

ST LOG

THE ATARI ST
OPERATOR'S
MAGAZINE

DECEMBER 1986

ISSUE 9



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ST status report
A tutorial on *DEGAS*
The gift guide for ST owners

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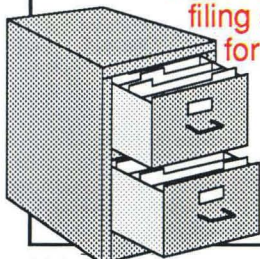
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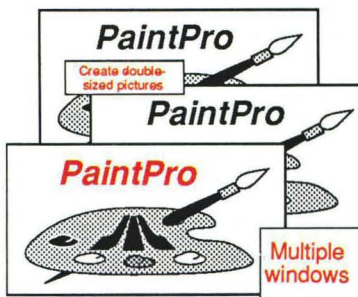
PaintPro

Create double-sized pictures

PaintPro

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Multiple windows

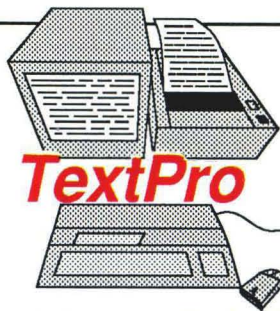


PaintPro is a friendly, yet powerful design and painting package for drawing graphic and artistic pictures. This GEM-based package supports up to **three** active windows—cut & paste from one window to another. Complete toolkit of functions: free-form sketching, lines, ellipses, boxes, fill, copy, move, zoom, undo, help and extensive text

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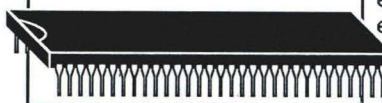


flexible printer driver installation. It is designed with fast entry of text in mind. Advanced **TextPro** users can substitute shortcut keyboard commands for drop-down menu commands. **\$49.95**

"Outstanding wordprocessing program . . . for the novice and professional" *ST World* [Oct. 86]. **TextPro** features full-screen editing by mouse or keyboard, multi-column output, automatic index and table-of-contents generation, sideways printing (to Epson printers), 30 user definable function keys, mode for editing C source programs and

AssemPro

The complete 68000 assembler development package for the ST

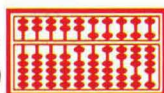


AssemPro is the professional developer's package for programming in 68000 assembly language on the ST. The package includes: editor, two-pass interactive assembler and error editing (direct or separate with an error file), and GEM parameter information, monitor-debugger, disassembler and 68020 single-step simulator. Selective assembly from memory to memory or from file to file, large GEM and TOS libraries, macros, local and redefinable variables, 32-bit arithmetic, online help showing addressing types and GEM/TOS functions. **\$59.95**

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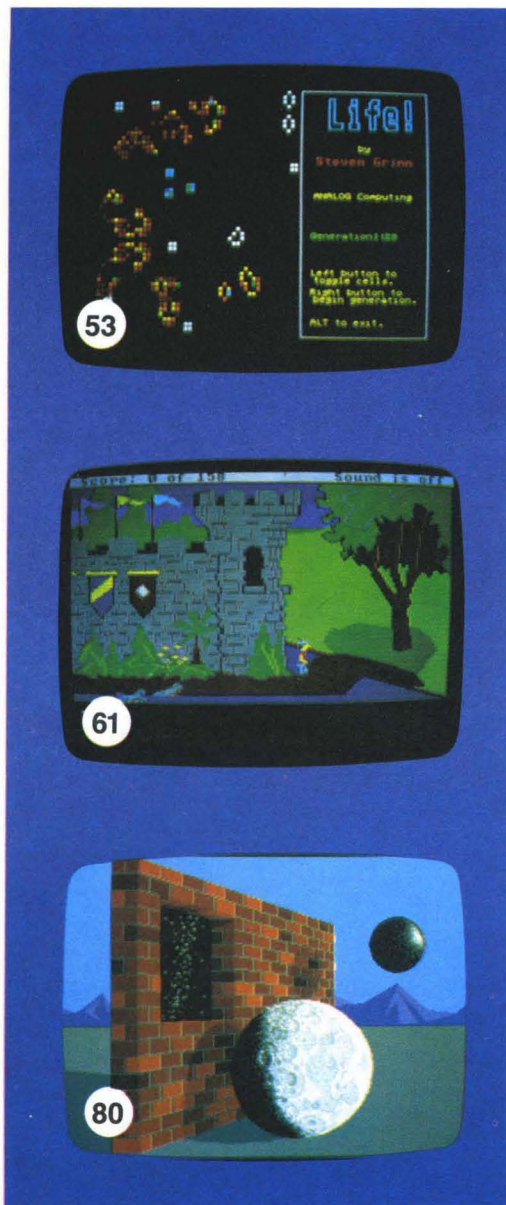
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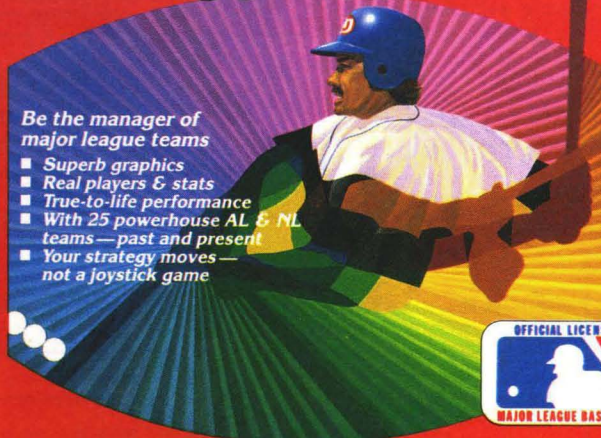
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Status report

ST SECTION

The new, improved ST.

by D.F. Scott

This month, we'll take a look at Atari's plans for a new 16-bit machine. Among our sources: John Skruch, manager of the 8-bit line; Larry Samuels, Atari's Director of Sales and Marketing; Marty Taucher, Public Relations Manager of Microsoft Corp.; and others, who wish to remain anonymous.

Again, this is the ST section of our report. For the total picture, you may want to refer to the 8-bit portion on page 12.

The current status of the project to build a new 16-bit machine (called EST by some) is the "idea" stage. Atari President Sam Tramiel has been heard discussing the machine in public, though some sources at Atari deny its existence, saying any reference to an EST computer is a confusion of letters. Other sources, also at Atari, confirm that a new 16-bit machine (not to be confused with the TT) is under high-level consideration.

Here's what we know: a new ST will include a new, super-high-resolution monitor. In last month's **Status report**, we stated that such a monitor may be considered for the TT. The monitor is now a confirmed Atari product. It should be a large color monitor, supporting a new resolution of 1024x1024 pixels. The color palette will be expanded, perhaps exponentially.

The EST would most likely be marketed not only as a super ST, but as the ultimate scaled-up terminal for the 68020-based TT and the 8086-based IBM compatibility box, which I call 3B or the Big Blue Box. The extent of the hardware dif-

ferences are—so far—unknown, because there's no final design. There is no word, therefore, about whether existing STs will be upgradable to EST status.

There may be the possibility that ST software directly accessing the graphics hardware of that machine may not run on the EST—in the same way that software addressing some parts of the ST hardware directly will not receive the benefit of the blitter block-memory transfer chip. There may have to be a full-emulation mode provided in the EST.

Unlike the TT, the EST's potential market is not a subset of the ST customer base. It may be billed as the choice computer for a TT enhancement, so the TT's potential customer base would be expanded. The thought behind the EST may just be to increase potential TT buyers' numbers.

The EST is not a reality; it is a consideration. We should treat it as such, not as a confirmed product development, since we might not ever see the machine. And now, to other matters of "consideration"—and things we may not see.

Last month, we reported that Microsoft was working with Atari to produce an ST version of either **Word** or **Write**. We now know the Microsoft product to be released by Atari will be **Write**, a scaled-down version of **Word**.

In a press release, Atari Vice President in Charge of Software, Leonard Tramiel, is quoted as saying Microsoft's decision to produce **Write** "is a major endorsement of the ST computer line. Microsoft is one of the world's premier software developers. Microsoft **Write** is the only word processor for the ST to use fully graphic text with

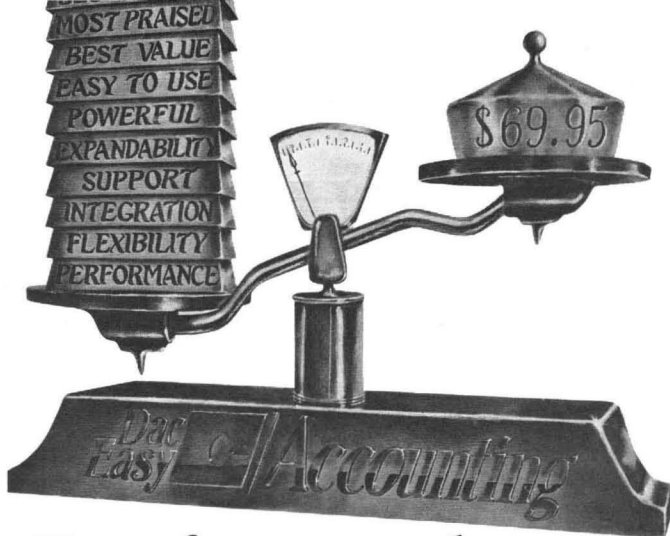
proportionally spaced fonts that work on the screen and on the printer independently. It makes full use of the GEM user interface."

Atari executives have explicitly pointed out that Atari and Microsoft are working in conjunction to produce **Write**. Microsoft's stance on that is quite contradictory to Atari's, and is an angry one.

Marty Taucher, in charge of Public Relations for Microsoft, told us **Write** is very much a complete product, completed by Microsoft alone—and that Microsoft's business with Atari is all over with. He said Microsoft has signed the rights to **Write** over to Atari, which will handle all of the marketing itself. As a result, Microsoft will not consider the ST version of **Write** as part of its product line. He also stated that Microsoft has no intention of doing any further business with Atari.

Corroborating Taucher's claims is the fact that Atari is sole marketer of the product, entitled "Atari **Write**," not "Microsoft **Write**." Atari suggests a retail price of \$129.95. Why Microsoft doesn't feel safe marketing **Write** on its own is an unanswered question. It refuses to say anything more on the subject. And Atari is so happy to have the product that the company is not about to risk showing disappointment over Microsoft's bad feelings. Atari's Larry Samuels believes Microsoft is merely waiting to see how **Write** fares before commencing any new ST projects.

Microsoft has prior commitments to other machines, primarily the Macintosh. It cannot jeopardize its contracts with Apple and IBM. **Write** is no longer marketed by that name for any other machine. Thus,



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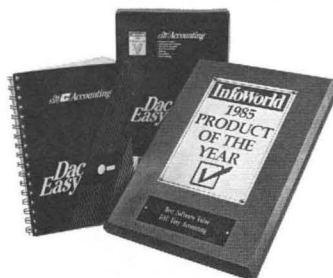
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selling its rights to Atari made Microsoft some money—without jeopardizing its relationships with the larger companies.

Remember, when Microsoft developed its spreadsheet Multiplan for the Commodore 64, it sold the rights to that version of the program to Epyx. When working with smaller manufacturers, Microsoft is, of late, characteristically arrogant. Having played a role in the development of even SpectraVideo's own home computer—and making it sell well in Japan—the company seems to have chosen to restrict its future support to large firms which are safe to support, while testing the wind and making a few commitment-free developments whenever attention shifts to the smaller manufacturers.

It would be wonderful to have just one software corporation that supported everyone it reasonably could, with all the resources it had. Microsoft used to be that company; perhaps it will be again.

Atari should have released the RAM version of GDOS (Graphic Device Operating System) by press time. The Atari-expanded version of DRI's GEMDOS may be available in time for the November COMDEX, where we may see some tangible evidence of the TT's existence, as well.

Atari seems to be finalizing a market strategy for the TT. In the same way that the 3B will be the 8086 expansion, the TT (if that remains its title) will be the 68020/68881 expansion. The user who begins with the ST (or EST) may choose to enhance his machine either to be able to run a plethora of software (MS-DOS), or toward multi-user, multi-tasking, heavy-duty, incredibly-hyphenated power (UNIX V).

**“There's already
worry over
whether the
ST is too old.”**

So the TT is losing its full-computer status, falling under the “ST expansion” category. As predicted last month, computer specialty stores will be its main sales channel, though mass merchants and department stores haven't been counted out.

One source at Atari has pointed out that the TT may deliver speed and multitasking, but, he asks, is that necessarily what

the buyer wants? If the machine performs a task in 10 microseconds instead of 30, is that necessarily a \$1200.00 savings of time?

One major selling point originally intended for the TT—graphic power—may be shifted over to the EST. For some applications (depending on the quality of the software), the ST can be *fast enough*. The individual ST-user may not need a multi-user operating system.

To attract the individual user, what the TT needs are some solid applications. This is where Atari must start from square one—in the development of an entirely new machine. In Atari's favor is the fact that the TT is UNIX-based. UNIX is of an accepted standardized format and is prominent among 68020/68881-based machines currently on the market. All Atari may need to do is find the companies capable of porting over existing superior CAD/CAM, engineering and graphic design applications over to the TT. Suggestion: AT&T may be of some help here (certainly, Microsoft wouldn't be).

Other ST enhancements... The 3B box is still slated for early 1987. No projected price has been released. Also, Atari is releasing the **SH 204** 20Mb hard disk drive,

TIMEKEEPER™ for Atari ST

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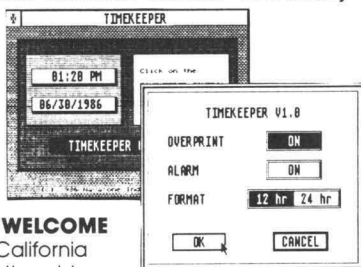
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CIRCLE #131 ON READER SERVICE CARD

which will probably be widely distributed by press time. Dealers are currently being notified that a new ST monitor with its own built-in disk drive (a la Macintosh) is in the works. No word yet about a release date, or whether the ST bundle price will change.

On the software front: expect **Battlezone**, **Crystal Castles** and the long-overdue **Star Raiders** for ST release—to borrow a term from Jerry Pournelle—“Real Soon Now.” Still in the labs is the marketable version of **Neo-Chrome**, which Atari promises will include such new features as stretching and shrinking objects, object rotation, picture-portion save-and-recall, frame-by-frame animation and jackknifing (*Jackknifing?*)

Under development by the corporation is something described as a “project management” business software series. Directed toward those in accounting, marketing and other money-related fields, it promises to integrate graphic charting, spreadsheet processing, word processing and—get this—desktop publishing!

Atari is quick to limit its definition of this term to something like “the capability of producing high-quality output for reports and documents,” especially since software chief Leonard Tramiel considers the desktop publishing industry (producing new magazines, as well as being the subject of them) mere buzzwords. Perhaps public response is changing his mind a little.

