicated the analysis, no matter how beautiful the graphs, no matter how intricate the plots, the lottery this week will be totally random and no software on the planet can help you guess the numbers. Stick with your anniversary and birthday. You will be just as lucky.

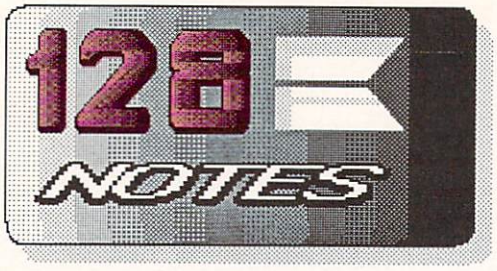
If you persist in your curiosity about lottery prediction programs, the following INFO BASIC program will let you accurately simulate your own state's lottery (digits 0-9) or lotto (pick numbers) game. Run it to generate numbers for the analysis program, predict a winning combination, then run the INFO Lottery program and see if you win.

THE INFO LOTTERY

Check out those flashy Lottery Analysis programs or run your own lottery or lotto game in the privacy of your own home! Make millions in your spare time! Just type in INFO's nifty Lottery Program!

```
10 REM INFO MAGAZINE 1986
20 PRINT"INFO LOTTERY"
30 PRINT
40 T=9
50 INPUT"(0)Lottery or (1)Lotto";l
60 IF l<0 OR l>1 THEN 50
70 IF l=0 THEN 100
80 INPUT"Largest number in game";t
90 IF T<9 OR T>99 THEN 80
100 INPUT"How many numbers in
    game";N
110 IF N<1 OR N>10 THEN 100
120 DIM M(N):M(0)=-1
130 FOR X=1 TO N
140 M(X)=INT((T-L+1)*RND(1))+L
150 IF L=0 THEN 190
160 FOR Z=0 TO X-1
170 IF M(X)=M(Z) THEN 140
180 NEXT Z
190 NEXT X
200 IF L=0 THEN 240
210 Z=0:FOR X=1 TO N-1
220 IF M(X)>M(X+1) THEN
    Q=M(X):M(X)=M(X+1):M(X+1)=Q:Z=1
230 NEXT X:IF Z=1 THEN 210
240 PRINT"The winning numbers are:
250 FOR X=1 TO N
260 PRINT M(X);
270 NEXT X
280 PRINT
290 PRINT"  Hit RETURN for another
    number"
300 PRINT"  Hit R to restart"
310 PRINT"  Hit any other key to quit"
320 GET A$:IF A$= THEN 320
330 IF A$=CHR$(13) THEN 130
340 IF A$=R THEN RUN
```

How To Type In INFO Programs: On your Commodore computer's keyboard, use your fingers to tap the keys corresponding to the letters, numbers, and funny markings in the program listing. Be careful not to make any mistakes.



TEXT SCREENS

One problem you may run into with the C128 is figuring out how to print, poke, prompt, and otherwise handle text I/O when you have two potential displays, 40-column and 80-column. Of course, PRINT automatically prints to the screen currently selected, but sometimes that's not what you want to do, and it tells you nothing about formatting. The quick and dirty solution is to just print everything to both screens. You can do this with a simple FOR/NEXT loop like this:

```
FOR X=0 TO 5 STEP 5 : GRAPHIC X : PRINT "WHATEVER" : NEXT X
```

The GRAPHIC command switches back and forth between the screens. This line:

```
10 GET A$: FOR X=0 TO 5 STEP 5: GRAPHIC X: PRINT A$;: NEXT X: GOTO 10
```

will let you type onto both screens simultaneously. Here you'll run into your first formatting problem. What looks good on 40 columns will not necessarily look good on 80, and vice versa. You'll just have to do your best.

If you want to print selectively depending on which screen is in use (to, say print to the screen *not* currently displayed), you can PEEK location 215 to see which mode is currently active. If PEEK(215)=0, then the 40-column screen is in use, if PEEK(215)=128 then the C128 is in 80-column mode. This gives you the *actual* screen in use, not just the position of the 40/80 column switch, which is another thing entirely.

80-COLUMN 'ERG-CARDS'

You may have noticed that when you switch from an 80 to a 40-column screeen in C128 mode, or when you **GO 64** from an 80-column screen the 80-column display remains unchanged. You can use this quirk of the C128 as a handy 'help screen'. Just use the 80-column screen to list a disk directory, or type notes to yourself, or display whatever information you think you might find handy while running your 40-column or C64 mode application, then switch to 40-column or C64 mode. When you need to refresh your memory, just take a brief look at your 80-column display, then flip back to 40 columns and continue on. Displaying a disk directory is especially useful. You might also want to write short BASIC loaders for your most-used programs that print a nicely formatted HELP screen before automatically switching displays and running the program.

MORE USEFUL DLOAD

The F2 key is preprogrammed to give you an automatic DLOAD. But it doesn't work well with directory listings. By reprogramming the F2 key with this direct-mode line:

```
key 2,"dL[2 spaces][17 cursor-rights]:"+chr$(13)
```

you will be able to cursor up to the program you want to load in a a directory listing and just press F2 to have it load in properly.

I GOT MUSIC

Music is easy on the C128. Without even defining envelope sounds, you have access to ten different instruments. All you need is the PLAY command. This program will play a little tune, changing the tempo and range of the tune as it repeats:

```
10 rem: music demo
20 play"v1o4t7u15x0i"
30 for z = 1 to 2
40 for x = 1 to 2
50 for y = 1 to 2
60 play"ecdefgabc"
70 play"i"
80 next y
90 play"o2t8s"
100 next x
110 play"o4t0q"
120 next z
```

The letter and number combinations following the PLAY command are mnemonic and pretty easy to use. The **V** specifies a voice number, from 1 to 3, and must be the first parameter specified. The **O** specifies an octave, from 0 to 6. **T** is the instrument, from 0 to 9, signifying ten instruments from piano to xylophone. **U** controls the volume, from 0 to 15. **X** turns the filter on(1) or off(0). The notes are specified by a letter from A to G, with a # for sharps or a $ for flats. You use an **R** for rests. The notes are preceded by their duration, W,H,Q,I,S signifying whole, half, etc., notes. A period makes the note dotted. More than one note may follow a duration specified. Another subcommand (M) controls multi-voice operations. Don't be afraid to experiment.

COMAL SUPERCHIP

I'm a COMAL fan: so shoot me. I still think COMAL 2.0 is the best language ever written for microcomputers. If a compiler were available for it you couldn't force most programmers to use anything else at gunpoint.

Now there is a major new improvement to the COMAL 2.0 cartridge targeted mainly to C128 owners: the **COMAL Superchip**. The COMAL cartridge was designed with extendability in mind; there is an empty ROM socket on the board. The Superchip is the first commercially available ROM extension for COMAL designed to plug into that socket and make a permanent improvement to the language. It provides 16K of COMAL extensions on a single EPROM.

Installing the chip is a snap. Snap open the cartridge, snap in the chip, snap it shut. (I guess that's three snaps...) When you power up your computer, the Superchip extensions kick in automatically. It does not give you a full C128 COMAL, but does enable many of the C128's features under C64 COMAL. The cartridge first determines whether you are running on a C128 or C64, and if it's a C128 system the keypad is automatically enabled. It will also autoboot the COMAL program named "hi" if you have a disk in the drive.

Besides kicking in the full C128 keyboard, the Superchip also gives you full access to text and graphics on the 80-column screen. There are a whole bunch of cursor control and print formatting commands associated with the 80-column screen. Text capabilities extend to COMAL's protected INPUT fields and the whole bit. Graphics are more primitive, with only point-to-point lines and single-point plotting supported.

The 80-column and enhanced keyboard functions of the Superchip are, of course, limited to C128 use. There are also several more general packages for both C128 and C64 use.

There's a version of the COMAL Rabbit fastloader for 1541 drives. It will not put your 1571 in burst mode, but it helps. A *files* module gives you BLOAD and BSAVE commands, TYPEing of ASCII files, and two commands for controlling input via the RS232 port. String and math extensions provide case conversion, string swapping, string sorts, even/odd/prime number detection, max of two numbers, hypotenuse calculation, and much more. And there are additional system features including color names, keyboard control, new system variables, and more. There should be something for just about everybody among these COMAL packages.

If you have the COMAL 2.0 cartridge you can get the Superchip for $29.95 and plug it in yourself, or send along your old cartridge and $5.00 additional and the COMAL group will do it for you. A new COMAL 2.0 cartridge with the Superchip is $104.90, $128.90 with two manuals and a disk. Add $4.00 shpg. on cartridge orders, $2.00 for chip orders. From: COMAL Users Group, 6041 Monona Dr., Madison WI 53716, 608/222-4432.

BIG BLUE READER

If there is a universal language of disk formats, it is MS-DOS. Commodore's GCR (Group Code Recording) disk format is unique to Commodore machines, but MS-DOS is used by a multitude of IBM-compatible personal computers in almost every nation in the world. Of course, this means that there is a lot of information out there in MS-DOS format. And until now it was inaccessible to Commodore users.

Big Blue Reader programs a 1571 disk drive to not only read, but to translate MS-DOS files. If you own a C128 and at least one 1571 drive, you can now access that mountain of MS-DOS material. Of course, running MS-DOS programs is another matter. **Big Blue Reader** does *not* turn your C128 into an IBM/PC clone. It would require a prohibitively expensive pile of hardware and software to do that. What it *does* do is let you read and translate MS-DOS text, information, and documentation files.

Those who will receive the most benefit from Big Blue Reader will probably be those who use an IBM/PC (or clone) at work or school but have a C128 system at home. BBR will let those people, for the first time, transfer wordprocessing files back and forth between the two machines.

BBR autoboots on the C128, displaying its main menu on either the 40 or 80-column screen, depending on which is selected. (40-column folks are not left out this time!) The

80-column screen displays a menu, disk information, and the disk directory all on one nicely formatted screen; the 40-column display lets you swap two screens for the same information.

The main menu presents you with several interesting options. You can display a directory, load a file into memory, display a file, or copy one. You can also set the time and date on the built-in software clock, which BBR uses to time-and-date stamp MS-DOS files. The copy buffer is dynamic, so there is also a menu selection to adjust the buffer size.

The display shows all available information about the disk currently in the drive, including a full scrolling directory, number of files, number of bytes free, etc. The program automatically detects which format, Commodore or MS-DOS, the current disk is, and adjusts to it.

You have the option of loading a file and displaying it to the screen or printer. If necessary, you can perform ASCII-to-CBM/ASCII conversion, or vice-versa. Big Blue Reader is capable of transferring text files between two Commodore disks, two MS-DOS disks, or CBM to MS-DOS and vice-versa, with conversion if necessary. If a file is larger than the buffer, it can be copied by swapping disks. If you have two drives, the MS-DOS disk's drive must be a 1571, but the Commodore-format drive can be any Commodore compatible drive.

There are two additional support programs on the Big Blue Reader disk. **Big Blue Format** lets you format MS-DOS disks on your 1571 in standard IBM 360K, 9-track, double-sided format. **Big Blue Backup** is a full-disk swap-and-go copy program for MS-DOS diskettes in either single or double-sided formats. A single-sided disk takes about four minutes, and double-sided about eight.

I used Big Blue Reader and its support programs to format an MS-DOS diskette on the 1571 and copy over several wordprocessing files from various dusty MS-DOS disks lying around the office. It let me transfer them without fail. I could only check the reverse process by copying Commodore files to MS-DOS format and then reading them with the file read option on Big Blue Reader itself, since we have no PC-compatibles in the office. (Yes, you *can* run a business completely on Commodore computers!) That seemed fine, too. SOGWAP cautions that BBR is intended for sequential file transfers. Program files may not copy faithfully; you couldn't run them even if they did. You also should be cautious about the imbedded control codes in some wordprocessing files. They may throw off the wordprocessor on the other machine. As much as possible, you should try to work with pristine ASCII sequential files for best results.

I was impressed with Big Blue Reader. Mike Miller and the folks at SOGWAP did a great job of producing a program that is intuitive and easy to use. The manual is short, to the point, and informative, and includes enough tutorial information on MS-DOS and ASCII to let you know what you're doing. The program is fast, and the status displays always let you know exactly what's going on.

My only complaint with BBR is that it limits you to working with one file at a time, even if the buffer has plenty of space left in it. But in spite of that, it is an extremely powerful and useful program. We have known since its introduction that the 1571 was *capable* of reading MS-DOS. We are glad that SOGWAP has come through with a program that finally programs it to.

$29.95 from: SOGWAP Software, 611 Boccaccio Ave., Venice CA 90291, 213/822-1138.

PARTNER 128

I was impressed with Partner 128 when I saw it at CES in June, and I'm even more impressed with it now that I've actually got one of my own to play with.

Partner 128 is a transparent popup utility program along the lines of **Sidekick** for the IBM/PC. Because of the limited memory capacity of the Commodore 128 compared to that of the IBM/PC, Partner resides on a cartridge in its own 32K of ROM, with its own 8K of scratchpad RAM. It is invoked by a reset button on the cartridge itself.

Partner 128 works only on an 80-column C128 display. When you first boot your system, a quick Partner display flashes across the screen to let you know it is activated, then your C128 returns to its normal autoboot sequence. Partner takes absolutely no RAM away from your system, so it is probably going to prove to be compatible with most C128 software. Because it is on a cartridge, it is *not* compatible with **Vizawrite** or **Vizastar**, each of which also requires a cartridge. We have tried

them with a multi-slot cartridge expander and even that won't work; they interfere with each other's operation.

The first thing you need to do to operate Partner is format a data disk. With only 8K of RAM of its own, you will need to keep notepad notes, address files, calendar information, etc., on the data disk between operations, and, of course, between sessions.

Once you are powered up and running, a press of the cartridge's reset button stops any running application and presents you with the Partner 128 menu. From this you can select the Appointment Calendar, Memo Pad, Address/Phone List, Calculator, Print Screen, DOS/Printer Commands, SwiftLock, and Setup options.

Four of these are system utility functions. You will want to use the Setup option first to define your disk drive and printer setup. Once set, this can be saved to a disk file and loaded every session. The Print Screen function lets you print *text screens only* to your printer, a handy option to use with those programs that don't have that option built-in. But it won't help you out with graphics programs. The DOS/Printer Commands option lets you pass a direct command to your drive or printer at any time during the execution of your main program, which is a very nice thing to be able to do, especially with programs which automatically reset your peripherals after they boot up. The final system utility function is called SwiftLock. This lets you enter a five-character code into your machine which locks it up until the code is reentered. If you work in an office with snoopy people, or around cats and children, you may want to invoke SwiftLock when you leave the room.