Conclusion.

Staking the future of our business in computing solely upon what's new or improved would be like doing the laundry only if the soap companies remembered to

“improve” our favorite detergent this month. A lot of us miss the excitement of microcomputing's being a new field, now that some of us have been involved in it for about a decade. As you've read, there's already worry over whether the ST is too old, or has gone too long without a “new improvement.”

On the one hand, you can argue that the computer you own should improve as the state of technology improves. To that effect, I must admit I'm spoiled enough to really look forward to the 68020 expansion. But some software producers are waiting for The Finalized ST (sometime after The Final Hardware Modification, if there ever is one) before publishing anything for the ST.

“New” sells. When I'm asked to reveal what I know as an **ANALOG Computing** writer, I'm asked what's new—even if it's mere rumor, not verifiable fact. Perhaps some of us rely too much upon what's not here yet, while overlooking the quality of what we have. Even “new” compatibles sell nowadays—combinations of the same old machine, with new speed, portability or storage capacity. Think of all the multi-function cards, turbo boards, “Above Boards” and replacement processors available to improve a PC. Even the expansion cards have a “lifespan;” the Hercules graphics card is more an “Icarus” now, after having flown too close to the Sun.

The ST started out as the machine that didn't need to be expanded. The printer plugs in here, the modem there, and your synthesizer there. I've had many a conversation with those who didn't share my excitement over such a complete machine. “You mean you *can't* expand it?” one

would ask. “Why would you want to?” I would respond.

I can answer that question now. The excitement of owning a new product—computer or automatic yogurt freezer—wears off quickly, sometimes too soon for engineers to regenerate it. To be frank about it, some recent pieces of software are just fancy new packages for the same old material, utilities whose lifespan will be over just in time for yet more new, fancier packages to replace them. In just the last few weeks, I've been asked, “You still use **ST-Talk**?” Well, son, that's just too dad-gum old!”

A computer which has to be expanded just to remain efficient was incomplete to start with. A potential buyer should not be misled into believing that new, expanded or improved is necessarily better, even in the microcomputer field. That attitude creates an awful dependence on the manufacturers' churning out either minor improvements or promises. Marketing can take care of the latter item, but, as John Skrch has said, the development division has too much *innovation* to take care of to bother with facelifts and minuscule speed increases.

Users of 8-bit Ataris are loudly proclaiming that their machines are complete as they are; they're eight years old, but not “outmoded.” It's time private developers of the new and improved look back to see who they've turned their backs on.

Here's where both 8-bit and ST users can voice their support to Atari and private developers, at the upcoming user-group sponsored Atari computer fairs, like the one at the Holiday Inn, Allentown, Pennsylvania, March 13-15, 1987. **A**



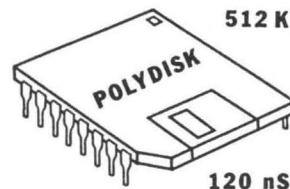
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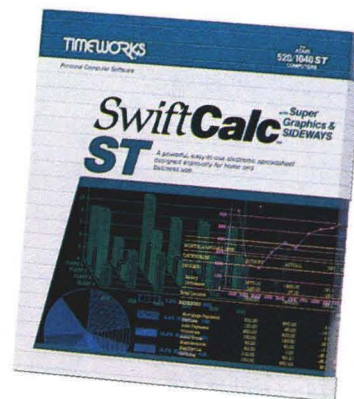
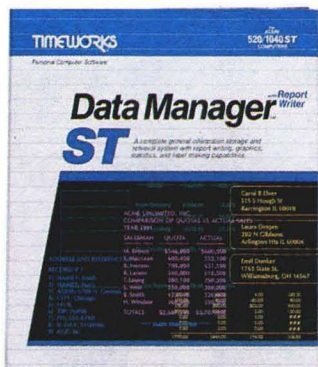
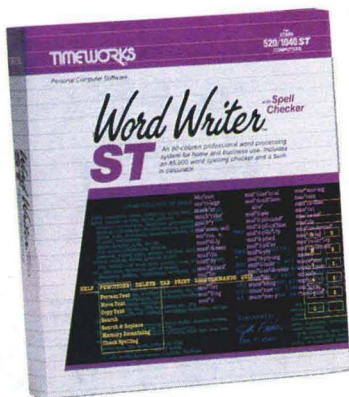


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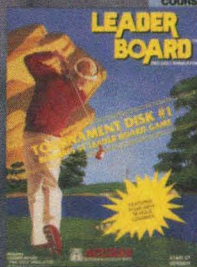
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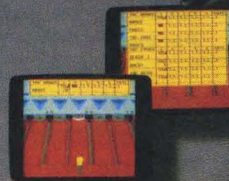
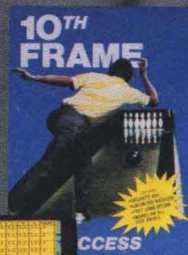
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IAN'S QUEST

ST news and information

by Ian Chadwick

Tinker tinker tinker.

That's the sound of me, engaged in the genteel art of hacking. I admit it: I'm an obsessive hacker. I really don't like programming all that much, but I do like chipping away at other folks' programs. And at hardware, too—nothing gives me greater delight than opening up something electronic and poking about inside (well, almost nothing, but this is a family magazine. . .).

One day, I was dallying about on CompuServe and saw a file of instructions for enlarging the screen display on my monochrome monitor. "Hot damn!" I thought, and grabbed it in my capture buffer. As soon as I was off-line, I was up to my elbows in hot wires, twiddling tiny little screws and pots. The result? Well, okay, so I'm not so hot; I have a greatly expanded monitor display that is nicely crooked. Sigh. The left side curves up and is ever so slightly out of focus. I hope detwiddling some of the pots will reduce the effect. One day, I'll get around to doing it again. Maybe even within the Age of Mammals. Maybe.

Somewhat safer is my hacking in files and programs. I like to get down to track and sector level, and scramble bytes. My collection of 8-bit software is full of hacked programs. I learned how to hack **Flight Simulator** files, **War in Russia** files; I changed **Eastern Front**, some of the maps in **NAM** and **Panzer Grenadier**—all on the sector level (all legit copies of the programs, too). Sure, it took a lot of trial and error, but

I made a zillion backups first, then spent a few dozen hours making little changes and noting their effects. The results are rewarding, at least in the same sense that solving a puzzle is.

Okay, so I also do the same on the ST. Of course, I don't have a lot to work with (at least no wargames, yet. . . nudge, nudge), but I have fun changing alert dialogs, menu names, that sort of thing. My biggest challenge to date came after playing Epyx's **Rogue** (yes, I *did* buy it, twenty-six levels and all). I kept dying. A

lot. I don't like to die, even metaphorically. I made it to level 15 once. Not enough. "Time to hack," I thought.

I got out my hacker program (more on this later) and started to search the 220-plus sectors in the game. Aha! Deep into the file, I noticed in the ASCII display a lot of things like 2d6, 3d3 in one sector. Hmm. "Nope," I thought, "that ain't hexadecimal. That's D&D™ syntax, betcha." The 2d6 means roll two six-sided dice. Of course, I wasn't sure of the order of things, but I started changing a lot of values. I made my character stronger—9d9 (Hey! This is my fantasy; if I wanna pretend I'm Conan, that's my business. . .) and everything else weaker. Then I went back in after the amulet.

Hack, slash, hack, slash; I left behind me a bloody trail of dead monsters. I even went down to level 30 (when you're on a roll...) and made my way back up. Then I retired the game, successfully mastered. After all, who'll know? Hee hee...

So that's a little excursion into what I do with my spare time. The game didn't interest me half as much as figuring out its innards. And for that, you need a hacking tool. "Aha," the reader mutters, "the meat of the article, after all." No, it's the carrot (I'm a vegetarian, remember). Hackers' tools—usually disk utilities—are those which allow you access to disks and sometimes memory. They let you read and write sectors, recover lost files, examine and set file attributes, that sort of thing.

I have several hackers' tools in my workbench—**Hippo ST Disk Utilities**, MichTron Utilities, **Antic's Disk Doctor**, Holmes & Duckworth's **Atari ST Toolkit Volume 1**, and a demo version of a German program from Focus called **TLDU** (The Last Disk Utility). Of that lot, the one I use most (say 99 percent of the time) is **Disk Doctor**. Why? you might well ask. Read on.

My version of the **Hippo ST Disk Utilities (DUST)** is very early—TOS-in-ROM days. It doesn't work well on my ROM-based hard drive system, being prone to crash rather frequently. Since it's the only protected program of the lot, I can't save it on my hard drive, without having the original disk nearby for "verification" every time I use it. **DUST** has trouble reading the first sectors on a disk. It does "double" screen redraws, and the "help" files in my version are scrambled, so only a few of them are intact. The readable ones contain several errors, such as stating that TOS ignores read-only and hidden-file attributes (it does not). **DUST** does have a

memory editor, but it also crashes during use (even if you haven't changed anything!) After a few attempts, I gave up on it. And I haven't examined a later version.

H&D's package is a collection of several programs, each with rather limited use (e.g., a file recovery program, a sector editor, a directory print—which actually creates an ASCII file you have to print when you exit). In order to creatively hack a disk, you need to load one, use it, then quit, load another, and so on. It doesn't tell you anything about file attributes, can't change disk labels, has poor error recovery, and only deals with drives A and B. It lacks information on file attributes and sophisticated directory information, and has no on-line help. Besides that, in some programs (like file recovery), the display is poorly designed and minimal use (if any) is made of GEM. It does have a memory edit/display program, but I found those search routines woefully slow.

MichTron's **MUTIL.PR** is much better. It allows you to easily change file attributes, but doesn't tell you what they mean anywhere—and the docs are inadequate in this area. The display doesn't tell you how many sectors are in a file (it uses the analog GEM scroll bar, with no indication of the number shown), and there's no way to go directly to a specified sector (e.g., jump to the third of sixty). It also has the annoying inability to remember the drive you select; it always returns to the boot drive, no matter how many times you use another one. Also, the ASCII string search is case-sensitive, with no means to turn the case off. Other features, like verify sectors, don't return much information—or any. Finally, I've had the program crash (two bombs) a few times in mid-hack, so I stopped using it.


TLDU is, admittedly, a demo version, so it doesn't have all the features installed, but it doesn't really need them. I wouldn't use it anyway. First of all, it doesn't work in color, so that makes it a poor choice for any users who didn't opt for monochrome. It promises over 100 commands in its final version, but so few worked in the version I've got (although the docs say they should), it's dangerous to even experiment with. It's an awkward command-driven TOS (not GEM) program without any help files, so you need to memorize all those commands. If a new version is out, perhaps much of this has changed for the better. It could certainly use improvement. Besides, anything that bills itself as the last, the ultimate, the best, or whatever is bound to be flaky, in my book.

Okay, so I use Dan Matejka's **Disk Doctor**. To date, it hasn't crashed on me once. It handles floppies and hard drives equally well and has on-line help files (which, having had something to do with the writing thereof, I believe are well done) that can be sent to the printer or the screen.


It reads and writes sectors, searches, displays how many sectors are in a file and deleted files, and all the file attributes. It works. I have this thing about liking programs that work. It doesn't have a memory-edit feature, a track-format option, nor can it set file attributes as easily as **MUTIL**. I sorely miss those features, but it has excellent file and disk recovery routines that compensate well for the lack of other features, and a nice display. Of the programs of this ilk, I think it's the best.

With **Disk Doctor**, I've saved myself a lot of ulcers. I've recovered files inadvertently (or even deliberately) trashed. I've fixed or altered files to suit my needs and tastes, corrected small problems, and learned a lot about the ST's disk structure and how many programs are assembled. Not everyone is a disk hacker, but it's an instructive thing to learn—and can be a lot of fun, albeit a tad dangerous if you mess up (backups becomes a key word).

None of the programs above can read or write those elusive tracks beyond 79, although several copy and/or format programs allow you to use them. None of the programs here really tell you how to create a boot sector for a double-sided disk, though MichTron thoughtfully provides a double-sided boot sector to simply copy to disk, using their program. **MUTIL** comes with **Mi-Dupe**, a track-oriented disk-copy program. H&D's package has a single-drive format/copy program, offering little more than the vanilla TOS format/copy routine does. Neither will copy past sector 79.

My ultimate disk utility would include several features lacking in everything I've seen so far: ability to disassemble a file from disk or memory (and save the source code that results); ability to load a file at any location in memory; ability to read and write to the "hidden" tracks (80-82); full memory view, edit and save (as a file or as sectors); jump to any memory location (and run a program from there); multiple search options; and several other features already found in popular 8-bit debuggers and disk utilities. Until then, I'll keep hacking with what I've got and wait for things to get better. Hmmm. Maybe I can improve my score in **Time Bandit** this way. . . 

Ian Chadwick is the Director of Editorial Services at Batteries Included. He lives in Toronto with Susan and their pet stegosaurus. They considered getting a pelycosaur instead (possibly a dimetrodon), but were worried that it would eat one of their cats. Ian is currently writing romance fiction and trying to figure how to reverse his time-travel experiment, to return the stegosaurus to the Jurassic before it defoliates their garden.



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Life!

A microcosm for you to create and run on your ST.

by Steven Grimm

Life! is an adaptation of John Conway's famous Game of Life, described in the October 1970 *Scientific American*. The Game of Life has been a favorite of hackers for years, as it's perfectly suited to run on a computer. This version will run on an Atari 520ST in low-resolution mode. It's written in C and 68000, using the **Megamax C** compiler; if you don't have that compiler, **Life!** will be available on the **ANALOG Computing** Atari Users' Group, on Delphi.

The game.

Life! is "played" on a grid of square cells (in this case, 48x50). Each cell can be on or off. A generation is defined as the time it takes the computer to completely scan and replot the grid. The computer scans the grid, and removes or places cells there, using the following three rules.

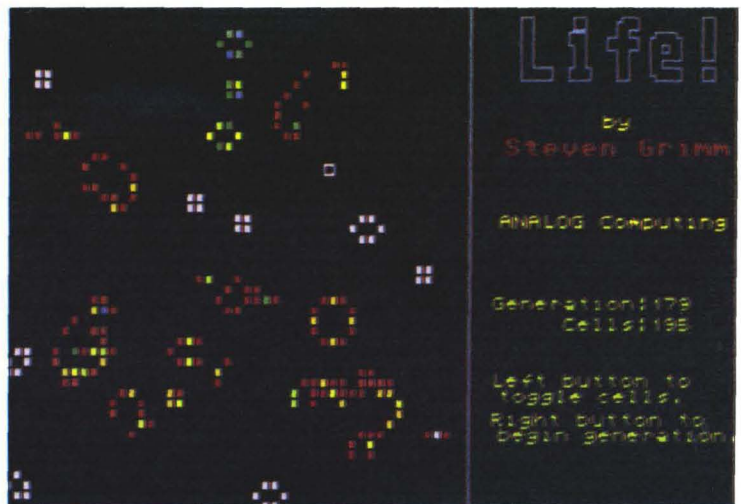
If a cell has two on neighbors, it remains in the same state; an on cell will remain on, and an off cell will remain off. If a cell has three on neighbors, it is turned on. If a cell has less than two or more than three on neighbors, it is turned off.