The other four Partner 128 functions are productivity utilities. The Appointment Calendar tracks up to five appointments, five "things to do", and five key tasks per day. Date selection is graphic; you pick the day from a monthly calendar display by moving the cursor over the date and hitting return. This brings up an appointment display for the day in question. The built-in perpetual calendar will take you through December 1999. Though the space allocated for text is small, it is adequate. You can print calendar and appointment information at any time, and the disk access feature includes directory listing.

The Memo Pad is a miniature wordprocessor, probably adequate for most letterwriting as well as personal memos. There are no block editing features, though it does have a simple search function and fair cursor movement and insert mode options. There is also a typewriter mode, which will send each line to the printer as you press RETURN, just like an auto-correcting typewriter.

The Address/Phone list is actually a simple database program with predefined fields labelled for name, address, and phone information. Partner's memory will hold about 60 records; larger lists will have to be broken up into disk files. A list in memory can be sorted on any field, which is very handy if you want a list sorted on zip codes one day and last names the next. You can print lists in address list, phone list, or mailing label formats. If you have an autodial modem, Partner will even dial phone numbers for you. Address files can even be used for mail merges with Timework's **Word Writer** wordprocessor.

The Partner Calculator is probably the simplest of the tools on this cartridge. It is a simple four-banger (well, it does powers, too, so I guess it's a five-banger) with a single memory. It does support using the printer as an extremely wide paper tape readout.

The 8K of RAM in the Partner 128 cartridge can also be used to contain user-written utilities, though you will have to contact Timeworks for the proper technical information on how to do it. Timeworks has high hopes that many genius end users will develop utility programs that take advantage of this capability.

I think Partner 128 is the best product Timeworks has come out with to date. The user interface is easy and intuitive, the manual is excellent, and the product itself is well thought out and implemented elegantly. Most of the potential problems have been anticipated and provided for. It is expandible and extendible, but not by any means "pared down". Partner 128 is an excellent productivity tool, and is without a doubt one of the best C128 products to date.

Additional note: C64 owners can look forward to their own version of Partner later this Fall.

$69.95 from: Timeworks, 4444 Lake Cook Rd., Deerfield IL 60015, 312/948-9200.

INFO Reader Mail

(continued from page 28)

Mail From: Tupperware
Date: Saturday 30-Aug-86 01:38 EDT

Hello,

Just bought the lastest issue today as I could not wait for my subscription to come in the mail. My compliments for a fine magazine. I particularily respect your stand regarding reviewing copy programs. I just wished you published more regularly.

How does one apply to be a software reviewer? In the last week, I completed **Rings of Zilfin** and **Whatever Happened to Carmen Sandiego?**. I am a married male, age 36, who spends 30 hours a week at my 64 playing games. Any room for me as a reviewer?

Joe Campbell
Slidell LA

Joe, are you **sure** *you are married? I mean, have you looked around the house lately to make sure your wife is still there? People, if there is one thing we have tried to make clear in the pages of INFO from its inception it is this: Try to strike a balance in your life! Check every once in awhile and see how many people are living in your house. Ask them if they are related to you and if so, how. Keep a picture of your spouse by the computer so you remember what he/she looks like. Focus on something farther away than your monitor screen at least once every eight hours or so to keep from going blind. Love your computer, yes, but always strive for a balanced lifestyle. --Mark & Benn*

Mail From: Lincoln C
Date: Friday 29-Aug-86 20:12 EDT

Dear INFO,

Can you explain why some word processing programs save their data as PRG files, and others as SEQ? I was under the impression that only the more primitive word processors still saved the user's files under a PRG extension, since SEQ files seem more accessible. Yet **PaperClip**, your own favorite (and the one I use), uses PRG! What is the advantage in PRG files for a top-of-the-line program like PClip? It's hard to access what you've created without first booting PClip, since you can't just use a short SEQ file reading program.

Thanks,

Lincoln Child

Actually, Lincoln, Commodore SEQ and PRG files are identical except for a single identifier byte in the disk directory. By changing this byte with a disk editor you can change a SEQ file to PRG and vice versa. On a more mundane plane, you can modify a SEQ file reader to read PRG files by changing the OPEN statement from one similar to **OPEN 2,8,2,"filename,S"** *to* **OPEN 2,8,2,"filename,P"**. *Unless your wordprocessor does strange things to characters (PaperClip doesn't), this should do it. --Mark & Benn*

COMPUSERVE

Dear INFO,

First...I love your magazine! Keep up the great work.

Anyway, I have a couple of questions I'd like to ask, if you have the time. I would appreciate any help you may be able to give me. (I've tried writing Commodore, and as I'm sure you're familiar with, I got the 'ole run-around).

I am hoping to purchase an Amiga any day now (I was even considering an ST-if only for a second) and I was wondering if the Sony KV-1311 monitor comes with the necessary cables to attach it to an Amiga. If not could you tell me where to get it? (Or what to ask for).

Also, do you know if the Okimate 20 plug-n-print module for the 64/128 is the same for the Amiga?

Any news on the availability of an Amiga without interlace yet?

Thanks.

Steve Dowd
74316,1645

Well, here goes: First, Redmond Cable (206/525-6873) and others sell Amiga-to-Sony cables. Second, the Okimate 20 requires separate Plug-N-Print modules for 64/128 and Amiga operation. And third, a no-interlace model Amiga is just a rumor right now. Commodore has made no official announcement of any new Amiga models. If you wait to buy, you are only depriving yourself of many happy months of Amiga computing. It's like we have said many times in the past: there is always a newer, better machine "just around the corner", but if you wait for it you will never buy. I paid $1700 for my first C64 system (serial #00005204) and have never regretted it. --Mark & Benn

INFO Reader Mail

READER MAIL

Dear INFO,

"Satire" or not, if I were Jack Tramiel I'd sue. The comparison of the Commodore 128 vs. the Atari 520ST **[in issue #9: ed.]** has so many inaccuracies and distortions, it's pitiful. Equipped the same way as a 520ST system, there is no price advantage for the C128. I pity the poor sap who reads your ad and believes every word. The C128 is a machine that's hanging onto obsolete technology. The Atari is STate-of-the-art. Programs for the ST are the best of their kind for ANY personal computer, IBM and Macintosh included.

"Power Without the Bull?" More like bull without the power to back it up. If anyone wants to put a C128 head-to-head against my 520ST in a fair contest of speed, graphics, and state-of-the-art software, my machine is available. I doubt that I will get any takers, though.

Stephen M. Frye
Fremont CA

P.S. I noticed that you must really be trying to save fuel by using pro-Atari letters to keep your office warm -- none of the ones you claim to have received in response to your ST/C128 "comparison" ad were printed! So I 'm betting that you won't print this one either. What's the bet? A friend of mine is planning to buy a computer. If the letter gets published, he buys a C128. If the letter gets trashed, he buys a 520ST. Now it's up to you.

Stephen, we've received press releases from Atari that are less biased and enthusiastic about the ST than your letter. It's incredible how many pro-Atari people missed the whole point of that C128/ST comparison ad. It wasn't a comparison of the relative merits and deficiencies of the C128 and the Atari ST. It was a commentary on truth in advertising. The point was this: If you pick your facts carefully, you can support almost any point of view on any subject. A discussion involving both sides of any issue must include all the facts or your conclusions will be invalid.

By the way, you lose your bet.

--Mark & Benn

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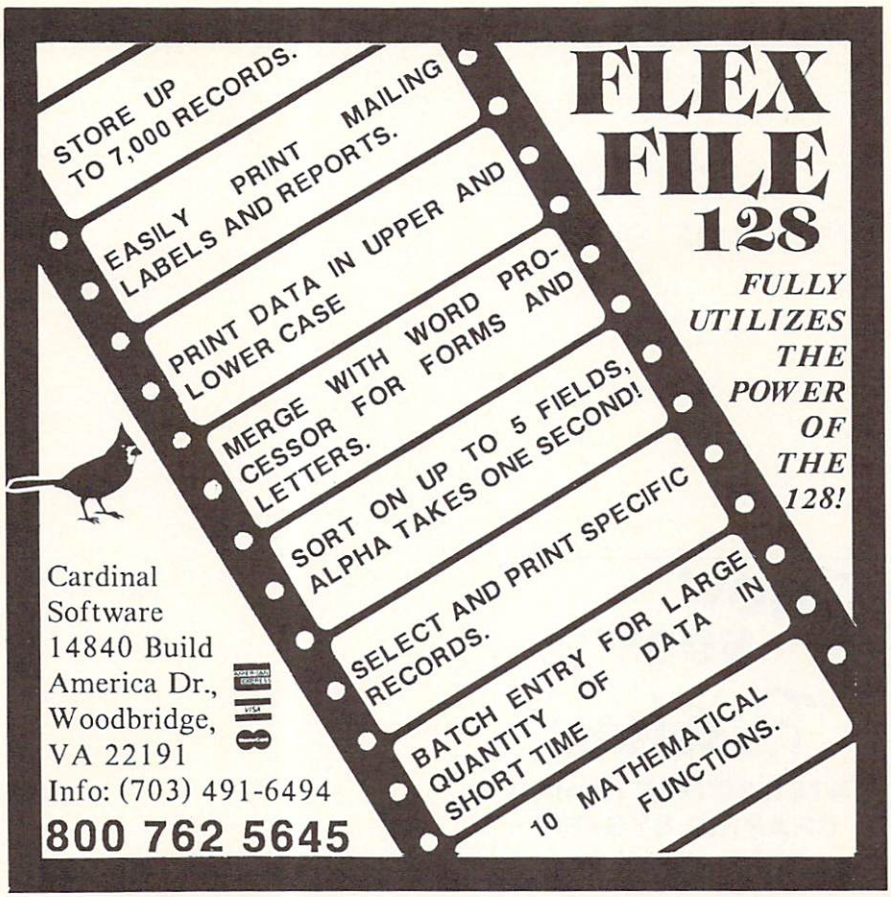

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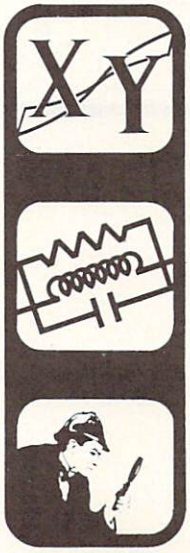

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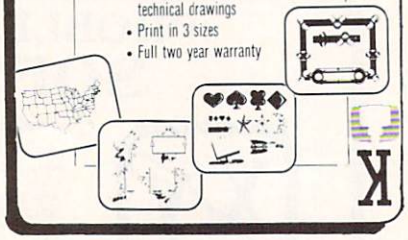

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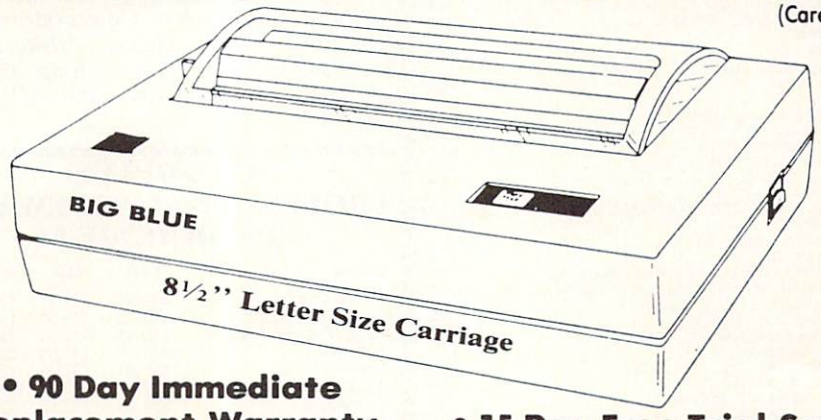

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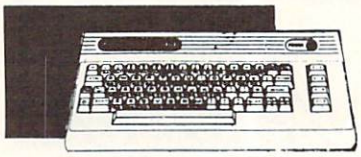

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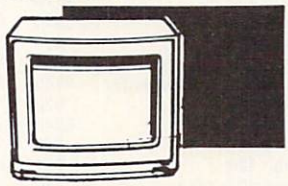

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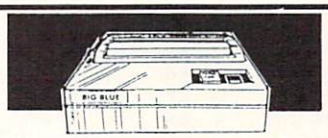

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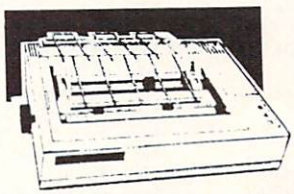

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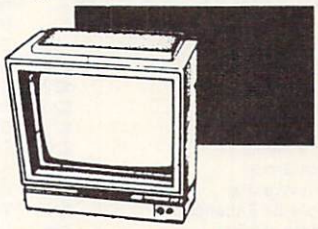

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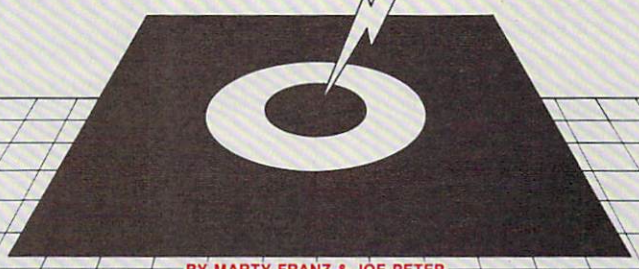

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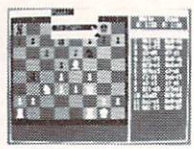

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AMIGA NOTES

MEMORY SAVING TRICK

In addition to the methods mentioned in issue #9, there is one more trick which seems to free up some memory when WorkBench is up and running. After you close a window or application, click on the WorkBench screen a few times, alternating back and forth between the left and right mouse button. The "free memory" message will show several K freed up after a few clicks. (I suspect this technique forces the operating system to reallocate system stack and heap space.)

ULTIMATE STATUS

The ultimate status symbol for an Amiga owner is a vintage Amiga joystick plugged into port two. Most folks don't even *know* that Amiga produced joysticks and other controllers for a couple of years before they began designing the Amiga personal computer. Of course, the *ultimate* ultimate Amiga status symbol is the **Amiga Joyboard**, a foot-operated joystick-type controller that looks not unlike a black bathroom scale. It was originally shipped with a companion skiing game cartridge for the Atari 2600 game machine.

CLI EDITING

The CLI is a line-oriented editor, a throwback to the ancient days of home computing. After using the full-screen editor on the Commodore 64, using the CLI editor on the Amiga is a painful experience.

The CLI does support a few basic editing keys, though they are not well documented in the Amiga manuals. Most use a combination of an alphanumeric key with the CONTROL key, just as CP/M does. They are all listed on the AmigaDOS Ergcard in issue #9, but here are the most useful:

CTRL/X	Delete line
CTRL/I	Tab
CTRL/J	Newline
CTRL/L	Clear Window
CTRL/\	End Sequence

There are others, but they are mostly useless. Notice the conspicuous absence of a true backspace key or a 'Repeat Line' key. Both are sorely missed.

The 'End Sequence' key can be used along with a simple AmigaDOS command to turn your CLI window into a simple typewriter. Enter the command line **COPY * to PRT:** and hit return. Every line you type will be echoed to your default printer. To end the session, use the 'End Sequence' key, CTRL/Backslash.

CHIP TROUBLES

If you own an early model Amiga, you could be plagued with problems resulting from a marginal 8520 ACIA chip. The Amiga is equipped with two of these pesky devils. We've got an early machine suffering from the symptoms of a bad "A" chip right now. Formost among them is the inability to run version 1.2 of the Workbench without crashing. (Some sort of system timing problem is involved, apparently.) Other programs seem to be prone to difficulties, also, with no real predictible regularity. Failure of the "A" chip is also sometimes tied to parallel port problems. A blown "B" chip can result in disk problems and dead mouse/joystick ports. Most dealers who service Amigas know about the problem and can perform a simple chip transplant to bring your machine up to snuff. Check with your local dealer if you think you might have a problem.

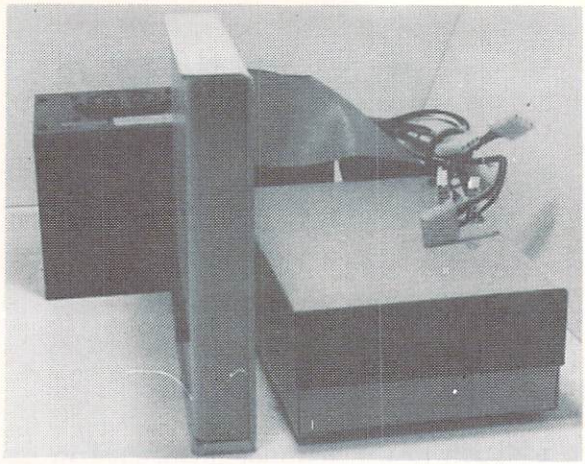
MORE EARLY PROBLEMS...

If you bought an external disk drive to go with that early model Amiga, and then later tried to add a *second* external drive, you may have found that it did not work. Well, the problem was that early drives did not pass the 12 volt line from the Amiga on to the next drive in the daisy chain as they should have. If you hook the *new* model drive to the Amiga, *then* the older drive to the newer drive, all will work well. The latest revision of the external drive passes the required voltage properly.

NO MOUSE?

With everything on the Amiga driven by the mouse, how can you run your programs if your mouse goes belly up? Don't worry; the kindly folks at Commodore/Amiga thought of everything. There are *keyboard equivalents* for the Amiga mouse. The cursor keys simulate the up/down and left/right mouse movement when used in combination with either Amiga key. Use the Shift key, too, to speed up mouse movement. Alt/Left-Amiga and Alt/Right-Amiga combinations substitute for the mouse buttons. Note that some programs (such as Marble Madness) override this native Intuition feature so it won't work.

MICRO FORGE HARD DRIVE



The search continues for the perfect hard disk drive for the Amiga. Tecmar has bowed out of the game, taking their overpriced but pretty entry with them. Micro Forge was the only other company to offer a hard disk drive for the Amiga early in its history. Others are now available or are becoming available "soon", but Micro Forge's is tried and true, having been available for months.

At $1582.70, no one can call the Micro Forge drive cheap. But it *is* almost $500 less expensive than the Tecmar hard drive, and offers similar performance.

THE HARDWARE

The unit we received for review had a rather large interface card which stuck up a couple of inches above the top of the Amiga. The plastic case which enclosed the card snapped together and enclosed the card without supporting it, which made for a rather shaky-looking arrangement. (They have recently changed to a metal case with the board reassuringly bolted in place.) The drive was in a beige metal case with some rather random openings in the rear for cable connections. Accompanying the drive was a huge black power supply with a cooling fan that had apparently once been part of a nuclear reactor. The fan mounted in it looked like the tail rotor from a Huey helicopter. An octopus of colored wires and connectors extended from it in all directions. We have been told that the latest version of the drive is in a metal dual-drive case with an integral power supply and is much nicer to look at. It would have to be.

Firmware installation of the drive involved plugging everything in where it was supposed to go, struggling with the cheap plastic interface card box, and making one phone call to Georgia to make sure I had it all right before I switched on the power. (I was afraid a misconnection might shut down the Midwestern power grid.) The fan in the black box surprised me by making less noise than the "hair dryer" blower on the Tecmar prototype.

If you want to, you can buy a 10-meg or a 40-meg version of the Micro Forge drive, and the new style dual drive case will even hold an additional 10, 20, or 40-meg drive. The black power supply of the unit we tested would also power an additional drive in its own metal case.

THE SOFTWARE

It was easy to transfer the installation files I needed from MF's disk to my own WorkBench disks. As with most add-on hardware, Micro Forge's hard disk demands that its own installation routine be on the Workbench boot disk, so if you own any software that absolutely must boot from its own unmodified disk, you will not be able to configure it for the Micro Forge (or probably *any*) hard drive. After the initial installation on the WorkBench disk, the hard drive was available on bootup, at the cost of about 64K of system RAM for the hard disk driver.

OPERATION

Well, it works. Like Tecmar's, Micro Forge's hard disk gives you 20 megs of storage on one AmigaDOS-compatible drive. All AmigaDOS commands worked as expected. Unfortunately, we timed this drive at only about 2X to 3X as fast as an Amiga floppy disk drive, the same speed as the Tecmar. Micro Forge says the actual data transfer rates are about 5X to 7X faster, but there are some "real-world" directory and miscellaneous considerations that restrict it, too. Until we see a DMA drive, this is apparently the best that can be done under AmigaDOS.

CONCLUSIONS

We hope to see faster drives at lower prices eventually. In the meantime, the folks at Micro Forge are good to work with, and seem earnest about supplying good customer support. That's important. They also offer discounts and special support for developers. If good support and increased storage are important concerns, the Micro Forge hard drive is a good choice. If you need speed and lower cost, you will have to wait for another hard disk drive to come along.

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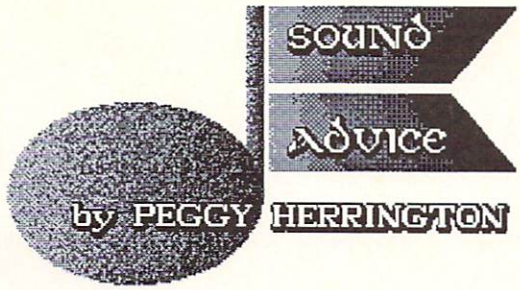


Digital Sampling on the Amiga

Remember those dogs that sang Jingle Bells on the radio last Christmas? If you do, you know a bit about digital sampling.

Sampling was initially a means of recording traditional music instruments to use in electronic music, so that it would sound more like The Real Thing. During the past few years, many techniques for making and using samples have been developed, along with a number of sampling instruments, which of course includes the Amiga. The Amiga's sound production hardware centers on four sound channels that work much like ordinary tape recorders. Each of them can take a series of numbers from memory and, with a corresponding, variable rate digital-to-analog converter (all of which reside on Portia, the sound chip) convert those numbers into sound. That part is built-in. One way to put numbers for sound into memory in the first place is with an analog-to-digital converter, the main piece of equipment in a device called a digital sampler. That part doesn't come built-in and you can get the low-down on Amiga samplers and the software required to make, manage and manipulate samples right here.

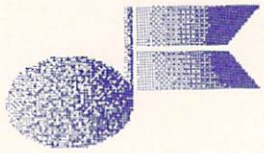
Before we go into what these external devices do and how well they perform, let's look into sampling in general. Webster defines *sample* as "a part or piece taken or shown as representative of a whole group, species, etc.; a specimen; pattern". In its purest form, a digital sound sample is nothing more than a little snatch of sound (traditionally a second or two) turned into numbers, that, as Webster suggests, reminds us of a certain type of sound when we hear it played. It could be a saxophone, a drum, a jetplane, a thunder-roll or even a short orchestral passage. Provided the numbers are in memory, the Amiga can play four samples at once, each of which can be literally anything you can hear. Samples are usually very brief in duration because they require enormous amounts of random access memory (RAM). Their overall clarity and the length of time they sound are directly related, and you can't get one without sacrificing the other. I'm not certain there is such a thing, but typical Amiga samples I've seen are from 30 Kbytes to 100 Kbytes in size, and some are twice that. Not only can the Amiga play these sampled sounds, it can play each of them at any pitch you tell it to.

Those dogs owe their songster fame to the nature of digital recording. Analog devices like tape recorders store all aspects of sound as one integral unit. With a device like that, you can't separate the characteristic sound of the dog from the pitch (relative high or lowness) of his bark. But with a digital device like the Amiga, you can. Somebody got Bowser to bark into a microphone, recording it digitally (which is the process of sampling) and then through software control they altered the pitch of that bark over and over, shaping it to the tune of Jingle Bells and recording it with an instrumental accompaniment. Although the Amiga wasn't around when that record was made, of course, it is fully capable of sound production of that caliber.

MANIPULATING AND ALTERING SAMPLES

The variety of sounds you can make with sampling is limited only by the software you can get your hands on and your imagination. With music composition software that's compatible with the samples you make, you could sample someone saying "Hello!" and play it back on a musical keyboard, changing the pitch each time you press a key. You could play chords of "Hellos!" or sample chords played on a piano (major, minor, diminished seventh, etc.) and put them into a piano arrangement, using only one Amiga channel if you worked at it. Provided you have the contacts, you could even sample an orchestra and produce *Peter and the Wolf*. Programmers are using samples for extraordinary sound effects in games. The neatest thing about samples, though, is that you're not stuck with the sound you started with.

Other aspects besides pitch can be altered. With the right software, you could add reverb or echo effects or flop the sample end to end and play it backwards. With a technique called looping, you could stretch out an internal portion of a sound and sustain it over a longer, indefinite, period of time. By detuning several identical samples slightly, you could hear a bank of violins or a group of people singing from your speakers. Yes, in stereo. You could mix two or three samples together so that they would occupy only one of the Amiga's four



channels, or take a hunk from one and put it somewhere within another and mix that with yet another, to devise your own personal never-heard-before sound. Unlike spinning a record faster, you could change the speed of the sound without altering the pitch. Manipulations like these aren't that hard to accomplish because sampling software usually graphs a sample as a sound wave, with distinctive patterns of peaks and valleys at which you point and click the mouse to designate the portions you wish to work on or move. Remember, samples are numbers and making changes to them are simple mathematical exercises to a computer.

MATH AND OTHER MYSTERIES

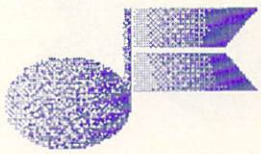
But making *good* samples isn't easy. Samples can be compared to movies which, as we know, are still pictures shown one after the other at a speed that fools our eyes into seeing movement. Sampling does the same thing to our ears. Individual audio stills are played at a rate that makes us hear continuous sound. Bad samples are like jerky motion pictures; audibly or visibly, if you don't have enough stills (in sampling this is called resolution) and if they aren't individually accurate, you won't get a good representation of the original. Each audio still in the Amiga is recorded in one 8-bit byte (256 values). Due to the way computers handle numbers plus a host of other factors, those stills aren't as accurate as their photographic cousins.

Microphones convert sounds into constantly fluctuating voltage. An audio still is made by freezing that voltage, recording its position in 256 values in whole numbers ranging from -128 to +127 -- which is only an approximation of the voltage at that instant since it doesn't actually travel on whole number boundaries. It's close, but error is still introduced. Graphs of stills from pitched sounds show repeating patterns of peaks and valleys, one set of which is called a cycle or Hertz (abbreviated Hz). A sound with 440 sets of peaks and valleys is said to have a frequency of 440Hz. When that particular sound passes a given point in one second, its pitch is heard as the one that orchestras tune to, Concert A, known in electronic music circles as A4. Each musical pitch has its own frequency in Hz and that's important because sound must be sampled at a rate (the number of stills per second) that is twice the frequency of its highest pitch.

If you're with me, you're figuring a rate of 880 samples per second would suffice to record a trumpet playing Concert A (440Hz). It isn't because all sounds except sine waves have overtones, higher frequencies that are less obvious than the fundamental pitch, and which determine the characteristic nature of a sound. Overtones help us distinguish between similar sounds, like a singer as opposed to a barking dog. Most sounds don't have to include all their overtones to be recognizable but the dividing line between recognition and true reproduction with all the stops along the way, will never be determined. Sampling is as much an art as a science, and, since there's no easy way to determine the highest overtone in a sound anyway, the trick is to guess at the sampling rate and give it a try. You'll get a feel for it in time. If the rate is too high, you'll waste computer memory and if it's too low, you'll have trouble recognizing it when you play it back.

An explanation of the strange results of an insufficient sampling rate was told to me by Sam Dicker and Bob Hoover, the guys who designed the audio software in the Amiga's ROM. Ever noticed how wagon wheels in western movies seem to turn backwards just after the wagon gets underway? That's a rate (the number of still photos per second) that's insufficient for the job, which in this case is fooling the eye into seeing the accurate motion of the wheel. It's just a little curiosity there, but when the same thing happens to a sampled sound, it's disastrous. The faster moving, higher pitches fold down on themselves, sounding lower than they were originally, while other, lower sounds continue on course. This is avoided by setting the sampling rate twice as high as the highest pitch (frequency) in the sound, including overtones. To guarantee including the highest humanly perceivable pitch (20,000Hz or 20kHz), you'd have to set it at 40kHz -- that's 40,000 samples per second, 40,000 sets of 256 values, two seconds of which would require 80 Kbytes of memory. Although some professional digitizers can manage that, tops on the Amiga is 28kHz. That's acceptable when you realize that most of us can't hear anything higher than 15kHz anyway.

Lots of other things can influence a sample. The quality of the input device has a lot to do with it. This is usually a microphone, tape recorder, stereo set or compact disk player that will boost the incoming signal up to line level.



Then there's quantization or the accuracy with which the voltage is represented in binary digits which is governed by the A-to-D conversion process in the sampler. Amiga samplers have good equipment to feed their numbers into, because the Amiga's resolution is potentially better than its 8-bit sound system would indicate. Usually, that would be a signal-to-noise ratio of 48dB, meaning that background hiss would be at most 48dB lower than the program material, but by cleverly using the Amiga's 6-bits of individual volume controls (a process called companding) that ratio can be increased to 70dB, with less than 1% distortion.