It's important to note that the scanning takes place in the current generation (the one on-screen). Otherwise, a new generation could affect itself, which would change the grid's status, depending on which direction the scan looked at cells.

How to operate Life!

To run **Life!**, you must be in low-resolution mode. Double-click LIFE.PRG (assuming that's what you've named it), and **Life!** will load.

A square cursor will appear on the screen. Move the cursor, using the mouse. Pressing the left mouse button will toggle cells on and off. You'll probably want to try



one of the sample shapes (see Figure 1) before experimenting with new shapes. The shapes will work best when centered in the workspace.

When you've finished drawing the initial cell pattern, press the right mouse button. **Life!** will begin processing the grid you've entered; one generation takes about two-fifths of a second. Cells will cycle through the colors in the rainbow if they remain on the screen long enough. This is purely a cosmetic effect, and in no way affects the cell counts.

When the pattern finally dies down, or when you want to quit, press the ALT key to return to the GEM desktop.

How the program works.

As stated earlier, **Life!** was written using the Megamax C compiler. I highly recommend this program to anyone interested in ST development. It's easy to use and many times faster than Digital Research's sluggish C. (**Life!** compiles in less than 30 seconds from floppy, 10 seconds for RAMdisk; linking takes less than a minute.)

Megamax C has a provision for inserting pure 68000 code in the middle of a C program. Auto variables are accessed as offsets from A6, statics as offsets from A4. I used this feature twice in **Life!**—once in the neighbor-counting routine, and again in the cell-plotting routine. Here's a function-by-function breakdown of **Life!**. Additional comments follow the breakdown.

`do_grid()` is a fairly straightforward function that processes the grid once. It counts cell neighbors, and uses the `cotab[]` and `litab[]` arrays. These are lookup tables, used to find a cell's new color when it has two or three on neighbors, respectively. An explanation about the "offset" and "52-offset" is in order here. Instead of keeping two separate arrays for the current and new generations, **Life!** uses one array that's twice

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// Life! continued

as large as one grid should be. Offset is toggled between 0 and 52 at each successive generation. For instance, `array[x+offset][y]` contains the on-screen cell values, and `array[x+52-offset][y]` contains the values for the new generation.

`edit_array()` handles array initialization and grid editing. GEM calls make this function very short. It is basically three while loops, the first of which waits for the right button to be pressed, and the second of which handles the left button being held down. The innermost loop calls `changecell()`, until the button is released, to facilitate "sketching" on the Life! grid. All of which brings us to . . .

`changecell(x,y,state)` just changes cell (x,y) to "state" (0 or 1) if it's on the screen.

`main()` is the main loop, as its name suggests. It saves the user's color palette and uses its own.

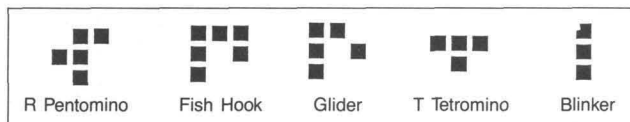
`title()` plots all the text and the box on the right side of the screen. The GEM colors in the `vsf_color()` call don't match the ST colors (in comments to the right), because GEM, for some odd reason, sets the colors up in a different order than the ST hardware. Since the palette is in the ST's order and I knew which color was where in that palette, it was necessary to translate the ST color I wanted to the GEM color. See issue 38 of **ANALOG Computing**, page 73, for an ST-to-GEM translation table.


`println(x,y,num)` prints num in small letters to the right of Generation:, in the box on the right side of the screen. It also prints the number of cells on the screen. I didn't use `printf` (unlike DRI's C, Megamax C does not support it), because the code for `printf` is quite large—and I only needed it once.

`plot(x,y,color)` is a high-speed cell-plotting routine. Originally, Life! called GEM to plot the cells, but that was so slow I decided to write my own, specialized plot routine. It's quite fast, as you can tell by watching the program.

Life! can provide you with hours of entertainment. Trying various entry groupings to find your own patterns can be a rewarding experience (the R Pentomino in Figure 1, for example, doesn't settle down until over 1000 generations!)

Figure 1. — Sample shapes.



Just watching the sample shapes evolve can be interesting and fun! Enjoy! 

Steven Grimm, author of issue 44's **Blast!**, plans to attend the University of California at Santa Cruz, where he'll major in Computer Science. He's been working on a BBS system for the Atari ST.

(Listing starts on next page)

Listing 1.
C listing.

```
#include <osbind.h>
#define TT 0xffff /* A time-saver for some arrays. */

int intin[64],intout[64],contrl[12],ptsin[64],ptsout[64],c,gl_apid;
int array[104*52],pxy[10],pal[16],handle,offset,i,j,*base;
long ncells; /* # of cells in the matrix. */
int yoff[52];
int tcolumn[52],bcolumn[52],change[52];

int palette[16] = { /* Color definitions for "rainbow" */
    0x000,0x700,0x730,0x750,0x770,0x470,0x070,0x075,0x077,0x057,0x027,
    0x007,0x507,0x707,0x704,0x777 };

int curform[37] = { /* Box cursor mouse form definition */
    2,2,1,0,1,
    0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
    0xf800,0x8800,0x8800,0x8800,0xf800,0,0,0,0,0,0,0,0 };

/* Continue and Live tables (for faster color cycling) */
int cotab[16] = {0,2,3,4,5,6,7,8,9,10,11,12,13,14,15,15};
int litab[16] = {1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,15};

/* Top and Bottom arrays for fast processing later on */
int topcol[52],botcol[52];

/* Tables for fast plot routine */
int bits[4] = {0xe000,0x0e00,0x00e0,0x000e};
int ebit[4] = {0x0fff,0xf0ff,0xff0f,0xffff};
int bit0[16] = {0,TT,0,TT,0,TT,0,TT,0,TT,0,TT,0,TT,0,TT};
int bit1[16] = {0,0,TT,TT,0,0,TT,TT,0,0,TT,TT,0,0,TT,TT};
int bit2[16] = {0,0,0,0,TT,TT,TT,TT,0,0,0,0,TT,TT,TT,TT};
int bit3[16] = {0,0,0,0,0,0,0,0,TT,TT,TT,TT,TT,TT,TT,TT};

/* Do one generation on the grid. */
do_grid()
{
    register int x,y,xo,n,*aptr,*point;
    int o,t,b,tcol,bcol,ch;
    for (x=1; x<49; ++x)
    {
        if (change[x] == 1) /* Only scan columns that need to be checked. */
        {
            t=tcolumn[x]; b=bcolumn[x];
            tcol=0; bcol=0; ch=0;
            xo=x+52-offset;
            for (y=t; y<=b; ++y)
            {
                aptr=&array[x+offset+yoff[y]]; /* Count neighbors... */
                asm ( /* ... with a fast 68000 routine. */
                    "move.w #0,n\n"
                    "move.w (aptr),D0\n"
                    "beq 101\n"
                    "addq.w #1,n\n"
                    "101: move.w 2(aptr),D0\n"
                    "beq 102\n"
                    "addq.w #1,n\n"
                    "102: move.w 4(aptr),D0\n"
                    "beq 110\n"
                    "addq.w #1,n\n"
                    "110: move.w 208(aptr),D0\n"
                    "beq 112\n"
                    "addq.w #1,n\n"
                    "112: move.w 212(aptr),D0\n"
                    "beq 120\n"
                    "addq.w #1,n\n"
                    "120: move.w 416(aptr),D0\n"
                    "beq 121\n"
                    "addq.w #1,n\n"
                    "121: move.w 418(aptr),D0\n"
                    "beq 122\n"
                    "addq.w #1,n\n"
                    "122: move.w 420(aptr),D0\n"
                    "beq 1d0\n"
                    "addq.w #1,n\n"
                    "1d0: "
                );
                o=array[x+offset+yoff[y]]; /* Get old cell value. */
                point=&array[xo+yoff[y]]; /* Get address of new cell value. */
                if (n == 2) /* 2 neighbors? */
                    *point = cotab[o]; /* Yes, continue present state. */
                if (n == 3) /* 3 neighbors? */
                    *point = litab[o]; /* Yes, bring to life or keep alive. */
                if ((n<2) || (n>3)) /* Anything else? */
                    *point = 0; /* Yes, this cell is DEAD. */
                if (*point != o) /* Did it change? */
                {
                    if (*point && (!o)) /* Yes, update cell count. */
                        ++ncells;
                    if (!*point)
                        --ncells;
                    ++ch;
                    plot(x-1,y-1,*point); /* Plot new point. */
                    if (tcol == 0) /* Update top and bottom of column. */
                        tcol=topcol[y];
                    bcol=botcol[y];
                }
            }
        }
        if (x > 1)
        {
            if (tcolumn[x-1] < tcol) && (change[x-1] == 1)
                tcol=tcolumn[x-1];
            if (bcolumn[x-1] > bcol) && (change[x-1] == 1)
                bcol=bcolumn[x-1];
        }
    }
}
```

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CIRCLE #136 ON READER SERVICE CARD


```

    }
    if (! tcol)
        ++tcol;
    if (bcol > 50)
        --bcol;
    bcolumn[x]=bcol;
    tcolumn[x]=tcol;
    if (tcol < tcolumn[x-1])
        tcolumn[x-1]=tcol;
    if (bcol > bcolumn[x-1])
        bcolumn[x-1]=bcol;
    if (ch != 0)
    {
        change[x-1]=1;
        change[x]=1;
        change[x+1]=1;
    }
    else
        change[x]=0;
}
}
}

/* Initialize array and let user draw a pattern. Kludgy, but it works. */
edit_array()
{
    int x,y,mx,my,btn;
    clear_rect();
    v_gtext(handle,204,150,"Left button to");
    v_gtext(handle,207,156,"toggle cells.");
    v_gtext(handle,204,165,"Right button to");
    v_gtext(handle,207,171,"begin generation.");
    btn=1;
    while (btn & 1)
        graf_mkstate(&x,&y,&btn,&x);
    v_show_c(handle,0);
    btn=0;
    while (! (btn & 2)) /* Wait for right button */
    {
        graf_mkstate(&mx,&my,&btn,&x);
        if (btn & 1) /* Left button is pressed */
        {
            int n;
            x=mx/4+1; y=my/4+1;
            if (x<49) /* In the workspace? */
            {
                n=(array[x+offset+yoff[y]]);
                changecell(x,y,n);
                while (btn & 1)
                {
                    graf_mkstate(&mx,&my,&btn,&y);
                    changecell(mx/4+1,my/4+1,n);
                }
            }
        }
    }
}
}

```

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```

)
while (butn&0x0002) /* Wait for button to be released */
  graf_mkstate(&mx,&my,&butn,&x);
}

/* Change cell state to ON or OFF (color 1). */
changecell(x,y,state)
int x,y,state;
{
  int *st2;
  if (x>48)
    return(0);
  st2=&array[x+offset+yoff[y]];
  if ((*st2&&state)||(!*st2)&&(!state))
    return(0);
  *st2=state;
  v_hide_c(handle);
  plot(x-1,y-1,state);
  if (state)
    ++ncells;
  else
    --ncells;
  printf(270,128,ncells);
  v_show_c(handle,0);
}

/* Tie everything together. */
main()
{
  int work_in[11],work_out[57],butns,key,dummy,x,y;
  long gen;
  appl_init();
  appl_Getrez()
  { form_alert(1,"[2] [Life! requires] [LOW RESOLUTION!] [Okay...]");
    exit(0);
  }
  for (i=0; i<16; ++i) /* Save user's colors. */
    pal[i]=(int)5setcolor(i,-1);
  setpalette(palette); /* Install rainbow colors. */
  base=(int *)Physbase(); /* Get screen address. */
  for (i=0; i<10; work_in[i]=1, ++i);
  work_in[10]=2;
  v_opnvwk(work_in,&handle,work_out);
  v_hide_c(handle);
  v_clrwk(handle);
  vsf_interior(handle,1);
  vsc_form(handle,curform);
  title();
  offset=0; gen=0; ncells=0;
  for (x=0; x<52; ++x)
    { yoff[x]=x*104;
      for (y=0; y<52; ++y)
        { array[x+yoff[y]]=0;
          array[x+52+yoff[y]]=0;
        }
    }
  edit:
  edit_array();

  dogens:
  for (x=0; x<52; ++x)
    { tcolum[x]=1; bcolum[x]=50;
      change[x]=1;
      topcol[x]=x-1; botcol[x]=x+1;
    }
  change[0] = 0; change[49] = 0;
  topcol[1] = 1; topcol[50] = 50;
  clear_rect();
  v_gtext(handle,204,150,"Left button to");
  v_gtext(handle,207,156,"edit cells");
  v_gtext(handle,204,165,"Right button to");
  v_gtext(handle,207,171,"exit program");
  v_gtext(handle,204,180,"Alternate to pause");
  v_hide_c(handle);
  while (1)
    { ++gen;
      printf(270,120,gen);
      printf(270,128,ncells);
      do_grid();
      offset = 52-offset;
      graf_mkstate(&dummy,&dummy,&butns,&key);
      if (butns == 1)
        goto edit;
      if (butns == 2)
        break;
      while (key==8)
        graf_mkstate(&dummy,&dummy,&dummy,&key);
    }
  xbios(6,pal);
  appl_exit();
  exit(0);
}