EXPANSION RAM AND IFF COMPATIBILITY

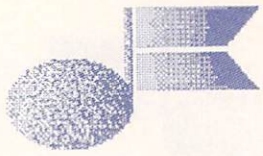
I used the following samplers on a 512K Amiga with and without two expansion RAM boards: a 2-megabyte model ($799.95 plus $99.95 for an expansion box) which is user-upgradable to 4-megs from RS DATA Systems (7322 SW Freeway, Suite 660, Houston TX 77074, 713/988-5441), and a 1-megabyte model ($399 assembled, available for less in a kit) from Academy Computers (1720 Juan Tabo NE, Albuquerque NM, 505/296-4886). Both firms offer other configurations, all implementing autoconfig but none allowing pass-through to the system bus for other devices. My findings follow. I also tested IFF compatibility of samples made by these devices with Electronic Arts' **Instant Music** and **Deluxe Video**, Mimetics' **ProMIDI Studio**, and a prerelease of Commodore's **Musicraft V1.0**. ActiVision's **Music Studio**, as of this writing, does not accomodate samples. Some worked, most frequently with Instant and Deluxe Music, while others refused to load or caused software failures. In all fairness to the programmers of these products, I've concluded that the IFF music standard isn't. A number of music parameters must be addressed before true IFF compatibility will exist.

SAMPLING DEVICES:

Interestingly, the following four samplers attach through three different ports on the Amiga. They and their software couldn't be more different if the developers had collaborated.

FutureSound

($175.00, Applied Visions, 15 Oak Ridge Road, Medford, MA 02155; 617/488-3602). Everything needed to make and alter samples comes in this package. The sampler (5 x 1-3/4 x 5-1/2) sits on or next to an external disk drive and houses a preamp. It plugs into the Amiga's parallel port and has another parallel port for a printer. A switch on the front of the unit toggles between printing and sampling, and is accompanied by microphone and RCA phono jacks (input from which can be mixed if they're both connected). A knob controlling input volume and recording level can be adjusted by watching onscreen peak and clipping indicators during trial sampling runs. I found them very helpful. Completing the package is an inexpensive microphone with a stand, an instruction manual and a disk containing several programs. The sampling rate is adjustable up to the 28kHz maximum of the Amiga and the main program will accomodate four samples simultaneously. The playback rate and volume for each is adjustable and they can be sounded once or looped, separately or together in any combination. Editing is done one sample at a time on a soundwave graph that can be magnified and moved through forward and back. Sections can be marked with the mouse for playing, copying, blanking out or mixing with another sample or scaled louder or softer. Samples can be flipped end for end and saved in three formats: FutureSound's format which is used by the separate play-only **JukeBox** program on the disk (also available in the public domain), IFF One-Shot for sound effects and speech, and IFF 3-Octave With Repeat for music compositions. FutureSound IFF files are generally compatible with Instant and Deluxe Music but not with Mimetics or Musicraft. While not elaborate, the manual is complete, readable and includes hints and technical info. The disk has sound routines and programs in C and BASIC that will call up and play samples. FutureSound does not utilize RAM memory expansion but a program update that does will be sent free to registered owners when version 1.2 of the Amiga operating system is available.



MicroGraphics Digitizer

($79.95, MicroGraphics Images, 20954 Osborne St., Canoga Park CA 91304; 818/407-0571). This sampler goes into the parallel port, too, but it is tiny, being little more than a connecter into which you plug a cable from an amplified sound source. I have a prototype unit with demonstration Version 1.0 software that includes an input level adjustment program and another separate program that samples at a fixed rate of 22kHz for about 2 seconds. Finalized 1.0 will have editing features, they tell me, and save samples in IFF format. Version 2.0 of the software will include music sequencing using a programming-like approach with editing from the Amiga console or a screen design patterned after that used with the Roland TR707 drum machine. Sequences can be nested to the limit of available memory. Version 3.0 is to have full MIDI capability and allow notes to be input from external keyboard synthesizers. 20 channels of sound (16 MIDI, 4 Amiga) are to be accessible simultaneously. Version 1.0 comes with the sampler and registered owners will be furnished with 2.0 and 3.0 at no charge as they are released. What I have looks promising but is not complete enough to utilize with expansion RAM or test for IFF compatibility.

Micro Forge Stereo Sound Digitizer

($349.00, Micro Forge, 398 Grant St. SE, Atlanta GA 30312; 404/688-9464). This unit, which is a little larger than FutureSound, must be inserted into Micro Forge's single slot adapter card (another $85) or their seven-slot expansion box, either of which plugs into the expansion bus on the side of the Amiga. Micro Forge assures me it will work with RAM expansion memory but since I only have the single slot adapter I couldn't test it with my RAM expanders because neither would attach at the same time as the sampler. It has separate RCA jacks for channels 1 and 2, with potentiometers for setting optimum signals from line level inputs. Awkwardly, these devices are situated at the rear of the unit facing the wall. Amplified signals are also acceptable, and with good reason: You don't have to adjust the tiny potentiometers, which you can't see without turning the computer sideways while craning around to watch the SetSSD program display on the screen to do so. Clarity from amplified signals is better. Once set up, you run SoundEdit to record, hear and edit samples one at a time, and you'd better do it from the CLI because you can't get a disk directory otherwise. Sampling rate is variable from 8 to 18kHz (at 18kHz, it will sample for 16 seconds with 512K). Editing features in the software are virtually nonexistant. You can adjust the playback rate, filter some noise out and cut portions from the beginning and end. Five additional disks contain 20 samples (many over 200K in size) of better quality than I could manage with my equipment. The documentation is aimed at developers and covers installation and adjustment, file formats in detail (theirs or IFF 8SVX) and C subroutines for recording and playing mono samples from chip RAM.

SoundScape Sound Sampler

($99.95, Mimetics Corporation, P.O. Box 60238, Station A, Palo Alto CA 94306; 408/741-0117). This sampler is roughly the size of a pack of cigarettes and plugs into the second mouse controller port, fitting flush against the Amiga chassis. If clearance with a device attaching to the system bus is a problem, mouse port extenders are available from Radio Shack. The hardware has three audio ports, one for a microphone (not included) and two for stereo patch cord input from a line level source, although it defeats its own stereo capabilities by combining both channels into a monaural signal. Two sampling programs are provided. The main one is the sampling portion of Mimetics ProMIDI Studio music sequencing program ($149) although a major upgrade will soon be supplied to registered owners. If you overlook some limitations, it is attractive, functional and flexible. The sampling rate is fixed at 15,000 samples per second and gives you a couple of seconds recording time which is sufficient for music instrument sounds; 14 dynamite sampled instrument files are provided. An adjustable amplitude (volume) level sensor starts the sampling process, and waveform table calculation for translating a sample over a ten-octave range is built-in. Alternately, different samples can be stored in each of the ten octaves but editing parameters apply equally to all. One sample at a time may be played back and edited by looping and/or applying an adjustable 3-stage, 4-level amplitude envelope (which is shown onscreen rather than a graph of the sampled waveform),

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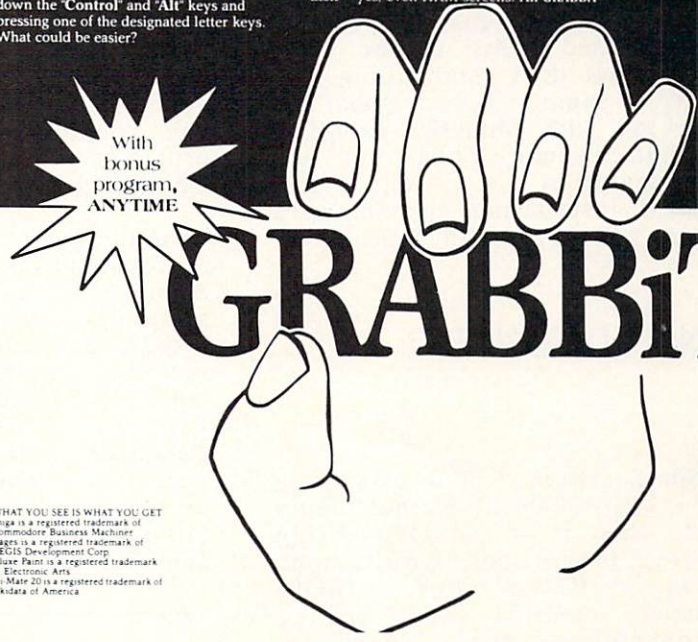

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but edits can be saved only in Mimetics' file format and not in the IFF save routine which is supplied. Samples can be played on the top two rows of the Amiga console or on a MIDI-attached keyboard or drum machine. Incoming pitch wheel and velocity sensitivity MIDI data can be read and adjusted by the software. The second program is called RAMSampler. It uses a fixed rate of 18,000 samples per second for up to 18 seconds of time on a 512K Amiga but has no editing features as it's intended for recording parts of songs, etc. Both programs utilize additional memory from the RAM expansion cards I used. This is the only sampler I know of that does companding and the overall quality of samples is very good, the shorter ones working with Mimetics ProMIDI Studio, Instant and Deluxe Video but not Musicraft. Documentation is skimpy and simplistic; it covers installation and software operation, but in no way is it tutorial or inspirational.

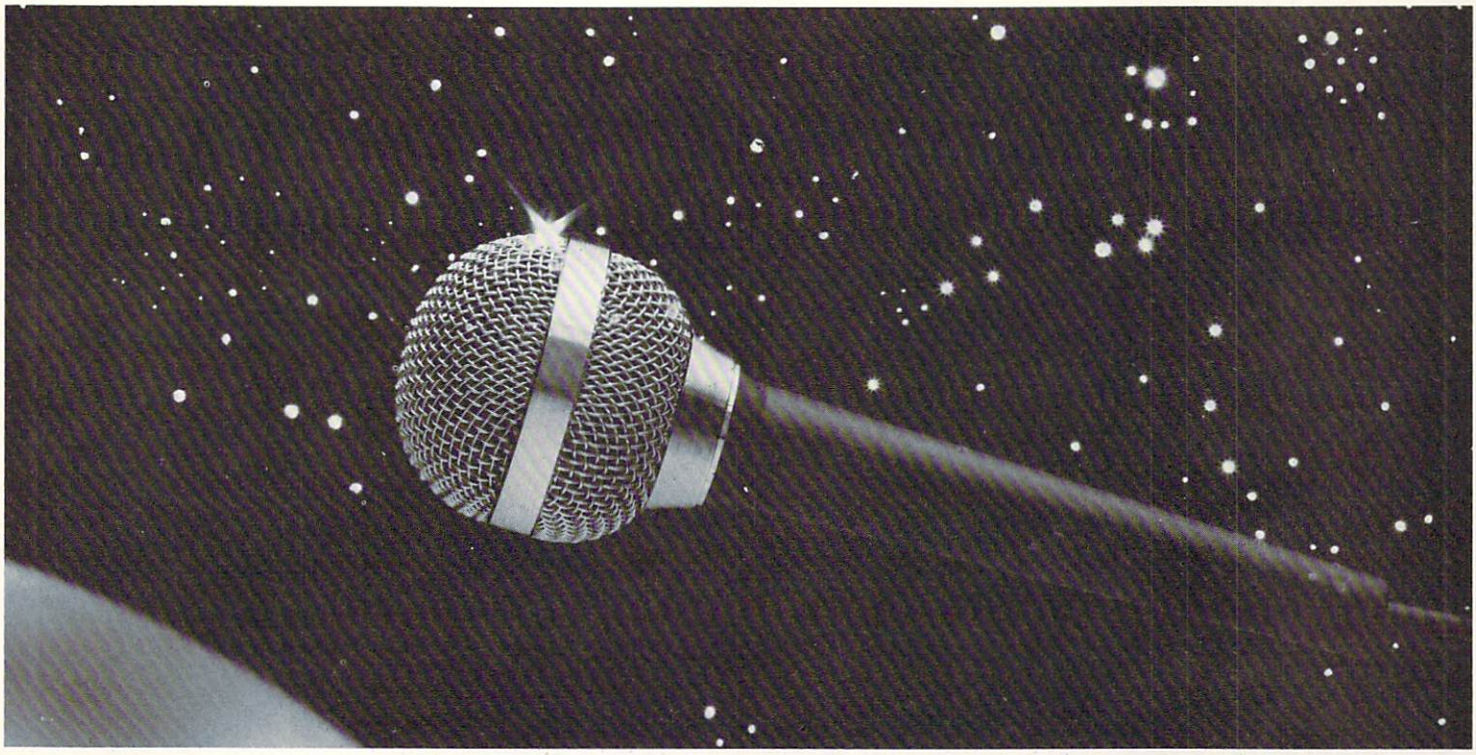
EDITING SOFTWARE:

SoundShop

($49.95, Revolution Software, P.O. Box 38, West Chester PA 19831; 215/430-0412). Rather than a sampling device, this is a sample editing program of elaborate proportions. (On the same disk is **BobShop**, a Blitter Objects (BOB) animated sequence creation and editing program.) SoundShop has three functional areas. The Entire Wave area displays a small horizontal graphic representation of the entire wave of up to four sampled or created waveforms. Each can be sounded once or repeatedly in combination with any of the others, or together in chords. Original values for volume and playback rate for each wave can be altered and portions of it designated with the mouse pointer for editing. Directly below lies the Detail Area where a blow-up of a portion of one of these waves can be displayed in much greater detail. You can move forward or back through the entire wave with this blow-up displaying 512 bytes at a time. The wave can be altered by drawing over it with the mouse or entirely new waves can be created that way and augmented with parts of other waves and/or editing functions. These include copy and paste, adding portions of waves to each other or adding sine waves, interleaving waves, amplification and fading with slopes, looping, and altering individual overtones. Most editing can be done while a sample is being sounded. They are saved to disk in IFF format. SoundTrak, the third area, is selected from a pull-down menu. This is an IFF SMUS 4-part music composition program where sound tracks (with a maximum of 500 notes each) using sampled or created waveforms as instrument voices can be recorded by playing on the top two rows of the Amiga keyboard, one track at a time. An editing window allows for correcting mistakes numerically and adjusting tempo and track volumes. The documentation is thorough and IFF sample compatibility to and from other programs is about the same as the others mentioned here.

Sampling is the hottest new trend in professional music today. There are a couple of Apple // hardware add-ons that offer sampling, and the MacIntosh can do it at a fixed rate of 22.2kHz. Several dedicated sampling keyboards are on the market, the most affordable being Ensoniq's **Mirage** which goes for $1695, followed by the E-MU **Emulator** in the $8,000 range. Leader of the pack (and we're not talking dogs here, singing or otherwise) is the Fairlight **Series III** which, although it's much more than a sampler, goes for a howling $59,000

"No, no; it's spelled T-O-K-E-N ring",



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APPLIED VISIONS

Applied Visions, 15 Oak Ridge Road, Medford, MA 02155 (617) 488-3602

continued from page 19

comprised of three modules which control music, graphics, and animation. The majority of the manual is devoted to a music tutorial. The music screen editor is as nice as some stand-alone music editors, so I suppose they have reason to be proud of it. The graphics section is good, too, and includes circle drawing and a good fine editing mode. The animator deals mostly with the design and movement of sprite images, though you can do a copy/move form of animation that is especially suited to simulating regular motion of screen segments, as for leaf rustling and water flowing. Judging by the demos, it's possible to produce some pretty good animations with this package.