/* Plot all the junk on the right side of the screen. */
title()
{
  vsf_color(handle,14); /* ST color 11 */
  pxy[0]=194; pxy[1]=0;
  pxy[2]=194; pxy[3]=199;
  pxy[4]=319; pxy[5]=199;
  pxy[6]=319; pxy[7]=0;
  pxy[8]=194; pxy[9]=0;
  v_pline(handle,5,pxy);
  vst_color(handle,9); /* ST color 8 */
  vst_height(handle,20,&i,&i,&i,&i);
}

```

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```

vst_effects(handle,16);
v_gtext(handle,214,30,"Life!");
vst_height(handle,6,&i,&i,&i,&i);
vst_effects(handle,0);
vst_color(handle,2); /* ST color 1 */
v_gtext(handle,208,60,"Steven Grimm");
vst_color(handle,4); /* ST color 4 */
vst_height(handle,4,&i,&i,&i,&i);
v_gtext(handle,250,49,"by");
v_gtext(handle,207,88,"ANALOG Computing");
vst_color(handle,7); /* ST color 5 */
v_gtext(handle,204,120,"Generation:");
v_gtext(handle,234,128,"Cells:");
}

/* Clear a rectangle in the lower right corner of the screen to print
instructions. */
clear_rect()
{
    pxy[0]=195; pxy[1]=140;
    pxy[2]=318; pxy[3]=198;
    vsf_color(handle,0);
    vr_rectf(handle,pxy);
}

/* Print generation number next to "Generation:". */
printn(x,y,num)
int x,y;
long num;
{
    long i;
    char c[2],pnum=0;
    if (! num) /* Special handling for no cells */
    { v_gtext(handle,x,y,"NONE");
      return(0);
    }
    c[1]=0;
    for (i=100000000; i>0; i /= 10) /* Print one power of 10 at a time */
    { if ((num/i) || (x>270)) /* Need to print a digit? */
      { c[0]=(num/i)+48; /* What do we want to print? */
        v_gtext(handle,x,y,c); /* Put the digit to the screen */
        num -= (i*(num/i)); /* Subtract it from the main number */
        x += 6; /* Move the "cursor" */
        ++pnum;
      }
    }
    c[0]=32; /* Pad the rest of the space with blanks */
    while (pnum<8)
    { ++pnum;
      v_gtext(handle,x,y,c);
      x += 6;
    }
}

/* Special plot routine. */
plot(x,y,color)
int x,y,color;
{
    static int b0,b1,b2,b3,*screen,xbit;
    auto int *eptr;
    screen=base;
    screen += (y*320);
    screen += (x & 0xffffc);
    x = x & 0x0003;
    xbit = bits[x];
    b0 = bit0[color] & xbit;
    b1 = bit1[color] & xbit;
    b2 = bit2[color] & xbit;
    b3 = bit3[color] & xbit;
    eptr=ebit+x;
    asm {
        movea.l screen(A4),A1
        movea.l eptr(A6),A0
        move.w (A1),D0
        and.w (A0),D0
        or.w b0(A4),D0
        move.w D0,(A1)
        move.w 2(A1),D1
        and.w (A0),D1
        or.w b1(A4),D1
        move.w D1,2(A1)
        move.w 4(A1),D2
        and.w (A0),D2
        or.w b2(A4),D2
        move.w D2,4(A1)
        move.w 6(A1),D3
        and.w (A0),D3
        or.w b3(A4),D3
        move.w D3,6(A1)
        adda.l #160,A1
        move.w D0,(A1)
        move.w D1,2(A1)
        move.w D2,4(A1)
        move.w D3,6(A1)
        adda.l #160,A1
        move.w D0,(A1)
        move.w D1,2(A1)
        move.w D2,4(A1)
        move.w D3,6(A1)
    }
}

/* Null routines to trick the Megamax linker into not including the
unnecessary file I/O stuff */
fopen()
{
}

```

```

fclose()
{
}
fread()
{
}
fwrite()
{
}
fseek()
{
}

```



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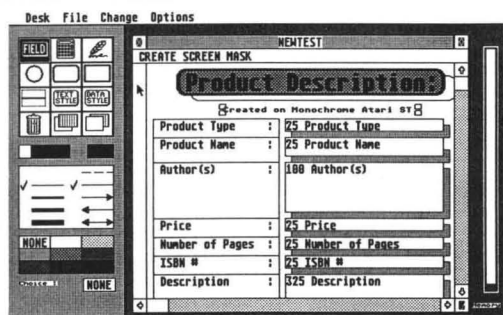
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CIRCLE #165 ON READER SERVICE CARD

ST news!



DATATRIEVE

Abacus tells us their new database manager program **DataTrieve** is easy to use, with drop-down menus. Some of its unique features include: screen templates that can be enhanced with color, built-in RAMdisk, and the ability to display data in multiple typestyles and font sizes.

In addition, data from up to four different files can be accessed simultaneously, and output can be sent to printer, screen, disk or modem. Files can be organized using up to twenty

indices; blocks of information can be cut, pasted and copied to other blocks; and headers, page numbers and footers can be used to generate reports.

DataTrieve can handle a maximum of 2 billion characters per file or 64,000 records per file. The program functions with color or monochrome systems, single- or double-sided drives. Complete with its 123-page manual.

Priced at \$49.95. Abacus, P.O. Box 7219, Grand Rapids, MI 49510 (616) 241-5510.

CIRCLE #127 ON READER SERVICE CARD

REGENT TRADE-IN

Regent Software has announced a special trade-in offer for **1st Word** owners. The company is now offering a \$39.95 trade-in allowance when you upgrade to the new **Regent Word II** word processor.

Regent Word II is a \$99.95 GEM-based word processor with a spelling checker and a mail merge facility.

For more information, contact Regent Software, 7131 Owensmouth, Suite 45A, Canoga Park, CA 91303 — (818) 882-2800.

CIRCLE #198 ON READER SERVICE CARD

ON THE WAY FROM FTL

Following the success of **Sundog**, FTL has announced several products. First, **RPV: Remotely Piloted Vehicles** keep the pilot safe behind enemy lines during aerial combat. You have simulated targets and can link up (hardware included) with another computer, for one-on-one combat. At \$39.95, **RPV** has high-speed animation and color graphics.

Dungeon Master is set in a mysterious underground world. Its clever techniques let the mouse pick up objects, press hidden buttons and move about the labyrinth. Detailed graphics of pits, monsters... for \$39.95.

FTL's popular **Micro Cookbook** is now on Atari, with hundreds of recipes, and a database to find recipes by ingredient, category, etc. Enter recipes, or take suggestions. **MC** will help with leftovers, give calories and sizes, plan menus and generate shopping lists—\$49.95.

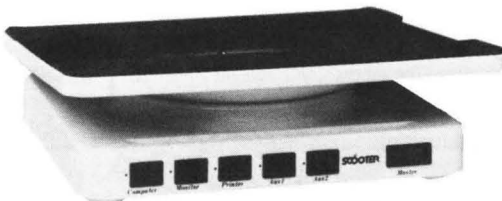
Oasis/FTL Systems, P.O. Box 112489, San Diego, CA 92111. CIRCLE #199 ON READER SERVICE CARD

POWER BASE

The **Scooter Model SP500M** isn't merely a swivel-and-tilt monitor stand. The front panel on its base provides five rocker switches, controlling five power outlets in the back. Also included is a master on/off switch with a power-on light and circuit breaker, plus the convenience of noise, surge and spike filters.

The **Scooter Model SP500M** is retailing for \$79.95, and information may be obtained through Scooter Products, Ohm/Electronics, Inc., 746 Vermont Street, Palatine, IL 60067 — (312) 359-6040.

CIRCLE #200 ON READER SERVICE CARD



OTHER NEWS

Sonic Art is a medley of art and music, which can be used as an on-screen art gallery, slide show, clip art, music album or card shop.

The disk retails for \$19.86. For additional information, contact Image Ink, 6 South State Street, Box 462, Ripley, NY 14775 (716) 736-7766.

CIRCLE #195 ON READER SERVICE CARD

The **PayDay** payroll program is designed for small- to medium-sized businesses, and can handle an annual payroll of up to \$21 million, for as many as 255 employees.

PayDay was written specifically for the ST, using TDI's Modula-2. Some of the many report generation capabilities consist of monthly, quarterly or yearly tax summary, W2 tax forms, payroll journal, and mailing labels.

Retail is \$69.95. Contact Crystal Software, P.O. Box 803, Merlin, OR 97532 — (503) 479-9516.

CIRCLE #196 ON READER SERVICE CARD

Stoneage Software has released three fully GEM-based products. **UltraCalc** is a 40-function scientific calculator that can be installed as a desk accessory, or run alone.

Lewis 123 is a spreadsheet designed for chemistry students or professors, who require assistance in sketching covalent bonds.

Encrypt allows you to encode all of your files, to protect them from access by others. These may be pictures, data files, programs, and more.

The product prices are \$24.95, \$29.95 and \$19.95, respectively. Stoneage Software, Inc., P.O. Box 1216, Amherst, NH 03031 — (603) 673-8734.

CIRCLE #197 ON READER SERVICE CARD

ST Tools I has over sixty ST BASIC subroutines, allowing users to easily incorporate GEM file selector and dialog boxes, along with most VDI graphics, into their own BASIC programs.

ST Demos I contains six compiled demos, plus the original ST BASIC code. These demo programs consist of graphics, music, games and utilities.

Each of the two programs sells for \$12.95. Available from AccuSoft, P.O. Box 02214, Columbus, OH 43202.

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1		Clear Range				
2		Copy				
3		Delete				
4		Freeze Title				
5		Goto				
6		Insert				
7		Justify				
8		Move				
9		Note Pad				
10		Replicate				
11		Replicate Cell				
12		Set Column Width				
13		Sort				
14		Split Screen				
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Four desk accessories: Calculator, Notepad, Telephone/Address book and Alarm Clock. Takes up less memory than most accessories. Will work with any GEM based program. Of special interest, the Alarm clock will flash a window up in any GEM based program to remind you of an appointment or whatever. Helpmate is always ready within GEM to help with organizing your desk.

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NEW

This real-time or stand-alone program is a window based Thesaurus. Helping the user find just that word that will spruce up an otherwise tedious document. The utility gives the user a list, from a selection of thousands of words, that mean the something as you have highlighted. If you've just drawn a blank and can't think of a word, let EZ Thesaurus help you find it.

INVENTORY MASTER

NEW



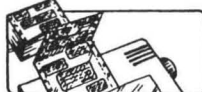
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INVENTORY MASTER is an easy to use Gem based inventory program that will do everything from keeping track of inventory to generating detailed printed reports. With GEM pull down menus you can execute fast and easy searches, sorts and printouts. It is so easy you can do it almost without looking at the manual. Additionally the program is written to be easily integrated with Invoice Master, giving you a powerful automatic inventory control system.

INVOICE MASTER

Only \$99.95

COMING SOON



- Create your own invoices
- Use in combination with Inventory Master or by itself
- Print your own invoices on any printer
- Stores more than 200 records per SS/DD disk

Invoice Master allows you to print out custom invoices to your printer then subtract the items purchased from inventory through Inventory Master. It is a full GEM implementation, with menus, windows and mouse control. Which makes it much easier to use. You will be amazed at the power and ease with which invoices can be made up with Invoice Master.

Create Your Own Invoices

PAYROLL MASTER

Only \$99.95

NEW



- Stores up to 400 employee records per disk.
- State tax information for multiple states.
- Prints Employee Checks - Address Labels - W-2 Forms - Employee List - End of Quarter/Year Reports - PLUS MUCH MORE!
- Ram resident for lightning fast access.

Payroll Master is a GEM based payroll program that will give the average user the power to perform any payroll task, large or small. All the information is available at a click of a button, so it is fast and easy to operate. No need to buy extra modules because the program has everything you need for completing tasks from printing checks to detailed reports.

THE SCHEDULE Only \$29.95

An Employee Weekly Work Scheduler

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- Employees names, hours, and dates

COMING SOON

Schedule your employees and then print a weekly schedule showing — employee names, working hours, and dates. See at a glance who will be working. It is GEM based for easy access to weekly schedule information through drop down menus, windows, and mouse control.

EZ GRAPH ONLY \$69.95

COMING SOON

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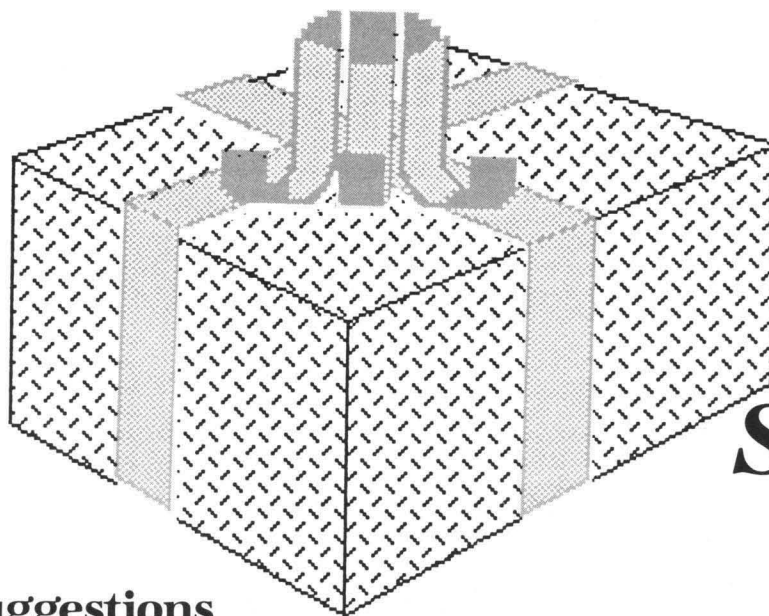
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The Atari ST Gift Guide

Plenty of suggestions to help you get your gift list started.

by Arthur Leyenberger

Whether you're giving or receiving, it's difficult choosing the right program, peripheral or gadget for an Atari system. So what do you do when the holidays are approaching and you or fellow Atarians have visions of sugarplum fairies (and Santa) dancing in your heads?

Even if you don't know a bit from a byte, or a joystick from a hole in the ground, you don't need to spend a lot of money to obtain a gift by that special Atari user in your life will appreciate. A little knowledge of what's available—and of what the needs of a computer user are—will equip you with the ability to make a thoughtful, useful purchase.

This article, full of goodies for ST owners, will help. Some of the products I will mention by name, having actually used/ tested/played each of them. Other items will be mentioned in general, with perhaps a couple of suggested brand names for you. A list of the manufacturers and their addresses can be found in the 8-bit section, on page 22.

I cannot mention every Atari-related product ever made, not even all the good ones I know about or use. My apologies in advance if I leave out your favorite. As for objectivity, I've been using various computers for over ten years and writing about them for more than four years. What I offer is fair, informed judgment from a user's perspective.

Mouseware.

With the advent of the 520ST, some new, unusual concerns have come about. First

of all, there's the question of what do do with your mouse when it's not being used. The answer, of course, is to get a **Mouse Pocket** from Kensington Microware. This \$10.00 gizmo keeps your mouse safe, clean and out of the way. It attaches to the side of your desk or monitor with supplied adhesive strips—and is as attractive as it is useful. Kensington also makes a **mouse cleaning kit**, that comes with enough supplies to clean your mouse for a year. The \$25.00 kit also includes the **Mouse Pocket**. A clean mouse is a happy mouse.

American Covers, Inc. makes a couple of useful products to keep your mouse rolling and trouble free. Their \$10.00 **Mouse Mat** is a soft pad that will improve your mouse's performance. It increases traction and comes in burgundy, blue and brown. Another product, the **Mouse-House**, is an \$8.00 cover for your mouse. If you don't mind a little critter with eyes, nose and ears next to your computer, the **Mouse-House** may be just the thing to keep your mouse snug and clean.

Inexpensive stocking stuffers.

Miles Kimball, a mail-order company, sells one item that, although not Atari-related *per se*, would be fun to find in a stocking. The **Personal Computer Clock** sells for only \$4.00. It looks like a miniature computer with an LCD clock on the screen.

No matter how clean I keep my "computer room," dust is inevitable. I keep covers on most of my equipment. There's a cover for every Atari computer and peripheral. They retail for \$5.00 to \$10.00 and will keep dust, moisture and even a spilled drink from damaging equipment. Several

companies make these; they are readily available in computer stores.

Of course, I'd be remiss if I didn't mention the most valuable accessory for the Atari user. You may have guessed it, but, if not, look at the cover of what you're now holding. Yup, it's a copy of **ANALOG Computing** with **ST-Log**. If you're reading this article, you already know how useful **ST-Log** is. But for a new user, or someone who doesn't know about this magazine, I can't think of a more perfect gift than the latest issue in their stocking.

More goodies.

As you start to use your ST, you begin to accumulate disks. Unless you consciously decide how to organize all of them, you'll soon find yourself drowning in a sea of magnetized plastic. There are a number of companies selling 3½-inch disk holders, that cost from \$6.00 to \$30.00. I like the 3½-inch **Flip 'N File** (Innovative Concepts) flip-up tray. It lists for \$19.95 and is useful in keeping your work area tidy. There are other companies making the same type of product. Just be sure the one you buy won't spill disks when full and makes it easy to grab any particular disk.

I recently found some excellent and very attractive disk holders for the ST's disks, by Innovative Technologies Corp. (ITC). The **Pocket Pak** costs \$14.00, holds six disks and is small enough to fit in a coat, purse or jacket pocket. At \$20.00 the **Easel** holds twenty disks, ten on each side, and lets you see disk contents. Both the **Pocket Pak** and the **Easel** are made of tough nylon fabric with velcro fasteners.

Another product by ITC, marketed by Shanner, is the **Shanner Planner**. It's a use-

// ST Gift Guide *continued*

ful accessory that comes in 3½- and 5¼-inch versions, each providing space for a notepad, disks, pen, calculator, software manual, business cards and ruler. The entire portfolio is zippered and comes gift boxed, for \$40.00.

Shanner markets the **LogiKhron Clock Card** for the ST. Originally available from Soft Logik, it's a real-time, battery-powered clock in a cartridge. Once it's inserted and a special file is run at boot-up, date and time file stamping will always be done correctly. The **LogiKhron Clock Card** sells for \$49.00.

There are several other, more generic gifts that are inexpensive yet worthwhile. One of the best is a membership to an Atari

tion, this volume gives you information about GEMDOS, the operating system and graphics, as well as the BIOS (Basic Input/Output System).

Another Abacus offering is the **ST GEM Programmer's Reference**. It's volume 3 in the Abacus series of ST books, presenting detailed information on GEM, with examples in C and the 68000 assembly language. An overview of such topics as VDI, AES, GDOS and GIOS is included. In addition, it gives material on programming in GEM, with explanations for using the Editor, C-Compiler, Assembler and Linker of the development system.

ST Machine Language (volume 4 in the series) is devoted exclusively to program-

BASIC to C. It's ideal if you already know and can program in BASIC, but want to learn how to program in C. This book compares BASIC programs and their C equivalents, so you can make the transition easily and rapidly.

All these books are currently available and sell for \$20.00 each, except the **ST BASIC Training Guide**, which retails for \$17.00.

Unison World has a book titled **The Creative PrintMaster**, to help you get the most out of their **PrintMaster** graphics program and similar software. The \$14.00, 200-page work gives tips on how to select various typestyles for your designs, lay out your work ahead of time, select borders, choose paper and use color.

If you want to take advantage of the multitude of electronic services currently available, there's a book to help you find true happiness with your modem. **Infomania: The Guide to Essential Services** by Elizabeth Ferrarini will permit you to get the most out of your on-line time. It's the best single source for information on over 250 electronic data services. Even if you're already a member of Delphi, CompuServe, the Source, or another service, this \$15.00 book describes and compares all the services, and discusses how to get started. Published by Houghton-Mifflin.

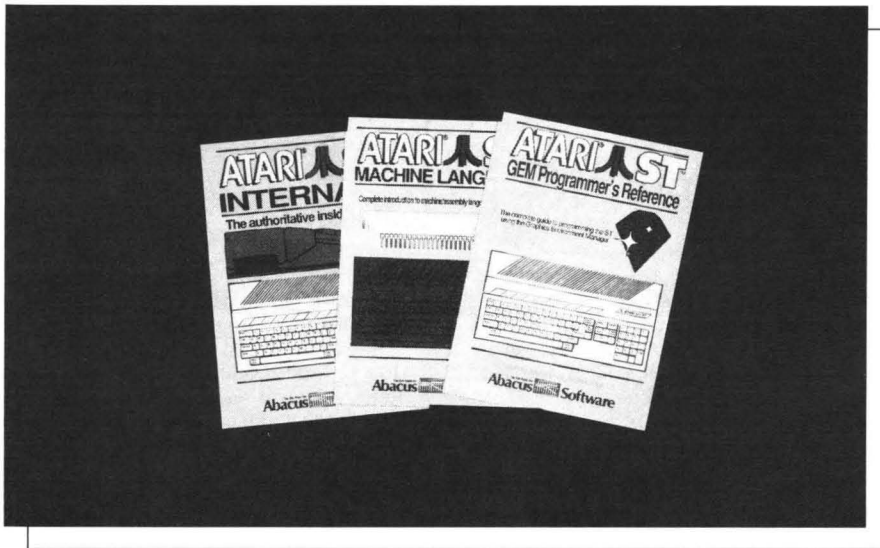
If you'd like to learn more about computer games design, Chris Crawford's, **The Art of Computer Games Design** is for you. Published by Osborne/McGraw-Hill, it sells for \$15.00. Crawford is a very unusual person whose views are expressed very well in his book. It's good reading for those who design games, as well as those who like to play them.

There are a handful of other items that would be welcomed by any ST user. Disks, printer paper and ribbons, or even a printer or monitor stand, would all be useful. A rather novel product is sold by Gemini Enterprises: **Underware** printer ribbons. The \$14.00 black ribbons are available for Epson, Prowriter, Okidata and Gemini 10x printers, and allow you to create iron-on dry transfers. Dump your favorite graphic image to your printer with this ribbon and regular paper. Then, transfer the image from the paper to a T-shirt with an iron.

If you need colored, normal ribbons, Gemini has red, green, blue, brown and purple ribbons for a variety of dot-matrix printers. These sell for \$8.00 each and are available for Epson, Okidata and Prowriter printers (the Panasonic's ribbon is \$10.00). These colored ribbons are especially useful with graphics programs like the **PrintMaster**.

Serious stuffers.

There are hundreds of products for the Atari ST, but only some of them will be used over and over. Utility programs fall into this category. Here are some suggestions for these products.



Any of the Abacus books will make an Atarian happy.

user group. There are many fine groups around the country. Memberships typically cost about \$20.00. Check the **ANALOG Computing** monthly user group listing.

Groups have monthly meetings, publish newsletters and often have libraries of public domain software. User groups have always had knowledgeable people willing to share information. With the new "lean, mean" Atari, user groups often provide the only source of Atari-specific information.

Books and magazine subscriptions also make excellent gifts. Several titles spring instantly to mind.

The predominant book publisher for STs is Abacus Books. Most of their titles are English translations of German-published Data Becker books. They keep coming out with more and better books. Here are a couple of their most useful titles.

ST Internals is a well-organized, useful compilation of technical information. A clear description is given for ST "parts" like the mouse, keyboard, 68000 processor, custom chips, I/O ports (RS-232, parallel, cartridge, DMA, floppy disk, MIDI and video) and operating system. In addi-

tion, this volume gives you information about GEMDOS, the operating system and graphics, as well as the BIOS (Basic Input/Output System).

In addition to these books, Abacus also has the **ST BASIC Training Guide**, a functional and educational introduction to ST BASIC. From problem analysis to commands, to algorithms, it provides the fundamentals of programming in an easy-to-understand format.

ST Graphics and Sound teaches how to create graphics and use the built-in sound facilities. Examples are written in BASIC, C, Logo and Modula-2; there's something for every programmer.

ST Tricks & Tips covers such topics as: using GEM from BASIC, combining BASIC and machine language, creating a RAM-disk and print spooler, automatically starting TOS applications, and much more. If you'd like to learn about programming your Atari ST, this and the other Abacus books will help.

The last Abacus book I'll mention is **ST**

If you use an ST to write—whether for a letter to Aunt Sally, a report, a term paper or a novel—you need a good spelling-checker program. The best one currently available for the ST is **Thunder!**, from Batteries Included. This serious desktop accessory is really three programs in one: a real-time, 50,000-word spelling checker, a word expander and correcter, and a writing analysis tool.

For \$40.00, you get two versions of the spelling checker: one a desktop accessory, available anytime from within a true GEM program; and another stand-alone program that can be used with any file. With the latter, you can check files created by non-GEM programs, as well as any using GEM.

The word-expansion feature allows you to define ways in which specific strings of letters or characters should be expanded. For example, if you type your name a lot, you can use the expansion feature to define your initials as meaning your entire name. Then, whenever you type your initials, your full name appears.

Thunder!'s writing analysis tools consist of statistics, including character, syllable, word and sentence count, and two types of readability indices, indicating years of schooling required for the average reader to understand what you've written.

Many manufacturers of computer software copy protect their products, physically preventing people from making copies to give away or resell. Under copyright law, you have a right to make a copy, in case your original no longer functions. This is the only right afforded to you. Making copies for any other purpose is strictly illegal—and a Federal offense.

The best backup program for the ST is Central Point Software's **Copy II ST**. The program is designed for making archival copies only for your own use, and can work with one or two disk drives, either single or double sided. In addition, **Copy II ST** provides a fast sector copier and a bit copier utility, to make "carbon copies" of disks. It's easy to use, completely mouse driven and sells for \$40.00.

Some people question the legitimacy of disk copy programs like this one. My answer: why should legitimate users be penalized by the behavior of others? There's a need for this type of product, and I'm glad that Central Point has decided to fill the void with their product.

Here's an unusual but useful item. The **X-10** system remotely turns AC devices on and off, either directly or via a timer. Assorted modules control lights, appliances and other electrical devices, by means of commands sent through your home's AC wiring. The **X-10 Powerhouse** can be connected to your ST, programmed to control various devices, and left to work—even after disconnected from the computer.

The **Powerhouse** peripheral attaches to

the ST's RS-232 port. Originally more than \$100.00, the **Powerhouse** is now available from DAK for about \$20.00 (order the IBM version #4410 and throw the disk away).

For software to go with the **Powerhouse**, get **Echo**. Published by MichTron, it costs about \$40.00. It allows you to use the **X-10** system to change the status of up to 256 electrical devices, at up to 128 different times of the week—a 7-day, 128-event system. **Echo** is a GEM application, so all entries are made via the mouse, and desktop accessories are always available.

Lamp and appliance modules (\$10.00 to \$15.00) are available from Sears, Radio Shack, mail order and electronic specialty stores. In addition, replacement wall switches and outlets—that look and work like ordinary fixtures—are available for under \$15.00. If you want a neat gift for someone, the **X-10 Powerhouse**, **Echo** and a couple of lamp or appliance modules are the ticket.

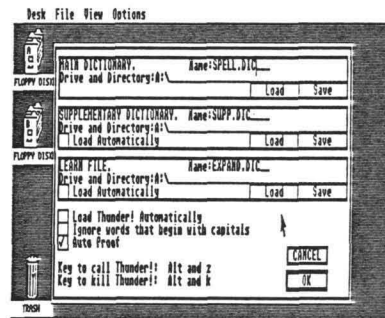
A very useful utility that just came out is **Action Pak**, from Action Software. This \$40.00 (add \$3.00 postage and handling) program is really five GEM-based programs in one. **Action Pak** provides a labeler that lets you custom design and print 3½-inch disk labels on an Epson or Epson-compatible printer. Up to thirty-eight filenames can be printed on each self-adhesive label.

Action Pak also prints out banners of up to four 72-character lines. Five fonts are included, or **DEGAS**-generated fonts can be used. The package has a program that converts 8-bit **Synfile** database files to ST format. ST files compatible with all your current database programs can be generated. And **Typewrite** turns the ST into a, ah, typewriter. This is useful for addressing envelopes or filling out forms. Fifth in the package is the **Typewrite** program as a desktop accessory.

MichTron has two utility programs worth considering to give or receive. **Cornerman** is a nine-function desktop utility with a number of features. It has an ASCII table, calculator, on-screen clock, security password function, note pad, phone dialer, phone log, DOS window and 15-squares puzzle. All this lists for \$50.00 and will significantly "clean up" your desktop.

The second MichTron utility, **ALT**, sells for \$30.00. With it, you can redefine your keyboard and convert whole strings of tedious typing into single keystrokes. Actually, the key combinations ALT-A through ALT-Z and ALT-0 through ALT-9 can be replaced by often-used text phrases, program commands, or any other string of up to sixty characters.

Another interesting and useful utility is **Power Vision** by Power Systems, for \$25.00. This program can be used to develop slide shows and graphic presentations, from **NEO-Chrome**, **DEGAS**, **N-Vision** and **Paintworks** files. A variety of user-defined dis-



Thunder! from Batteries Included.

play options, picture merge, mesh, overlay and several wipes (how pictures are drawn on the screen) can be used. In addition, there's a compress/uncompress utility, to let you store as many as fifty paint files on an SS/DD disk.

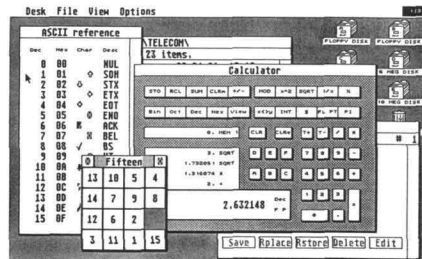
VIP Professional by VIP Technologies is a spreadsheet for the ST, based on the well-known Lotus 1-2-3. An integrated spreadsheet, **Professional** will give you sophisticated spreadsheet, data base and presentation graphics capabilities—in one program. As a Lotus clone, it lets you use the same keystrokes, applications, data files and templates as the original PC program. Yes, worksheet files created on an IBM PC with Lotus 1-2-3 can be transferred to the ST, then accessed by **Professional**.

The program comes in two flavors: **Professional** (an exact Lotus 1-2-3 clone) for \$180.00 and **Professional Lite** (no snickers, please), a \$100.00 version that's almost identical. **Lite** doesn't have the ability to use macros, has no database functions, and has a matrix of "only" 256 by 2048 cells (**Professional** allows a whopping 8192 spreadsheet rows). Neither program uses the GEM interface; they're referred to as "text" versions. But that's how Lotus 1-2-3 works, and it's been used effectively for years.