GARRY KITCHEN'S GAMEMAKER

GameMaker ($39.95 from Activision) is not exactly an animation program. It is, more accurately, a game maker. But it is so good at churning out animated cartoons that we just couldn't omit it. This package includes SoundMaker, MusicMaker, SpriteMaker, and SceneMaker modules for the creation of complete videos. Each is at least as good as stand-alone programs in similar veins. A game-and-video scriptwriting language ties together the component parts into an integrated whole. This language not only controls animation and sound, but since it is meant to be primarily a game design tool you can also create *interactive videos*. Your animation components are limited to sprites with this package (though up to 4 can be linked to form one object), but the interactive elements make it a lot of fun to use. There are also libraries of scenes, shapes, and sounds available separately from Activision.

Though we don't have our copy yet, the demos we saw of **GameMaker** for the Amiga at CES in June were just incredible. I could have played with SoundMaker alone for hours! This package will be a real knockout on the Amiga.

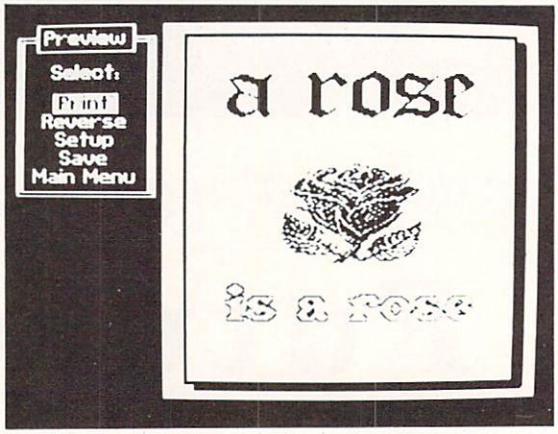
C-64 Printer Applications

PRINT SHOP

Print Shop ($39.95, Broderbund) was the first printer creativity program for the C64. It allows you to make your own signs, greeting cards, banners, letterheads, and designs by "pasting" together graphics images and text on the computer screen, then dumping them to your printer. An editor for graphics images is included. There are literally thousands of Print Shop icons available by now from Broderbund, little third party companies, and public domain libraries. Print Shop was a real innovation, and is still a fun and powerful graphics tool.

PRINT MASTER

Print Master ($34.95, Unison World) is a printer program similar in scope to Print Shop,

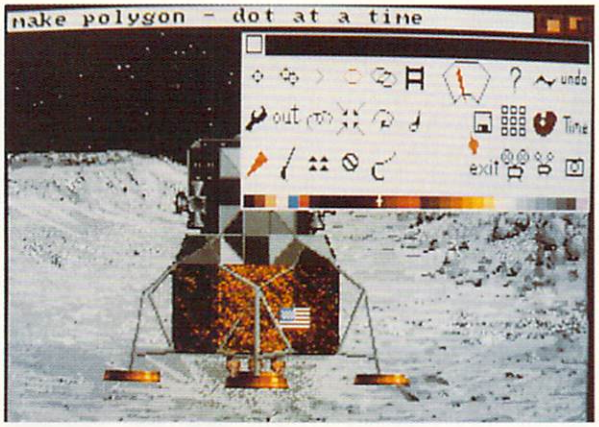


though it lacks the Screen Magic designer, substituting instead a calendar printing function. Since it came later, Print Master had the advantage of addressing Print Shop's shortcomings. Thus it prints faster and features a video preview mode, so you can tell what your creation will look like before you commit it to paper. Print Master graphics are incompatible with Print Shop's, but many are now available, and most graphics conversion packages will transfer icons from one to the other.

THE NEWSROOM

Springboard's **Newsroom** package ($50.00) lets you create your own newsletters. By arranging text, graphics, and title strips, you can come up with some nice-looking newsletters. You have your choice of five fonts in two sizes and a library of premade graphics, plus optional disks with more. Newsroom seems to be more sensitive to printer type (especially Epson) than some other print programs, so be sure to check out the print quality of Newsroom with your brand of printer before you buy.

Amiga Desktop Video/Animation



AEGIS ANIMATOR

Though it does not do sound effects or music, **Aegis Animator**($139.95) *does* do tweening. That's a process that takes polygons and twists and transforms them into new shapes. Tweening is the major feature of Animator and what makes it easy and fun to use. This package has tools that let you path move objects, rotate them around 3D axes, and change them into new objects. Besides colorful polygons, Animator can also manipulate windows, which can be created with **Aegis Images**, bundled in the Animator package. Backgrounds are also created with Images. With its pull-down menus, mouse operation, and fast menu, Animator is so easy to use that even kids can create some pretty nice cartoons with brightly animated shapes in short order.

DELUXE VIDEO

Deluxe Video ($99.95 from Electronic Arts) for the Amiga features cel animation, music, and sound effects. For a complete look at Deluxe Video, check out Ted Salamone's closeup report elsewhere in this issue.

IMPACT!

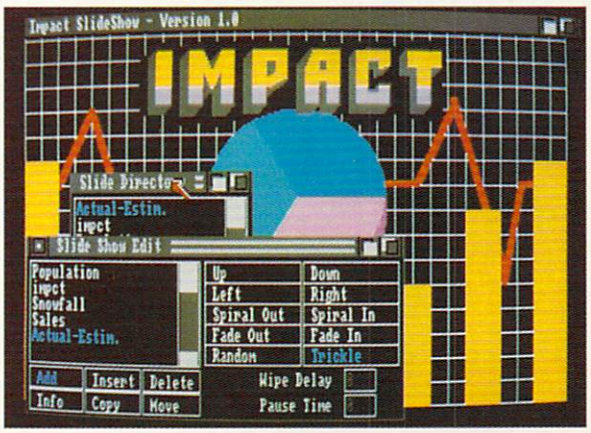
(not copy-protected!)

IMPACT! ($199.95, by Aegis Development) is billed as an easy to use business graphics and presentation package. Unfortunately, **IMPACT!** doesn't measure up to Aegis' other fine, and reasonably priced graphics titles.

The first problem with **IMPACT!** is the price: how can a company that markets a full-featured paint and animation program for $139 turn around and charge $200 for what amounts to a specialized (read 'less versatile') paint program with a slideshow utility and a rudimentary facility for converting simple tabular data into graph elements and labels?

The rest of **IMPACT!**'s flaws have to do with the clumsy user interface which seems dedicated to the proposition that the more mouse clicks and trips to the menu bar, the better (the double-requestor, manual-entry file handling is especially user-hostile).

Entering data for "automatic" graphing is no picnic either (both manual and imported file techniques are unnecessarily time-consuming).



In short, **IMPACT!** is too awkward for professional use, and too expensive & narrow in scope for casual use. I would much rather see Aegis work on an auxiliary disk for **IMAGES** which, for $30-$40, would add a slideshow module and a wide range of pre-designed brushes, grids, backgrounds, and other specialized tools for creating business visuals. Building on this already established product line would give users a much broader set of capabilities for their dollar, and do so in an already familiar graphics environment. Until this happens, I recommend sticking to your favorite paint program, getting one of the several slideshow utilities available, and building your graphs 'by hand'.

Amiga Printer Applications

DELUXE PRINT

Deluxe Print ($99.95 from Electronic Arts) is the first printer creativity program for the Amiga. With it, you make all the standard printer program stuff: signs, greeting cards, banners, labels, letterheads, and calendars. There are lots of graphics to pick from, and you can use all of the Amiga fonts. The editor does not limit you to preset spaces for your graphics and text as the C64 printer creativity programs do, but still offers such helps as automatic centering, flipping objects, etc. It also lets you print your creations in full color, if you have an Amiga-supported color printer.

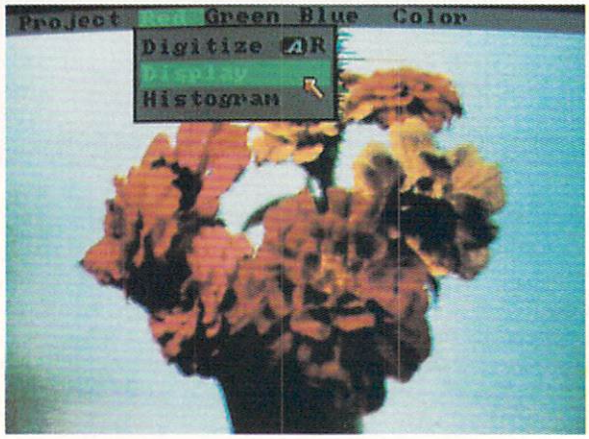
Digitizers

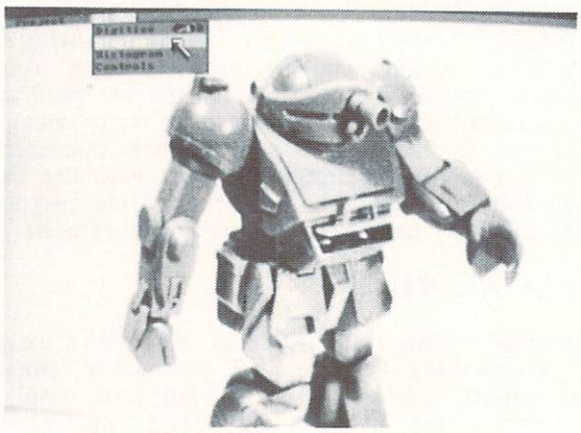
COMPUTEREYES
(for the C-64/128)

COMPUTEREYES ($129.95 from Digital Vision) is the established video digitizer for the Commodore 8-bit computers. By combining **COMPUTEREYES**, one of the low-cost black & white video cameras supported, and the C-64, you can assemble the industry's lowest cost complete digitizing system (about $500 less disk Drive). **COMPUTEREYES** is easy to use: the interface has simple adjustments for brightness and sync, and the software is entirely menu-driven. Digitizing an image takes from 5 to 50 seconds depending on the number of grey scale values desired. Digitized images may be saved to disk, and several software-specific disks are available from the manufacturer to allow saved images to be used with popular graphics packages.

DIGI-VIEW
(for the Amiga)

DIGI-VIEW ($199.95 from NewTek) is an incredible (and affordable) digitizing package which uses an inexpensive black & white video camera (we have been using the $235 Hitachi HV-720U with excellent results) to produce dazzling, near-broadcast quality color images on the Amiga. Color digitizing is done by making three passes (about 12 seconds each)





with three different filters, and then automatically combining the images together into either 32-color pictures which can be saved as IFF files (and loaded into other graphics packages) or even more impressive 4096-color HAM (Hold & Modify) pictures. Other video sources (like tv, VCR, and video output from other computers) can also be used as input for black & white digitizing. Color images can be further processed via a software

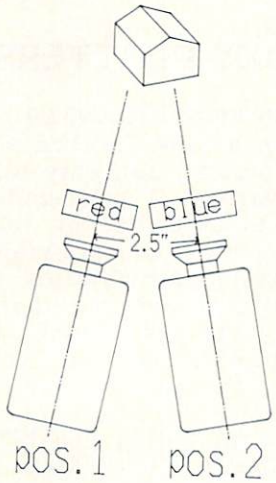
control panel which allows adjustments to brightness, saturation, contrast, sharpness, and individual RG&B levels

Digi-View also has a high-res monochrome mode (see photo) which doubles the resolution, and uses a 16-level grey scale. The only complaints we have with Digi-View, are the lack of a cable pass-thru on the interface (so we don't have to keep unplugging our parallel printer cables when we want to digitize), and the need for a sturdier, more professional filter wheel assembly.

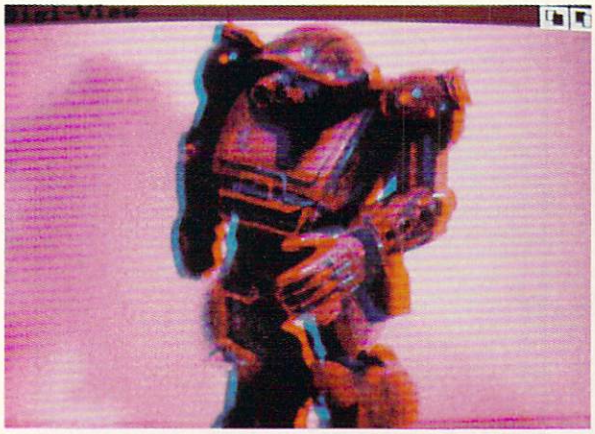
This is a must-have peripheral for the serious Amiga video and graphics enthusiast!

3-D Digitizing with DIGI-VIEW

While fooling around with **DIGI-VIEW**, we accidentally discovered this easy way to create those eye-opening 3-D images (you know; the kind that use red & blue glasses to view) with your **DIGI-VIEW** equipment and software: First, boot-up **DIGI-VIEW** and compose your view (you have to use a real object- a photo or recorded image will not, for fairly obvious reasons, work). Scan the red plane once, using



the red filter (position 1). Move the camera about 2 1/2" to the right (or rotate the object slightly to the left) keeping the camera aimed at the center of the object. Now scan the blue plane with the blue filter (position 2). Next, view the object in color (4096-color mode works best): you will see a double-image with blue and red 'coronas' to the left and right.



Now, take the filter wheel off the camera, and view the screen through it with the blue part of the filter in front of your right eye, and the red part in front of your left. Rock back and forth from right to left while you view. Don't be scared: it's only a picture! If you didn't get a pronounced 3-D effect, experiment with your two positions (too much distance between shots will spoil the effect), and check that your 'glasses' are oriented correctly for the image (try both left-right and right-left). If you have a pair of those 3-D B-rate sci-fi movie glasses lying around, you can get some of the effect from the above photo (tho viewing the screen is about 10 times more convincing). Have fun!