Another handy program is Electronic Arts' **Financial Cookbook**. For \$50.00 it includes dozens of financial "recipes," to calculate everything from mortgages to IRAs. Highly recommended.

Gifts that keep on giving.

DEGAS means "Design and Entertainment Graphics Arts System." It also means a graphics program that lets you create art and drawings, then save them to disk. The



The **Cornerman** desktop utility.

pictures generated can be shown on the screen with the included slide show program, and printed on your printer. The software works with one or two drives, in any of the three ST resolution modes.

Written by Tom Hudson, this product has the highest fun quotient of any program for the ST—and for only \$40.00. Batteries Included, a familiar name to most Atari users, publishes **DEGAS**.

Another painting program worthy of giving or receiving is **Paintworks** by Activision. Formally called **N-Vision**, it's a \$60.00 program that goes several steps further than **DEGAS**. With over seventy functions, it's a powerful design tool. Unlike **DEGAS**, **Paintworks** is a GEM application that uses pop-down menus. Like **DEGAS**, **Paintworks** can be used in all three resolutions. All commands, painting and menu selection are done with the mouse.

Paintworks has the usual line-draw, box, circle, fill and other features one would expect in a paint program, plus a few others that distinguish it. The major one of these is its ability to create and use clip art, by means of the clipboard (a cut and paste feature). Additionally, color cycling can be used, to create the illusion of movement

by rapidly changing the colors of some (or all) of the screen.

The vast resources of CompuServe Information Service are at your fingertips, with the CompuServe Starter Kit. For \$39.95, you receive five free hours of connect time and a thorough manual.

Delphi is where **ANALOG Computing** runs the Atari User's Group. On this SIG, you can find all the programs featured every month, for easy downloading. In addition, the editors and technical folk from **ANALOG Computing** help you, or listen to your ideas and questions. Of course, Delphi itself offers a wealth of on-line information and special interest groups for other computers and hobbies. There's a one-time membership fee of \$30.00, or \$50.00 with the manual.

Now, of course, you'll need a modem. The **Avatex 1200HC** is a good, inexpensive one. HC stands for completely Hayes compatible, unlike previous models, that didn't have a built-in speaker or internal registers. The **Avatex 1200HC** is a 300/1200-baud modem that sells for about \$140.00. Production of these modems has stopped, so get one while you still can.

The cream of the crop is still the Hayes

Smartmodem. It will set you back about \$200.00 for 300 baud and about \$450.00 for 300/1200 baud.

My favorite ST terminal program is still **STTalk** from QMI. This \$18.00, somewhat no-frill program (it's not GEM-based), continues to work whenever more feature-laden (and often more expensive programs fail. If you want to be able to upload and download every time, **STTalk** is the choice for you.

There are a couple other terminal programs for the ST, which should be considered if you want more features and are willing to pay for them. **IS*Talk** from Batteries Included is an excellent GEM-based program, offering all kinds of features (like an edit window, spelling checker and macro key functions), for \$80.00.

A very popular terminal program called **FLASH** is available from The Catalog. Selling for \$40.00, it's GEM-based and has a built-in editor. Its session history feature lets you review, send, save or edit. **FLASH** also offers a macro command language, to automate log-ons, file transfers and unattended operations.

Games.

No list of gift suggestions for the Atari

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user would be complete without of games. Like Atari 8-bits, the ST is a superb game-playing machine. Though there aren't quite as many games for the ST as for 8-bits, there are dozens currently available—and a few really stand out.

My favorite text-adventure is **Planetfall** from Infocom. It combines adventure, science fiction and humor into an engrossing example of interactive fiction.

For a child or someone new to the text game genre, I'd recommend Infocom's **Sea-stalker**. Not as difficult or as complex as **Planetfall**, it offers a good challenge and, like all Infocom games, has excellent documentation. Every Atarian should own at least one Infocom text-adventure. Prices range from \$40.00 to \$60.00. The entire Infocom line is available now for the 520ST and 1040ST computers.

One of the best ST games—and one that really takes advantage of the ST's stunning graphics capability—is **The Pawn** from Firebird. This \$45.00 game is a graphic text adventure that's immensely playable, due to its plot, humor and visual impact. I can't laud it enough.

Another excellent game is **Time Bandit**. Months in the making, this \$40.00 offering from MichTron is super. Is it an arcade game? Is it a text adventure? Is it a shoot-'em-up? You can find the answers to all these questions if you get **Time Bandit**. Is it addictive? Yes!

Sundog: The Frozen Legacy from Oasis/FTL Systems is another great ST game. As a science fiction adventure game with fantastic color graphics, this \$40.00 program would please any ST user. If you're an adventure fan, you'll love **Sundog** because of its very complete world and interesting story line. Any of these games — **The Pawn**, **Time Bandit**, and **Sundog**—would make an excellent gift. The only problem: which one to buy.

Another very popular game with ST users is **Brataccas**, by Psygnosis Limited of England. Mindscape is now selling this graphic adventure game in the U.S. for \$40.00. In it, you get to play hero, in a setting right out of the Saturday-morning cartoons. The graphics are excellent, the story well done and often humorous, the packaging unique.

For the ST user who has everything.

This last category is made up of gifts that are either expensive or somewhat unusual. Either way, they'd be fun to give or receive.

There might be better ways to spend \$300.00, but there's no better color monitor than the **Atari SC1224**. And, if you happen to have both monochrome and color monitors for your ST, you'll need **Monitor Master** by Practical Solutions. The **Monitor Master** allows you to connect a monochrome, RGB and composite monitor to an ST with a separate RCA audio out jack. Al-

though the composite signal is only available on 520STs with a RF modulator, the audio is available on all machines.

Monitor Master sells for \$55.00 and is available now. **Monitor Master II** will be seen after the first of the year for under \$100.00, providing a composite monitor signal on all ST computers.

A great bargain in a dot-matrix printer is the C.Itoh **Prowriter Junior**. It's completely Epson compatible, so any escape code sequences intended for the Epson FX-80 or FX-85 printer will work without a problem. It offers a near letter quality (NLQ) mode and proportional spacing. The **Prowriter Junior** also has both friction (single sheets) and tractor (continuous pin-feed) feed capability. One of the best things about this \$300.00 printer is the way it lets you address envelopes, either letter or business size. Simply insert the envelope, crank it to starting position and tell your word processor to print.

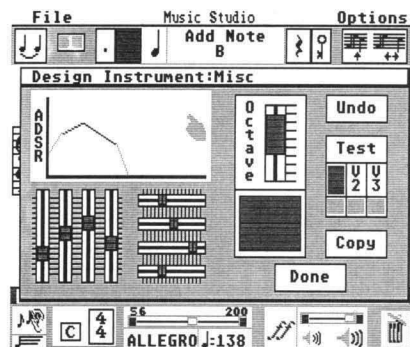
An excellent letter-quality printer is the **Silver-Reed EXP-550**. It normally sells for about \$400.00 and is seen under other names (like **Transtar 130**). The **Silver-Reed** uses changeable daisy wheels, has a wide carriage and prints at 17 characters per second. It offers three type pitches (10, 12 and 15) and proportional spacing. Carbon film ribbons can be used, for exceptional quality printing. I've been using one now for over two years and love it.

Another printer-related item is a printer buffer from Practical Peripherals. The **Microbuffer** comes in either 32K or 64K versions and, simply, works as advertised. The buffer originally sold for about \$250.00 to \$300.00, but I've seen them for much less in mail order ads. A buffer lets you get back to your computer task while the printer's still printing. Very handy.

One of the least expensive, most rewarding ways to get involved with the music/computer combination is to get an instrument like the **Casio CZ-101 Digital Synthesizer**. This mini-keyboard lists for \$500.00, but can be obtained at discount houses for under \$200.00. The **CZ-101** is an 8-voice polyphonic digital synthesizer with sixteen factory preset "patches," sixteen internal patch memories and the capability for another sixteen patches on a removal RAM cartridge.

The supplied patches range from trumpet, electric piano and organ voicings to far out, imagined sounds. Some are more realistic than others. For slightly more, the **CZ-1000** is virtually identical to the **CZ-101**, but has full-size keys (the keyboard is still four octaves).

Since the ST has MIDI capability built in, you can easily turn your computer into a multi-track tape recorder, by buying the right software. Currently, a number of companies make ST MIDI programs. The **Music Studio** from Activision and **ST Music Box** from XLent Software are just two of



Activision's Music Studio.

those available. The combination of the Casio keyboard, the ST computer and a MIDI program gives you tremendous musical capability.

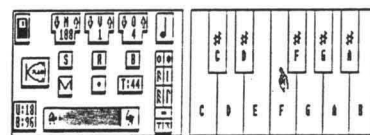
If you want to learn more about synthesizers, I highly recommend three books from GPI publications. They're compilations of articles from Keyboard magazine. Called **Synthesizer Basics**, **Synthesizer Technique**, and **Synthesizers and Computers**, each book sells for \$8.95, plus \$1.50 postage.

Atari has been promising a hard disk for the STs for over a year. While they were promising, Supra was delivering. I've used the **Supra 10-megabyte** and the smaller (in size; it uses a 3½-inch platter) **20-megabyte hard disks** for several months. Each has worked well, and can be recommended without first sending my conscience out of the room.

The **10-megabyte ST hard disk** is sold only direct from the factory, for \$549.00. The **20-megabyte drive** retails for \$649.00, from either the factory or retailers. All Supra ST hard disks connect to the ST's DMA port and come with a boot program. Supra Corporation was formerly Microbits Peripheral Products, or MPP (and this is the last time I'll explain that).

That wraps up my list of gift ideas for the Atari ST user. I hope I've either given you some useful suggestions for holiday gift giving, or—if you leave this article in a strategic place—helped you get what's on your holiday list.

By the way, who said there are no products for the ST? just tell 'em to read this article! **A**



Music Box from XLent Software.



Presents

A New 4xFORTH with a New Price!

The new 4xFORTH + (\$69.95*) for the Atari ST comes with a complete GEM interface including all VDI and AES calls, nothing has been left out. 4xFORTH also has an Editor, Assembler, Floating Point, Binary Save, Royalty Free Turnkey, Forth Accelerator, LineA, Stream Files, an incredible set of words which makes the creation and management of windows and menu bars easy, and the 4xFORTH User's Guide, 350+ pages of real documentation on every aspect of using 4xFORTH.

* All prices of The Dragon Group's products have been reduced, call for our new price list. All current users of 4xFORTH Level 1 may upgrade their systems for \$20.

The Dragon Group, Inc.

148 Poca Fork Rd, Elkview, WV 25071

304/965-5517, TLX 5106012426

CIRCLE #144 ON READER SERVICE CARD

Atari ST is a trademark of Atari Corp. GEM, VDI and AES are trademarks of DRI, Inc. 4xFORTH and Forth Accelerator are trademarks of The Dragon Group, Inc.

Megamax C

for the

Atari ST

Featuring

- One pass Compile • In-Line Assembly • Smart Linker
- Full Access to GEM routines • Register Variable Support • Position Independent Code • and much more...

System Includes:

- Full K&R C Compiler (with common extensions)
- Linker • Librarian • Disassembler • C Specific Editor
- Code Improver • Documentation • Graphical Shell

Benchmark	Compile Time	Execute Time	Size
Sieve	70	2.78	5095
"Hello, world"	63	N/A	4691

*Times in seconds. Sieve with register variables.

\$199.95 For more information, call or write:

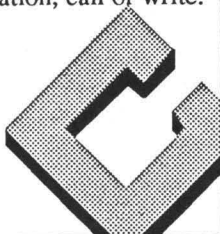
Megamax, Inc

Box 851521

Richardson, TX 75085

(214) 987-4931

VISA, MC, COD ACCEPTED



CIRCLE #145 ON READER SERVICE CARD

ATTN:
PASCAL
USERS

MODULA-2

the successor to Pascal

FOR
ATARI
520ST

- FULL interface to GEM DOS, AES and VDI
- Smart linker for greatly reduced code size
- Full Screen Editor linked to compiler locates and identifies all errors.
- True native code implementation (Not UCSD p-Code or M-code)
- Sophisticated multi-pass compiler allows forward references and code optimization
- Desktop automates Edit/Compile/Link cycle
- FileSystem, RealInOut, LongInOut, InOut, Strings, Storage, Terminal
- Streams, MathLib0 and all standard modules
- Directory search paths
- Supports real numbers and transcendental functions ie. sin, cos, tan, arctan, exp, ln, log, power, sqrt
- 3d graphics and multi-tasking demos
- CODE statement for assembly code
- 370-page manual
- Installs on Hard disk and RAM disk
- No royalties or copy protection
- Phone and network customer support provided

Pascal and Modula-2 source code are nearly identical. Modula-2 should be thought of as an enhanced superset of Pascal. Professor Niklaus Wirth (the creator of Pascal) designed Modula-2 to replace Pascal.

Added features of Modula-2 not found in Pascal

- CASE has an ELSE and may contain subranges
- Programs may be broken up into Modules for separate compilation
- Machine level interface
 - Bit-wise operators
 - Direct port and Memory access
 - Absolute addressing
 - Interrupt structure
- Dynamic strings that may be any size
- Multi-tasking is supported
- Procedure variables
- Module version control
- Programmer definable scope of objects
- Open array parameters (VAR r: ARRAY OF REALS;)
- Elegant type transfer functions

Ramdisk Benchmarks (secs)	Compile	Link	Execute	Optimized Size
Sieve of Eratosthenes:	6.2	4.3	3.5	2600 bytes
Float	6.4	4.8	8.3	4844 bytes
Calc	5.5	4.2	3.3	2878 bytes
Null program	5.1	3.2	—	2370 bytes

```
MODULE Sieve;
CONST
  Size = 8190;
TYPE
  FlagRange = [0..Size];
VAR
  FlagSet = SET OF FlagRange;
  i: FlagRange;
  Prime, k, Count, Iter: CARDINAL;
BEGIN
  ('$$-$$-$$-')
  FOR Iter := 1 TO 10 DO
    Count := 0;
    Flags := FlagSet(); (* empty set *)
    FOR i := 0 TO Size DO
      IF (i IN Flags) THEN
        Prime := (i * 2) + 3; k := i + Prime;
        WHILE k <= Size DO
          INCL (Flags, k);
          k := k + Prime;
        END;
        Count := Count + 1;
      END;
    END;
  END;
END Sieve.
```

```
MODULE Float;
FROM MathLib0 IMPORT sin, ln, exp,
  sqrt, arctan;
VAR x, y: REAL; i: CARDINAL;
BEGIN ('$T-$A-$S-$')
  x := 1.0;
  FOR i := 1 TO 1000 DO
    y := sin (x); y := ln (x); y := exp (x);
    y := sqrt (x); y := arctan (x);
    x := x + 0.01;
  END;
END Float.
```

```
MODULE calc;
VAR a, b, c: REAL; n, i: CARDINAL;
BEGIN ('$T-$A-$S-$')
  n := 5000;
  a := 2.71828; b := 3.14159; c := 1.0;
  FOR i := 1 TO n DO
    c := c * a; c := c * b; c := c / a; c := c / b;
  END;
END calc.
```

Product History

The TDI Modula-2 compiler has been running on the Pinnacle supermicro (Aug. '84), Amiga (Jan. '86) and will soon appear on the Macintosh and UNIX in the 4th Qtr. '86.

Regular Version \$79.95 Developer's Version \$149.95 Commercial Version \$299.95

The regular version contains all the features listed above. The developer's version supplies an extra diskette containing a symbol file decoder - link and load file disassemblers - a source file cross referencer - symbolic debugger - high level Windows library Module - Ramdisk and Print Spooler source files - Resource Compiler. The commercial version contains all of the Atari module source files.

Other Modula-2 Products

Kermit	- Contains full source plus \$15 connect time to Compuserve.	\$29.95
Examples	- Many Modula-2 example programs to show advanced programming techniques	\$24.95
GRID	- Sophisticated multi-key file access method with over 30 procedures to access variable length records.	\$49.95



SOFTWARE, INC.

10410 Markison Road ■ Dallas, Texas 75238 ■ (214) 340-4942
Telex: 888442

Compuserve Number: 75026,1331

CIRCLE #146 ON READER SERVICE CARD



COMPUTER MAIL ORDER

GUIDE TO ATARI PRODUCTS



The Atari 800XL System Special

- Atari 800XL Computer
- Atari 1050 Disk Drive
- Epson Homewriter 10 Printer with Interface
- Box of 10 Generic Diskettes
- Atari CX40 Joystick

All this for the low, low price of

\$369⁰⁰

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When you want to talk computers.

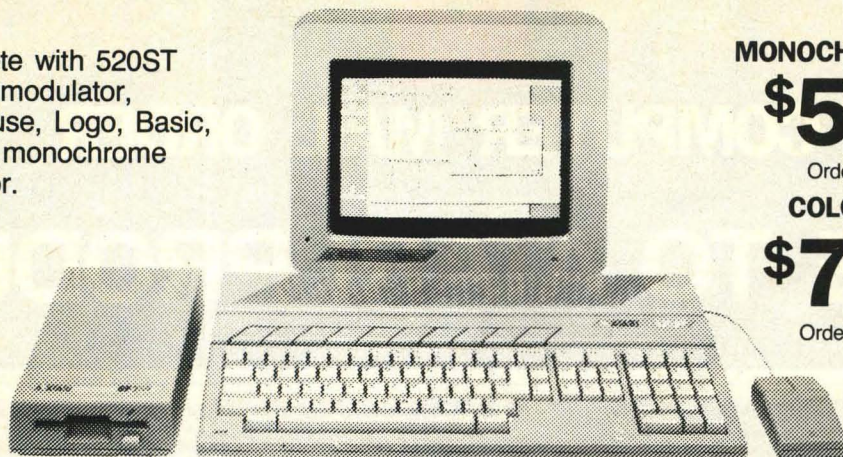
When you want to talk price.

Call toll-free: 1 800 233-8950.

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CMO. 477 East Third Street, Dept. B712, Williamsport, PA 17701
All major credit cards accepted

The Atari 520ST System Package

Comes complete with 520ST computer with modulator, disk drive, mouse, Logo, Basic, 1st Word, and monochrome or color monitor.



MONOCHROME SYSTEM

\$599⁰⁰

Order No. AA520S

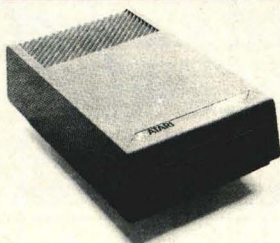
COLOR SYSTEM

\$779⁰⁰

Order No. AA520SC

"Call on the new Atari 520ST-FM"

SF314TM Microfloppy Disk Drive

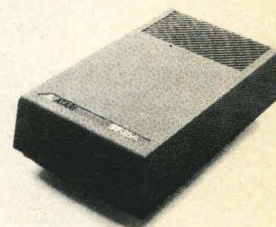


Like the 10ST's internal drive, the SF314 is a double-sided, double-density microfloppy disk drive. Add an additional floppy drive to your 1040ST and reap another 720K (formatted) of available disk storage capacity each time you switch on your computer.

\$219⁰⁰

No. AA314

SF354TM Microfloppy Disk Drive

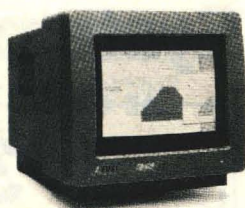


Suppose you want a second disk drive but don't need another 720K of disk storage space. Then the SF354 is just for you. It's a single-sided, double-density drive providing up to 360K (formatted) of storage on each 3 1/2-inch disk.

\$179⁰⁰

No. AA354

SM124TM High-Resolution Monochrome Monitor

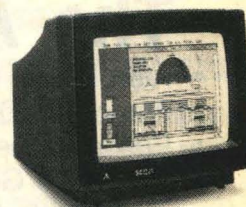


A state-of-the-art monochrome monitor. When you purchase your 520ST or 1040ST systems perhaps you'll choose the color monitor. Well, why not add a high-resolution monochrome display to your system. For word and data processing, there's no clearer, sharper display.

\$189⁰⁰

No. AA5124

SC1224TM RGB Color Monitor



A high-performance RGB color monitor. The SC1224 faultlessly displays all 512 of the 1040ST's colors. No doubt its startling display of bit-mapped color graphics will knock your socks off.

\$Call

No. AA51424



Call toll-free: 1 800 233-8950.

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

**All major credit
cards accepted.**

The 1040ST from Atari

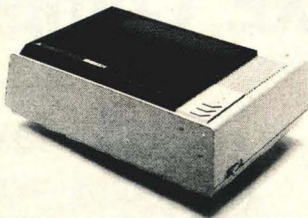
The first one megabyte computer system for under \$1000.

- Built-in 3½" double sided (720K drive)
- 1 Meg RAM
- 192K RAM w/TOS
- Bundled with Atari RGB monitor
- Includes ST language disk (Basic-Logo-Neochrome)
- Built-in power supply

\$979⁰⁰



DOT-MATRIX GRAPHICS PRINTER



Offering an array of print styles, character pitches, column widths and page-length options, the SMM804 Printer allows you maximum versatility in formatting your written work. Plus—it's uniquely designed to support the 1040ST's print screen utility to transfer hi-res designs and pictures from the computer directly to the printer.

\$189⁰⁰

No. AAXM804

HARD DISK DRIVE



Connecting this 20MB hard disk drive to your system lets you take advantage of the 1040ST's built-in, high-speed DMA channel (hard disk port). Data transfer (read/write) to and from the drive is virtually instantaneous. Think of it: high-speed data transfers and 20 Mbytes of disk storage—all at an incredibly low cost.

\$729⁰⁰

No. AA51620



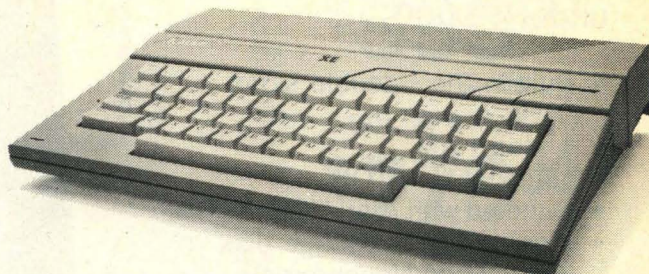
Call toll-free: 1 800 233-8950.

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All major credit cards accepted.

The Atari 130XE Computer

Atari has added a new slant to the world of computing. Beauty. Inside and outside. Brians and beauty combined to give you more of what you want from a personal computer. More graphics modes, colors, Random Access Memory, text modes, and independent sound voices than any other computer of its size. All in one stunning new body at a ver low price. The Atari 130XE has 131, 072 bytes of RAM. It uses the 6502C microprocessor and is software compatible with the thousands of programs available for the 800XL series.



No. AA130XE

\$139.⁰⁰

The Atari 800XL Computer



A powerful, versatile tool for work and play, the Atari 800XL Home Computer features built-in Atari Basic programming language, a full-stroke keyboard, a Help key and an international character set—plus built-in 64K memory. This additional memory gives the user access to over 2,000 software programs, while an expansion connection proves the potential for adding sophisticated peripherals. Teamed with the right Atari programs and peripherals, the 800XL can teach, entertain, program and help manage a home or business.

No. AA800X

\$79⁹⁹

The Atari 65XE Computer

Atari has added a new slant to the world of computing. Beauty. Inside and outside. Brians and beauty combined to give you more of what you want from a personal computer. More graphics modes, colors, Random Access Memory, text modes, and independent sound voices than any other computer of its size. All in one stunning new body at a very low price. The Atari 65XE has 65,000 bytes of RAM. It uses the 6502C microprocessor and is software compatible with the thousands of programs available for the 800XL series.



No. AA65XE

\$89⁹⁹

SUPRA Hard Drives for Atari Systems

Hard Drive convenience for your Atari System. 10, 20 and 30 Meg hard drives available. Each includes controller, Atari interface, hard disk DOS, attractive case, cables and power supply.

No. SJ0007, **10MB for XL Series**

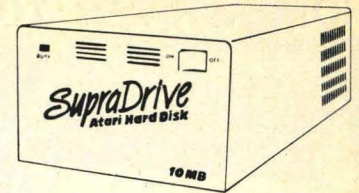
\$679⁰⁰

No. SJHD20ST, **20 MB for ST Series**

\$649⁰⁰

No. SJHD30ST, **30 MB for ST Series**

\$829⁰⁰



No. AA1050

ATARI 1050 Disk Drive

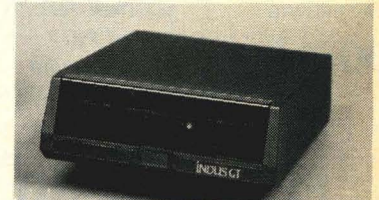
A CMO Exclusive!
While they last.

\$129⁰⁰

INDUS GT Disk Drive

The GT drive is compatible with the 400/800/1200 and XL series computers. Featuring full operation in either single or double density.

No. IADD **\$199⁰⁰**



MAXELL 5 1/4" Diskettes

Single Sided, Double Density

No. MXD1

\$10⁹⁹
Box of 10



VERBATIM

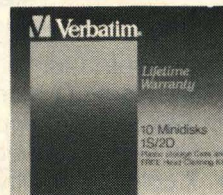
Single Sided, Double Density

5 1/4" Diskettes

Includes plastic storage case & head cleaner kit.

No. VE1

\$8⁹⁹
Box of 10



SONY

Bulk Pack User's Group Special

50 Double Sided, Double Density 3 1/2" Mini Diskettes.

No. SCMFD2P

\$89⁹⁹



ICD Rambo XL

Turns your 800XL or 1200XL into a 256K System.

No. LAB04

\$39⁹⁹

ICD Happy Archiver

Provides the owner with Archiver utilities. A must for serious hackers.

\$36⁹⁹

No. AB03

ICD US Doubler

True double density and high speed for the 1050 drive.

No. AB02

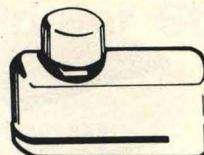
\$49⁹⁹

DATA SHARE Disk Notcher

Cuts uniform tabs in double sided diskettes, allowing use of both sides in single sides drives.

No. XNOTCH

\$6⁹⁹



BIB Disk Drive Head Cleaning Kit

\$14⁹⁹

No. HD-4 (3 1/2")

\$4⁹⁹

No. HD-5 (5 1/4")

Innovative Concepts Flip 'n File

Stand-up hard case holds 10 disks.

No. FF10D

\$1⁹⁹ ea.

AMARAY Diskette Storage Tubs

No. ARDT3, (3 1/2" 30 Capacity)

\$8¹⁹

No. ARDT5, 5 1/4" 50 Capacity)

\$8⁴⁹

ICD Sparta DOS Construction Set

No. AB04

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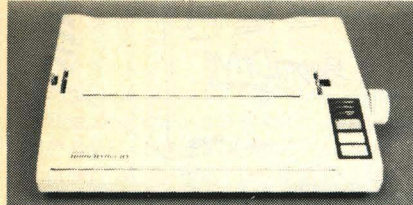


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EPSON HOMEWRITER 10



- 100 cps draft
- NLQ
- 80 column

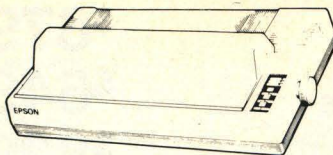
SPECIAL!

\$99⁹⁹

No. EPHW10

with purchase of PIC
Call CMO Sales Consultant
for proper interface.

EPSON LX86



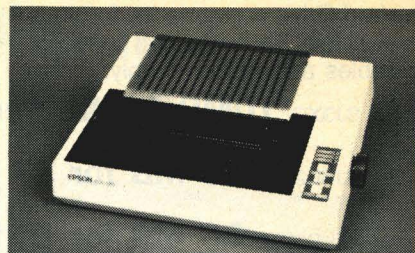
- 120 cps draft
- 16 cps in NLQ mode
- Parallel interface
- 80 column

NEW!

\$249⁰⁰

No. EPLX86

EPSON FX85

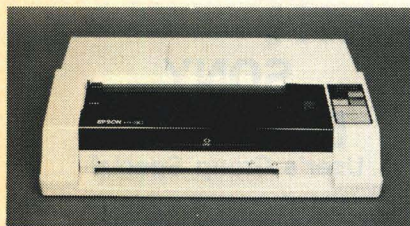


- 160 cps draft
- 32 cps in NLQ mode
- Parallel interface
- Optional tractor
- 8K RAM buffer

\$389⁰⁰

No. EPF85

EPSON HI-80

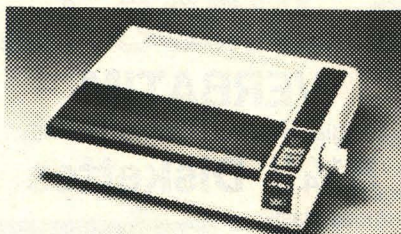


- Uses 4 pens at a time with 10 colors available
- Draws at 9" per second
- Includes HPGL
- Parallel interface

\$359⁰⁰

No. EPHI80

JUKI 5510C



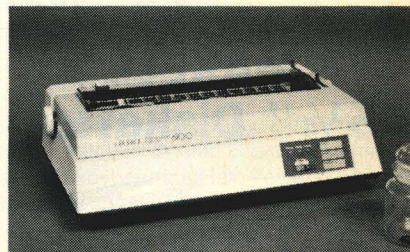
- 180 cps draft
- 30 cps NLQ mode
- IBM/Epson compatible
- 3K buffer expandable to 15K
- 7 color capability

COLOR!