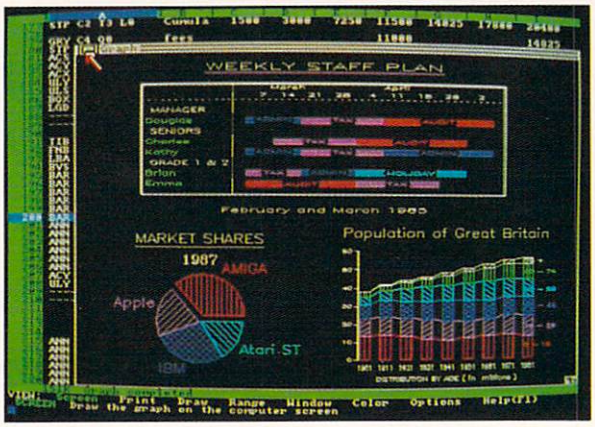
Last but not Least:

LOGISTIX

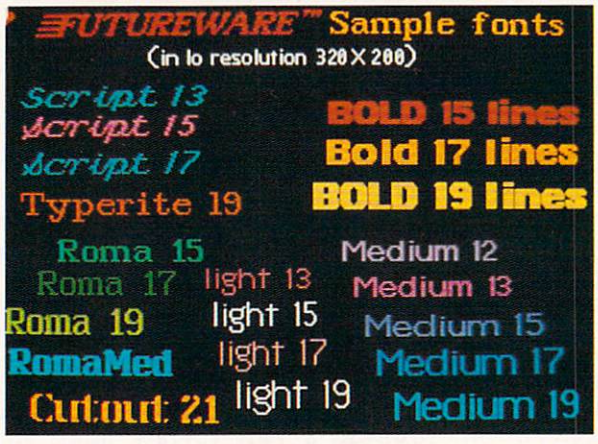
(dongle-protected, unlimited copies)

LOGISTIX ($249.95 / distributed by Progressive Peripherals) is a super heavy-weight contender for the Amiga integrated spreadsheet crown. So what is it doing in our graphics report? Well, **LOGIXTIX** has such a comprehensive set of business graphics tools built in to it that even if it weren't the premiere "Lotus-Killer" for the Amiga (and it is!), you might consider buying it just as a dedicated business and presentation graphics system! We promise a full review later, but here is a taste of some of the graphics capabilities:

* Low or hi (640 X 400) resolution).
* Single and multiple pie charts.



* Bar charts (floating, stacked, clustered, linked, 3D, percentage, horizontal, and vertical).
* Gantt, line, step, tick, scatter, spread, & dual Y axis charts.
* 5 titles & 128 free-format annotation lines.
* 9 character fonts, 10 sizes (these are hi-quality stroke-fonts which can be pen-plotted).
* Up to 4 graph windows on screen at a time.
* Full control over grids and axes.
* Logarithmic axes.
* Extensive control of supported printers and plotters (including color)
* 10 hatching styles, 10 line styles, 10 font sizes, 10 line styles, 10 font & line weights, and 10 special scatter markers.



"GREAT NEW FONTS"

(not copy-protected!)

"Great New Fonts" ($14.95 / Classic Concepts FUTUREWARE) is a set of custom Amiga fonts which can be used with or in place of standard Amiga fonts. This first collection includes 13 separate type styles in several point sizes ranging from 12 to 20 lines high. We especially like the Roma and Bold styles on this disk. FUTUREWARE fonts may be used with scratch pad, popular paint programs, and any other program which uses standard Amiga font files. Other collections (at $19.95 per disk) scheduled for release soon include: Decorative / Calligraphy / Script / Storybook Capitals / Codes and Special Fonts. Easy to use, and a good value.

ROLAND DXY PLOTTERS

The **DXY 880 Plotter** ($1295.00 / Roland) is an excellent 8-pen color flat-bed plotter which is fast, quiet, precise, and easy to install and use. A wide variety of pens and point sizes are available to suit plotting tasks ranging from precision mechanical drawings to 8-color overhead projection presentation films. Pens are automatically picked-up and returned (but not capped) by the pen holder. One of the best selling points for the Roland DXY plotters is that they are supported by every software package we know of which has plotter routines (including LOGISTIX, AEGIS DRAW & DRAW PLUS, AND DYNAMIC CAD). With this early acceptance, you can expect that these plotters will continue to be supported as new plotter-oriented software is developed. We also like the unique fold-down stand which allows the plotter to operate at a near vertical position (a real space-saver).

GRAPHICS VENDORS

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Classic Concepts, PO Box 94276, Richmond BC Canada V6Y 2A6
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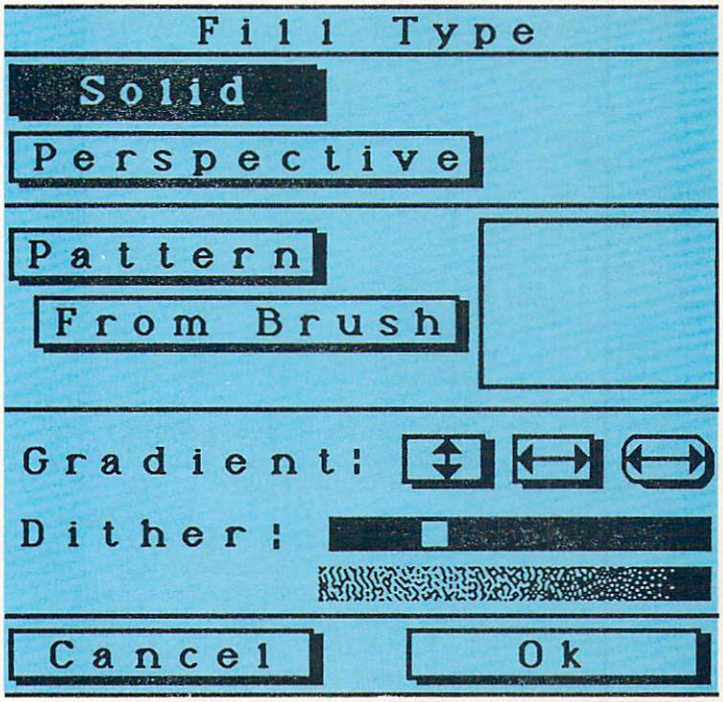
Unison World, 2150 Shattuck Ave., Berkeley CA 94704

DELUXE PAINT II IS COMING!

(from Electronic Arts, available early Dec.) All we could get by press time was the DPAINT II manual, but even reading about this successor to one of the Amiga's all-time graphics success stories has got our mouths watering! A quick run-down of some of the additions/enhancements: Hard disk and RAM expansion support / *fix* and *free* backgrounds (protects existing work while additions are made "on top" of it) / *Tile* has been added to symmetry modes



Fill requestor from *DeluxePaint II*

/ text now supports bold, italic, and underline attributes / polygon brush allows "cookie cutting" non-rectangular shapes / up to 1008 X 1024 pixel virtual screens (full-screen now becomes a window on larger painting area) / convert between page sizes and resolutions without losing work or quitting program / bi-directional cycling / new fill options (see illustration) for solid, perspective, pattern, and gradient fills (with adjustable dithering) / stencils (really nifty) / smoothing and anti-aliasing / aspect correction / perspective brushes (amazing) / improved file manipulation (including deletes) and **MUCH, MUCH, MORE!**

DPAINT II will cost $129. Owners of original DPAINT will be able to upgrade by sending the cover of their manual plus $30 to Electronic Arts. A full review will follow soon.

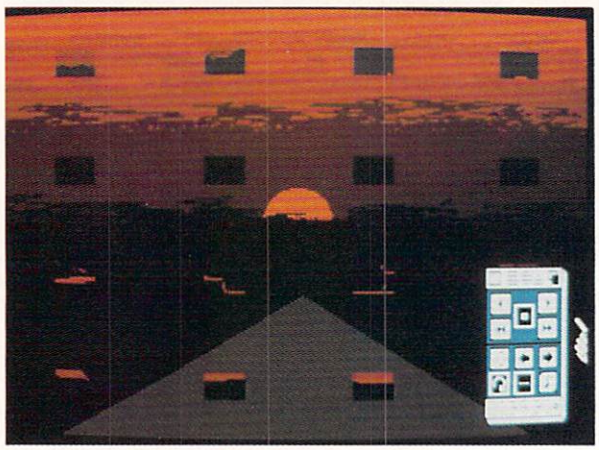
DELUXE VIDEO

by: Ted Salamone

The Amiga is a machine full of promise. Its power, graphic and audio abilities are unique for the price. All you need to complete the equation is the right software. One of the first packages to fulfill the promise of the Amiga is **Deluxe Video Construction Set** by Electronic Arts.

Deluxe Video provides Amigaphiles with professional level animation tools at a fraction of their usual cost. Even a novice can orchestrate animated, *interactive* slide shows, complete with sound effects and a musical soundtrack. Once saved to disk, they can be replayed at will without human intervention. Such freestanding videos can then be fed via standard RCA cables to a (stereo) VCR for production of amazingly high quality presentations. Deluxe Video productions can be used for business promotions or other marketing activities. Entrepreneurs could even establish a business creating them for others.

You do not need the Genlock device or any other hardware for this, though such equipment will certainly enhance the offerings. Optional software includes **Deluxe Paint** (for custom art work), **Instant Music** (for more varied soundtracks), **Deluxe Print** (for printed samples and flyers) and their associated utility and art disks. All are available separately from Electronic Arts. It's best to start with the necessities, then add the rest as your skills and needs increase.



DIFFERENT BUT SIMILAR

While most computer users are somewhat familiar with the usual types of software (word processors, spreadsheets, databases, etc.), this type of specialized, artistically-oriented package may appear more confusing and intimidating. Don't be discouraged; this is natural. After all, the concepts and principles underlying Deluxe Video are significantly different than those supporting most other software categories.

Amiga mavens already acquainted with video production and animation techniques just have to learn Deluxe Video's ways. Initiates must develop familiarity on both fronts

simultaneously, which is a demanding but not impossible task. Absolute novices can create sophisticated, multi-faceted shows with full audio support and special effects in quick order. The nuances and subtleties will, of course, take much longer.

ONE OF THE GANG

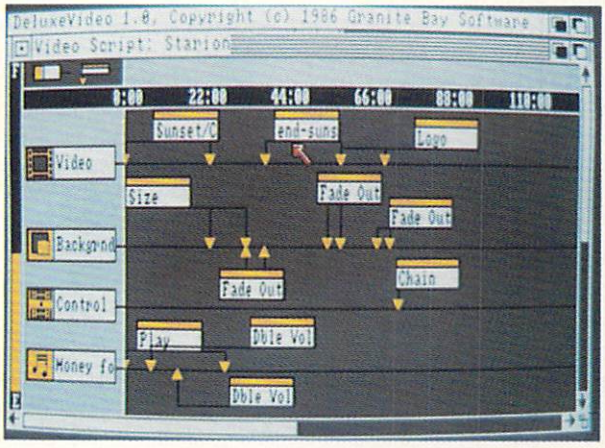
Deluxe Video is not the only video generation program available for microcomputers. Originally available only for supermicros and minicomputers costing $30,000 and up, video animation software is now available in some form for most household name micros.

Based on the standards that have been set by the programs now on the market for other machines, we can come up with some idea of what should be included in a good video animation program.

The command and control interface determines how a program looks, feels, and works. In that respect Deluxe Video is on par with the standard. Deluxe Video's simulated VCR control pad works well because so many people are already using the real thing. This simulated device works well to control the runtime portions of the program, while pulldown menus are in control of construction and tweaking functions.

A video program also must include the ability to create, import and alter free form art and drawings. While Deluxe Video allows easy creation of text based slides, it does not provide the drawing tools. Necessary graphics and clip art can be imported from the previously mentioned programs or other IFF-format works. For custom graphics, Deluxe Paint (or equivalent) is needed. Since DPaint preceded and works well with Deluxe Video, EA evidently felt the duplication of effort was not necessary. (Besides, they can sell two programs this way.)

Deluxe Video makes it easy, via its Framer utility, to add animation, which is probably the most important feature of a video presentation program. The animation subjects, however, must be developed elsewhere. (A sample firecracker on the demo disks illustrates how to use Deluxe Video for this purpose). Deluxe Video does not do "tweening", the process where the initial and ending positions of a subject are designated; intermediate steps being produced by the CPU on the fly. In Deluxe Paint this feature is approximated by careful manipulation of similar multi-cel scenes (the same way cartoons are created) which "move" the overall picture as desired. Run sequentially, they produce the same effect. However, this method requires substantially more effort for the same level of results.



The standard microcomputer animation program does not have anywhere near Deluxe Video's capacity for audio effects. Add the currently available music data disks and MIDI interface capabilities and Deluxe Video comes out far ahead in this category. On other systems, dedicated audio and video editing equipment is normally used to tie soundtracks and other sound effects to videos.

As far as genlock devices, frame grabbers, digitizers and associated devices are concerned, the Amiga is in its infancy. Some of these devices are currently available, others will hit the market as the Amiga prospers. In other words, there's some catching up to do before the Deluxe Video/Amiga combination reaches its full potential.

Deluxe Video's transition effects are on a par with those produced by specialized machines designed solely for video presentations. For example, **Videoshow**, a $4,000 hardware device which needs an IBM PC and separate software to function, has fewer effects. It needs even more custom equipment to produce hardcopy output, while Deluxe Video works with supported Amiga printers.

Its construction and integration approach, the use of background, foreground, music and other tracks is completely analagous with the standard presentation program's use of

"channels". As applied across all the systems, the functions and concepts are identical; just the terminology is different.

Probably the most important and least obvious advantage that Deluxe Video has is the Amiga's ability to generate standard NTSC signals. Almost all other systems need a special (costly) board to translate other signals to NTSC, the signal which drives televisions in the United States. These additional boards manipulate various signals, often losing subtleties or otherwise degrading the quality of the output in the process. Since sending Amiga output to a television or VCR is just a matter of connecting ordinary RCA cables, Deluxe Video videos are produced easier, faster, more cost effectively, and with better results. After all, the quality of the final product is what really counts.

TAKE 1

The first step in running Deluxe Video is to make working copies of the disks. This lessens but does not eliminate the possibility of irrecoverable harm befalling the masters. That's because a master must still be inserted at startup to prove to the working copies that a legitimate copy is around. This "key disk" protection scheme interferes with the goal of such software, which is increased productivity. It hampers hard disk owners even more, sometimes completely preventing placement of the program on the fixed disk. For an additional $20.00 you can send away for unprotected disks. Though the extra steps, money, and delay are annoying, the increased utility is probably worth it.

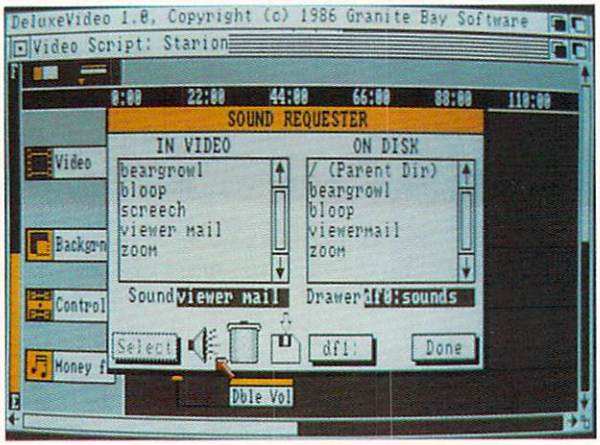
THE WRITTEN WORD & BEYOND

It would be nice to say the user manual is clear, concise and complete. Reality is another matter. Though a lot of information is presented, it is not well organized. Beyond the top-notch tutorial the whole thing gets murky. This might have something to do with the fact that an advanced user's guide is being prepared and may be out by the time you read this. The main problem with the manual is a lack of cross referencing or coordination among functions. Despite earnest efforts, the end result is confusing.

The best way to learn to operate Deluxe Video is to follow the tutorial religiously and then dissect the demonstration videos included in the package. After all that, experiment, experiment, experiment. The results will be worth the effort.

NOTHING LIKE THE REAL THING

Once the initial confusion burns off (like haze on a summer morn), Deluxe Video begins to shine. You sense the power, even begin to see some of the glory. While very few users will be able to quickly reproduce the quality



achieved in the demos, what can be accomplished in a short time is truly remarkable. Remember, the demo videos are a *goal*.

During the development stage of any video it is best to build on fundamentals learned from the demos and the tutorial in the manual. Add special effects or new features one at a time. Play the video after each alteration, making note of the changes. Many times it is not what you expected. Re-read the information about that feature or study its operation in the demos. Relate its observed (or supposed) results to those which occurred in your work. Adjust from there.

Develop a number of sample disks so you have working versions of techniques which prove useful. These modules can be used to create complete videos in much less time. This approach also prevents accidental loss of techniques and methods which took a good deal of time to perfect.

The first priority is to rough draft the video on paper or an outline processor. Translate this script to Deluxe Video. Lay out a loose version of the video. In other words, don't worry about perfect timing, sizing and feature placement until the entire script is in place.

After the loose layout is in place and all script changes have been accomodated, tighten up the details. Configure the timing for each slide and each function within them. Finalize

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the transition methods and adjust any color schemes which may have been automatically altered by previous script changes. By now all text, polygons, soundtracks, backgrounds and art work have been set. There should be no need to disturb them.

Finally, it's time to connect the VCR. The physical task is easy. Producing good taped results is a little trickier. Deluxe Video allows different play or runtime speeds; most VCRs offer different recording speeds. Mix and match both parameters for the best results. Depending upon the actual purpose and contents of your video, different parameters may work better, but my videos taped best when Deluxe Video ran at half speed and the VCR recorded at standard play (SP). This combo played back from tape smoothly, levelling some of the rough spots in the computer generated version.

THE FINAL REEL

Deluxe Video requires massive amounts of RAM and open disk space to work. For this reason expansion above 512K makes life much easier. It is not essential, just more convenient. To accomodate the disk space constraints, strip all nonessential files from working disks.

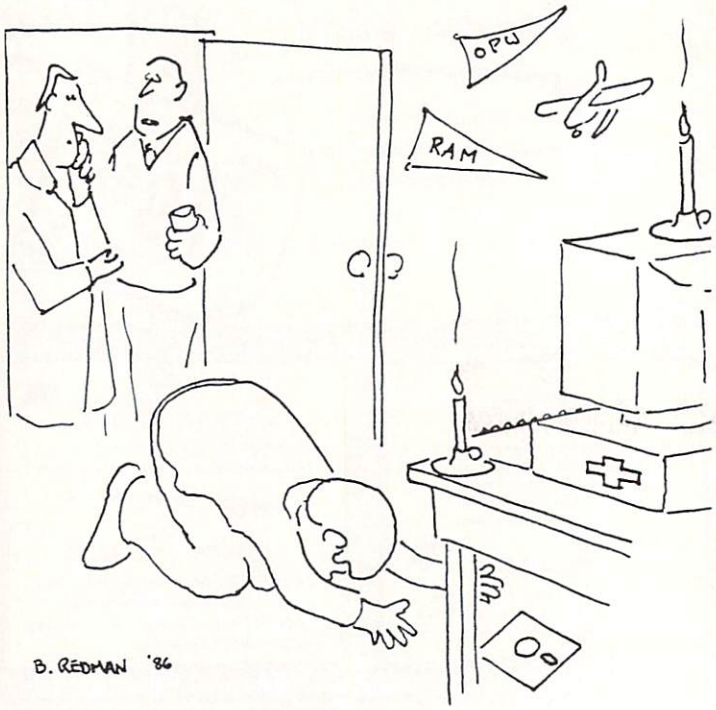
Deluxe Video is an impressive program. It opens new realms and brings advanced capabilities to the masses. There are many features not discussed here due to space. The learning curve is no worse than what should be expected for a program of this importance and these capabilities.

An Amiga without Deluxe Video is like Bogart without Bacall.

BEHIND THE SCENES

Scene scripts define the action in a video. You can create polygon text boxes which can be manipulated by DVideo's special features. APPEAR allows you to set appearance time and position of images (polygons for instance). MOVE TO tells the image where it is to go, while SIZE designates dimensions for the image once it has arrived at its MOVE TO spot. ROTATE TO controls 3 dimensional spinning or rotation of the image as it travels from its APPEAR spot to its MOVE TO location. STAMP conserves memory by placing a non-manipulatable impression of the image at its final resting place. Additional features include PATTERN, a command which designates a grid type for the background. WIPE performs transitions. CYCLECLR cycles the background colors according to designated palettes. COLORS designates the palettes.

Electronic Arts/512K Amiga/3 disks/$99.95



"We encouraged him to take a serious interest in it. Now, frankly, we're worried sick!"

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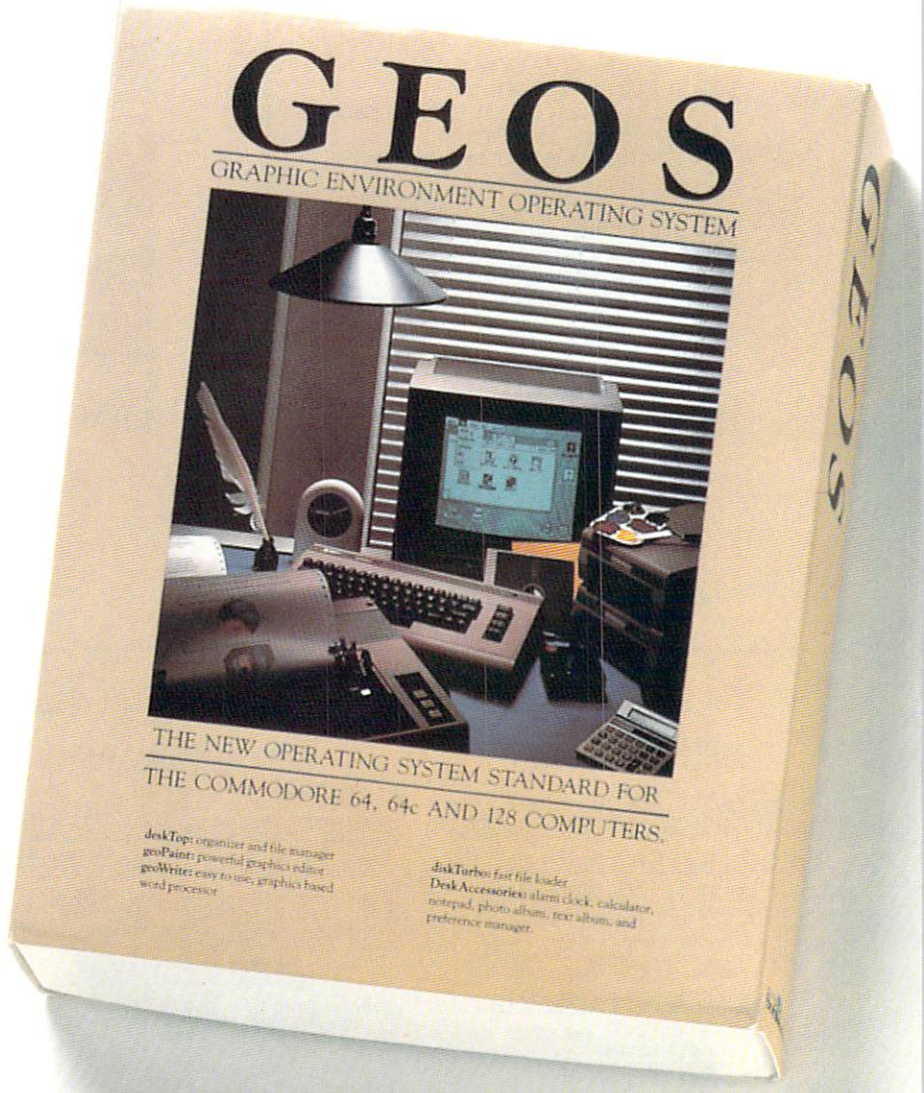
Increase your speed to warp factor 7. The first thing you notice with GEOS is how its diskTurbo speeds up your Commodore's disk loading and storing time.



Not twice or three times as fast. But five to seven times faster than normal. Which lets you streak through files and documents at what seems like warp speed.

And that saves you endless time.

Every universe comes complete with a desk. The way to keep order in our universe is with the GEOS Desktop. It's just like your desk at home, only without the coffee stains.

The Desktop keeps your art and documents filed, and comes

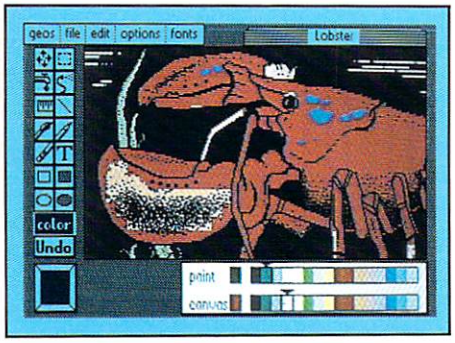
AT BERKELEY
W UNIVERSE.

with all the accessories you need to keep you organized:

An alarm clock keeps you punctual. A notepad keeps your memos. And a calculator keeps your accountant honest.

How to communicate with a new universe. With geoWrite, you can rearrange your written words. Move blocks of copy. Cut and paste. And even display your text in fonts of different styles and sizes, right on the screen.

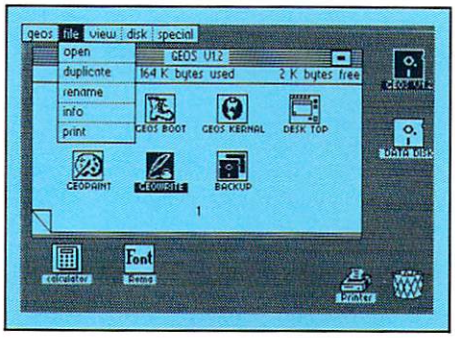
With geoPaint, you become a Michelangelo with a mouse.



Sketching and painting with all kinds of colors, textures and patterns.

You can invert, mirror and rotate images. Insert them into your geoWrite documents. And save them in your GEOS Photo Album for use later.

Finding your way through the universe. The most difficult



thing about a new universe is finding your way around. But with GEOS, you only need to remember two things:

Point and click.

When GEOS offers you options, you just point to your answers and click your mouse or joystick.

You want to draw? Point and click.

You want to write? Point and click.

You want to fill in that obtuse rhomboid with an air-brushed geometric pattern in a lighter shade of pink? Point and click.

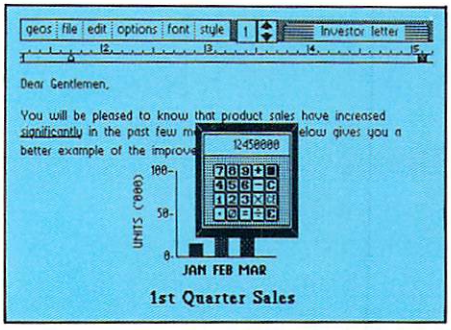
Easy, huh? And in case you ever do make a mistake, GEOS backs you up with an "Undo" feature that undoes the very last command you entered.

Berkeley Softworks

Running out of space. With GEOS, that's hardly likely. Because there's endless space in the universe for new applications.

Unfortunately, there's only so much space in this ad.

So zip down to your nearest software dealer. Tell him you want to explore the new universe in your Commodore.



And if he looks at you like you're some kind of alien, well, just tell him Berkeley Softworks sent you.

The name is universally known.

To order, call 1-800-443-0100 ext. 234

GEOS is just $59.95

(California residents add 6.5% sales tax.) $2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore 64 and C64 are trademarks of Commodore Electronics, Ltd. GEOS, GEOS Desktop, geoPaint, geoWrite, diskTurbo and Berkeley Softworks are tradenames of Berkeley Softworks.

Say you saw it in **INFO!**

The brightest minds are working at Berkeley.

THE UNIVERSE

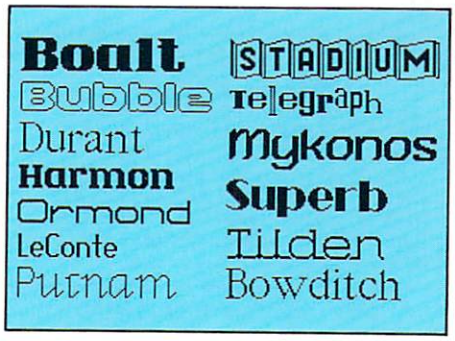
Well, we told you it wouldn't be long until the first GEOS applications were ready. And these are just the first. The number of satellites in the GEOS universe is infinite.

Judge Font Pack on looks alone. Let's face it. People judge your work not only by what it says, but how it looks.

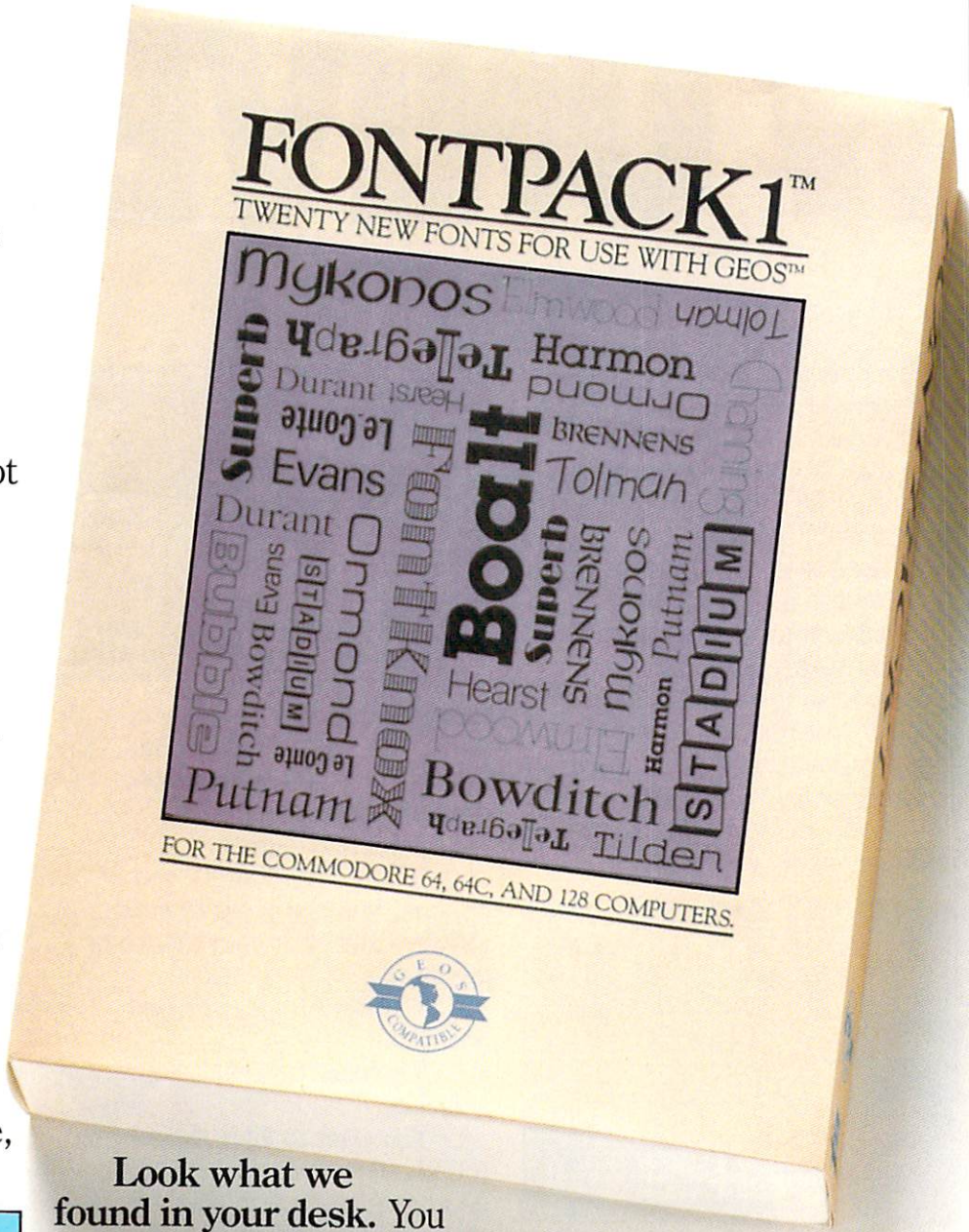
That's why we developed Font Pack. A collection of 20 different type styles that not only say what you mean, but really look like they mean it.

Channing is charming. **Boalt** is all business. FontKnox is financial. And **Telegraph** is ... hmmm, well, you get the point.

When you combine these 20 fonts with the five you get with geoWrite, your work not only reads



better, it practically speaks for itself.



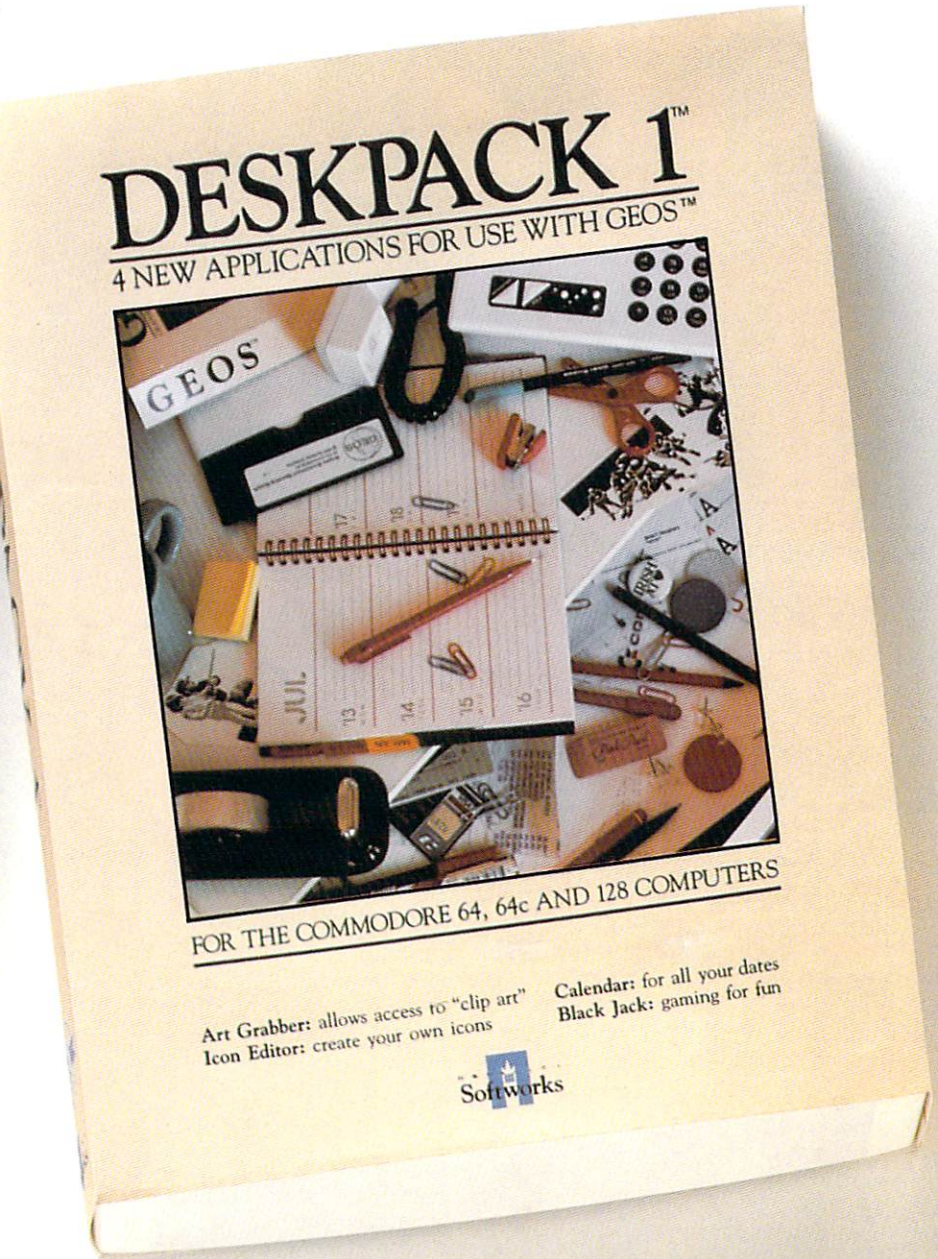
Look what we found in your desk. You know how there's always one drawer in your desk that's filled with really neat stuff? Well, GEOS has one of those, too.

It's called Desk Pack.

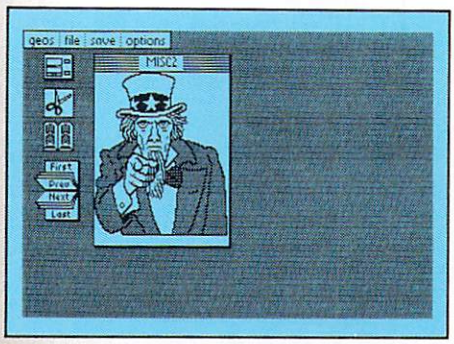
The ingenious Desk Pack Graphics Grabber copies graphics from clip art galleries like Print Shop, Print Master and Newsroom for use in geoWrite and geoPaint.

The Desk Pack Calendar pops up whenever you need to plan your schedule. And since it's valid until the year 9999, you'll never have to miss one of those swell family

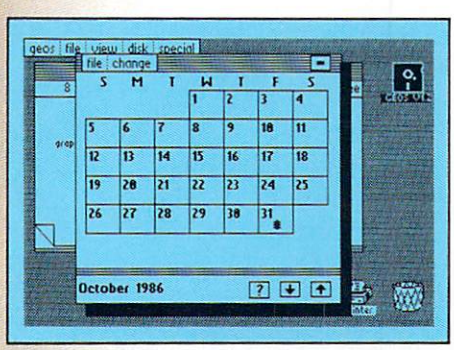
IS EXPANDING.



New discoveries reported. The GEOS universe is expanding. And we'll report each new discovery to you as it occurs.



In the meantime, add Desk Pack and Font Pack to your GEOS system. And see how much you can explore.



reunions ever again.

There's even an Icon Editor, which lets you customize your GEOS file icons with the graphic of your choice.

And when you can't deal with work, Desk Pack deals the sharpest Black Jack game this side of Vegas, complete with graphics and sound effects.

To order, call 1-800-443-0100 ext. 234
Font Pack $29.95 Desk Pack $34.95
(California residents add 6.5% sales tax.) $2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

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The professional paint system for Amiga. Use *Images* as a graphics processor to produce renderings of buildings, design sets and costumes for theatre, create layouts and concepts in advertising, or artwork for custom Amiga programs. Use it anywhere art and design is created by hand.

When combined with Genlock, *Images* can create mats and other video effects. If you pass paintings to Aegis *Animator,*™ you can create a rolling slide show for demos or backgrounds and windows for animations.

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Aegis Draw Plus is the New advanced big brother to Aegis Draw. It turns your Amiga into a low cost, powerful CAD Workstation. *Aegis Draw Plus* includes multiple drawing resolutions (640×200 & 640×400), Extensive Plotter Support, High Quality Printing, Multi-Tasking, Multi-Window & Multi-Drawing support, Display of Numerical units or Feet/Inches/Fractions (entry & display), Rotation and resizing of text, Dynamic Automatic Dimensioning (Associative), Parts Libraries, Mirroring, Arrays (linear, circular, & combinations), On-Screen Numerical Display (coordinates, lengths, angles, 'tool-in-use', status), Zoom, Metamorphic 'Hook', Multiple Layers with Multiple Colors Per Layer and much more. Combined with the standard features found in Aegis Draw, *Aegis Draw Plus* offers the most power for the smallest price. Use *Aegis Draw Plus* to create architectural plots, floor plans, "what-if" space plans, organizational charts, and anything else your creativity can think of! (NOTE: This is *not* Aegis Pro-Draw.™ Aegis Pro-Draw is a high level 3-D system available in 1987.)

Aegis Development – The number 1 choice in graphic software.

AEGIS DEVELOPMENT

Santa Monica, California

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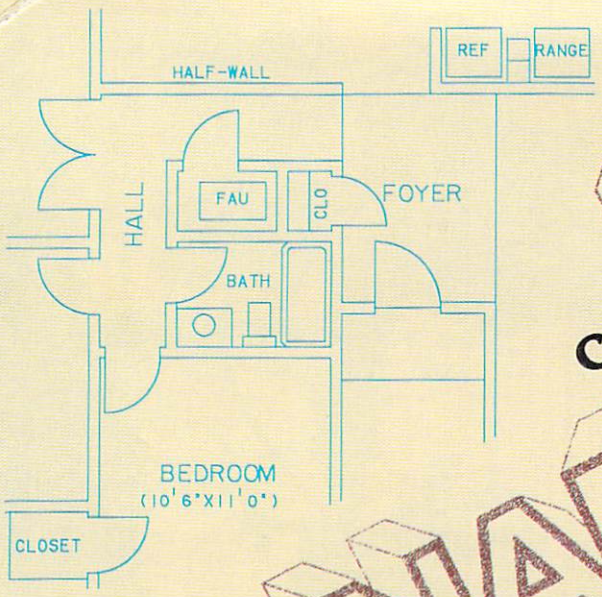

Finally, a proven CAD system for the Amiga

FROM MICRO-ILLUSIONS

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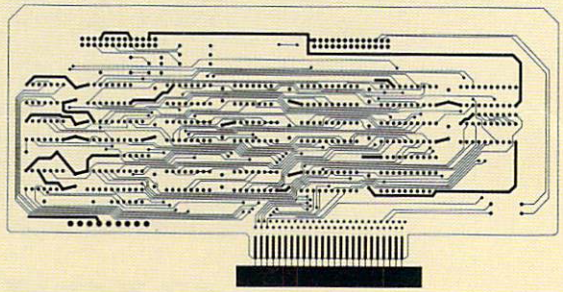
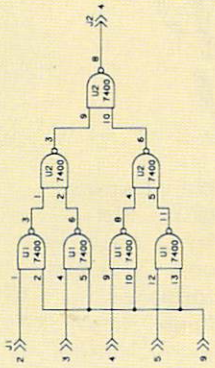
What AutoCAD* can do for the IBM*, Dynamic CAD can do with the Amiga... and a great deal more for less than a fourth of the price!

PRINTED CIRCUIT ARTWORK

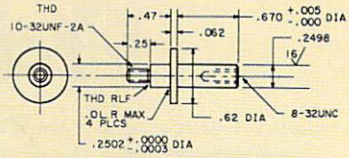


Emerging from years of successful problem solving applications in piping, and electronics for the aerospace industry, DYNAMIC CAD has brought a highly advanced and powerful CAD system together with today's most dynamic and versatile micro-computer, the Amiga. DYNAMIC CAD takes full advantage of Amiga's extensive capabilities with color, multiple modes of resolution, mouse functions, and easily accessible pull-down menus.

This is not some promised "vapor-ware." DYNAMIC CAD exists now and comes to the Amiga with a proven track record. The time and money-saving applications of DYNAMIC CAD for engineers and architects are truly astounding. Here is an advanced, 2-D drafting system with isometric capabilities that can be combined with many models of printers, plotters, and digitizers. In getting started you'll have the support of an extensive manual written in understandable English along with working examples as tutorial lessons.



SCHEMATICS



MECHANICAL DRAFTING

SIGNAL NAME	COMP NAME	PIN NUMB	SOURCE	TYPE COMP
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S0001	U1	1		7400
S0002	J1	3	•	CON
S0002	U1	4		7400
S0003	J1	4	•	CON
S0003	U1	9		7400
S0004	J1	5	•	CON
S0004	U1	12		7400
S0005	J1	9	•	CON
S0005	U1	2		7400
S0005	U1	5		7400
S0005	U1	10		7400
S0005	U1	13		7400
S0006	U1	3	•	7400
S0006	U2	1	•	7400
S0007	U1	6	•	7400
S0007	U2	2		7400
S0008	U1	8	•	7400
S0008	U2	4		7400
S0009	U1	11	•	7400
S0009	U2	5		7400
S0010	U2	3	•	7400
S0010	U2	9		7400
S0011	U2	6	•	7400
S0011	U2	10		7400
S0012	U2	8	•	7400
S0012	J2	4		CON

NET LIST FROM SCHEMATIC

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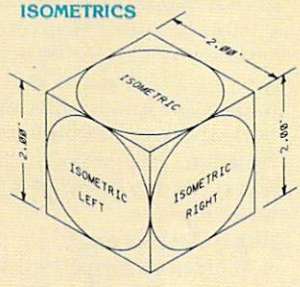

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- D·C brings you professional CAD capability tested and proven in the production of tens of thousands of drawings.
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- D·C has net listing capability from your schematic.
- Schematic comparison to your printed circuit artwork for continuity check.
- D·C can produce isometric views.
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- Capable of utilizing up to 4,096 colors.
- D·C can generate over 8,000 layers.
- D·C supports most standard dot matrix printers, ink jet, lazer jet, pen plotters, and the Gerber* Photoplotter.

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512 K RAM
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