\$469⁰⁰

No. JU5510C

JUKI 6100



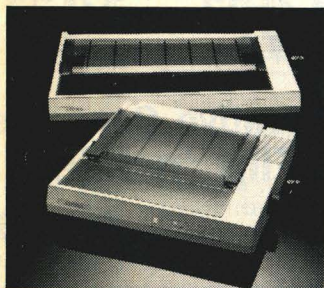
- 18 cps
- 2K Buffer standard
- 2400 MTBF rated
- Parallel interface

**LETTER
QUALITY!**

\$439⁰⁰

No. JU6100

CITIZEN MSP



- 40 cps NLQ
- 160 cps draft
- Built-in tractor
- 1K buffer

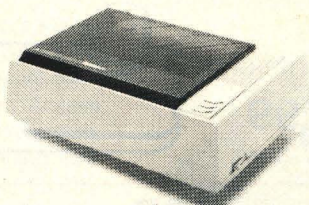
\$299⁰⁰

No. CZMSP10 (80 col.)

\$419⁰⁰

No. CZMSP15 (132 col.)

ATARI XMM801 (for XE & XL) XMM804 (for ST)



ATARI's NEW DOT MATRIX
GRAPHICS PRINTER

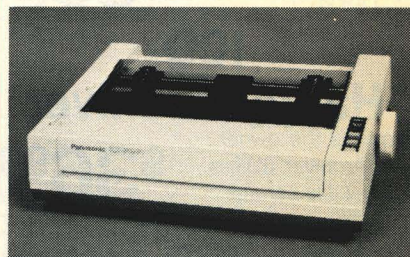
\$159⁰⁰

No. AAXM801

\$189⁰⁰

No. AAXM804

PANASONIC KX-1091

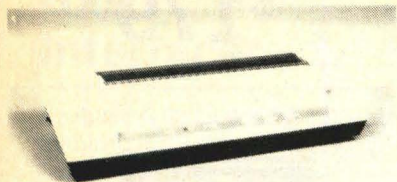


- 120 cps, multiple mode NLQ
- 80 column, 1K buffer
- Tractor and friction feed

\$229⁰⁰

No. PA1091

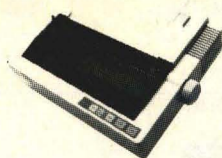
STAR LV1210 PRINTER



- 120 cps • IBM compatible
- Built-in tractor
- 80 column • Parallel Interface

No. SGLV1210 **\$189⁰⁰**

STAR NX-10 PRINTER



- 120 cps • Bi-direction
- Logic seeking
- IBM Character set
- Friction and Tractor feed

No. SGNX10 **\$239⁰⁰**

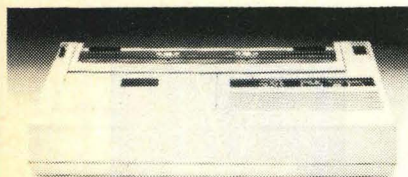
STAR SG-15 PRINTER



- 120 cps • 16K Buffer
- Wide Carriage

No. SGSG15 **\$399⁰⁰**

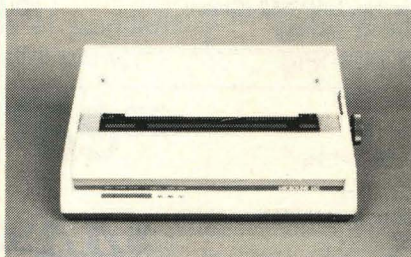
OKIDATA OKIMATE 20



- Color Screen Print Software
- 80 cps Draft/40 cps NLQ
- 24 Element Print Head
- 80 Column, 8K Buffer

No. OK20 **\$139⁰⁰**
w/purchase of Interface

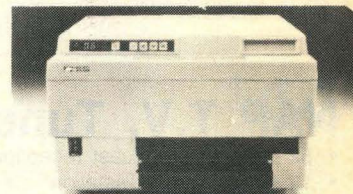
OKIDATA 182



- 120 cps • 60 cps enhanced
- Adjustable pin feed
- Parallel Interface

No. OK182 **\$219⁰⁰**

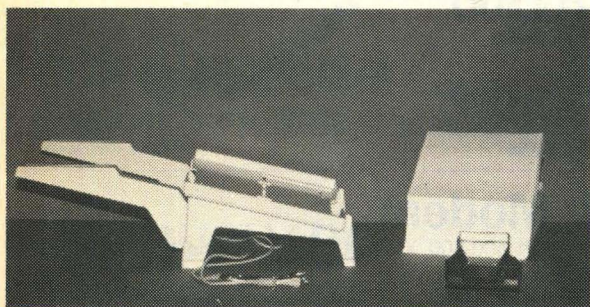
CANON LASER LBP-8A1



- 8 pages per minute
- High quality printing
- 16 fonts per page capability
- Diablo 630 emulation
- Parallel interface

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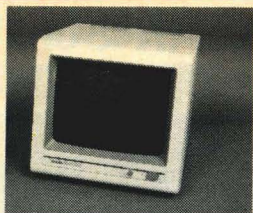


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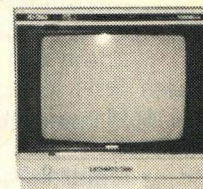
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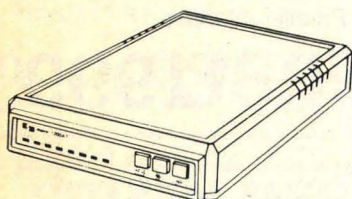
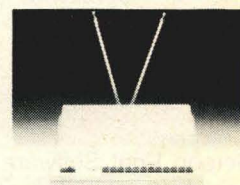
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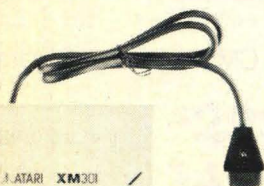
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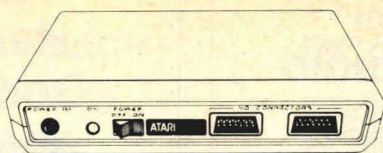
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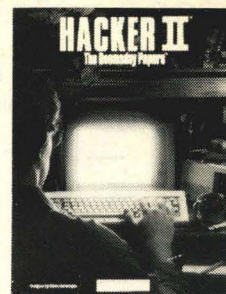
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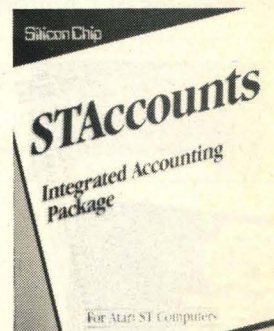
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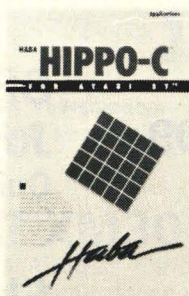
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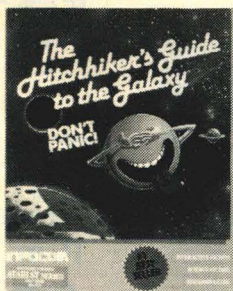
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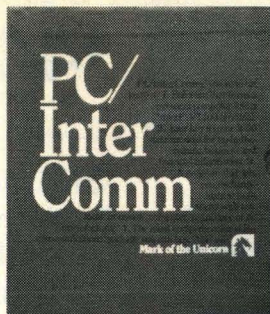
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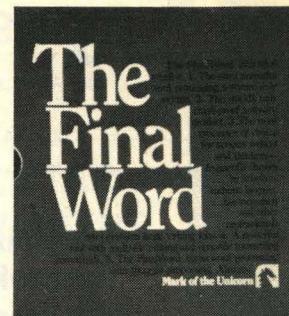
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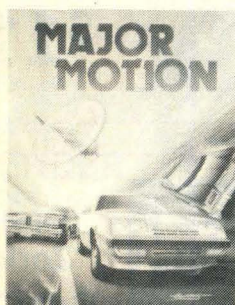
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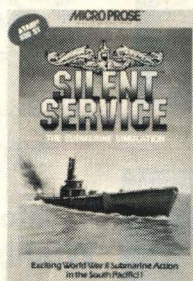
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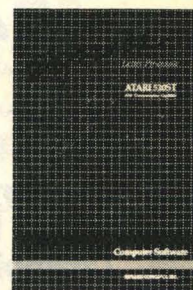
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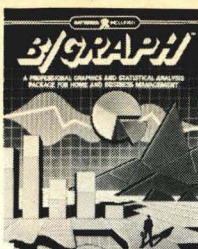


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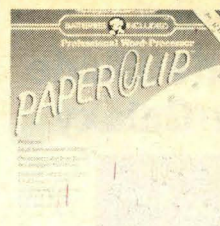
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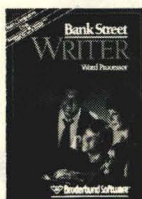
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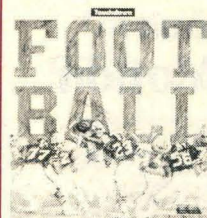
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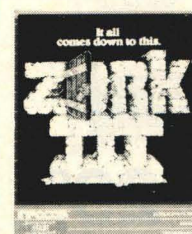
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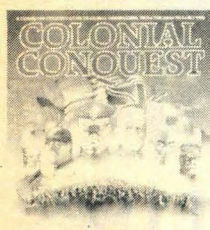
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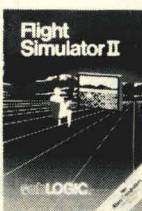
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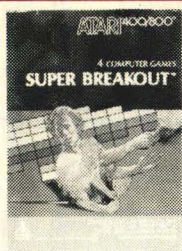
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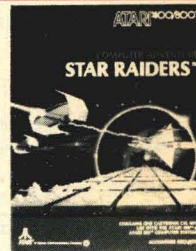
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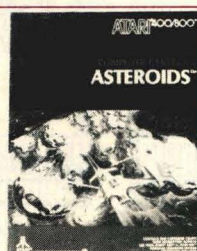
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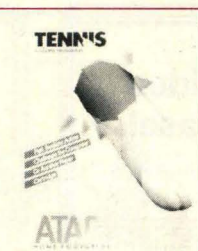
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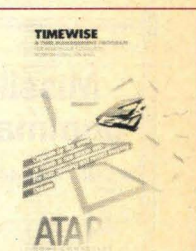
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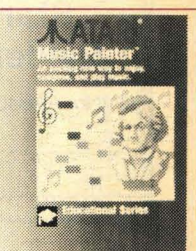
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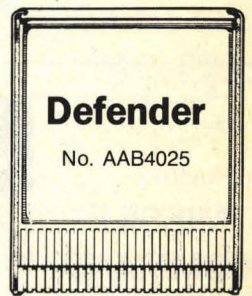
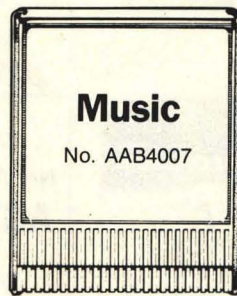
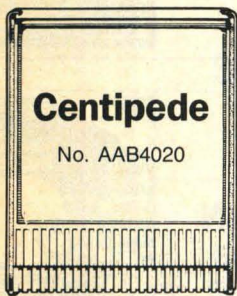
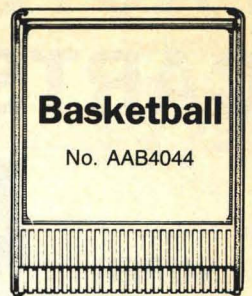
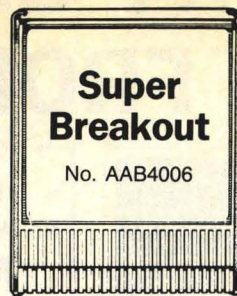
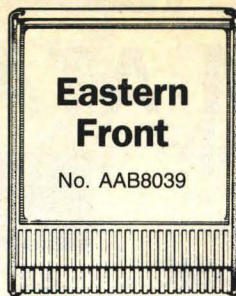
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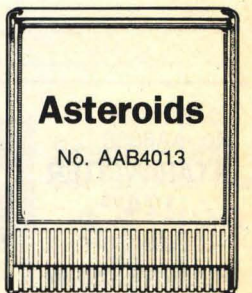
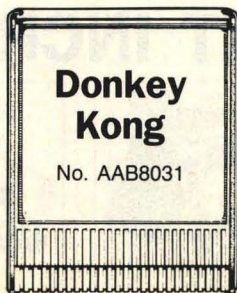
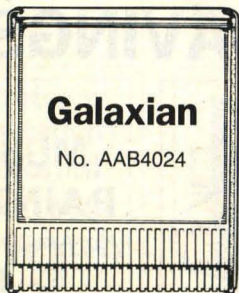
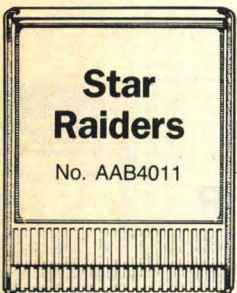
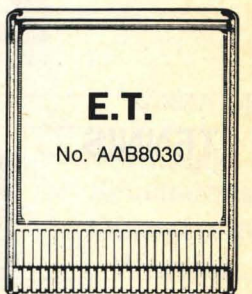
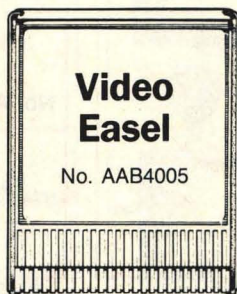
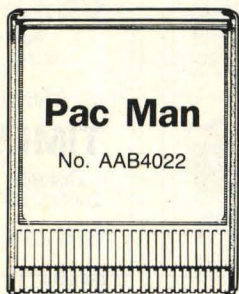
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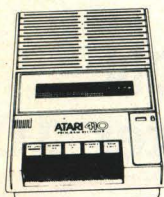
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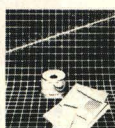
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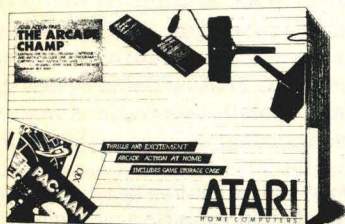
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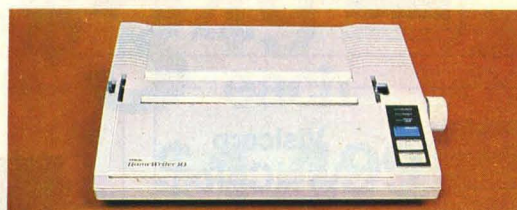


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C-MANSHIP

by Clayton Walnum

Hurray! The long wait is over. This month, as promised, we're going to start digging into GEM and learn how to get the most out of our STs. You've worked hard for the last nine months (nine months!) getting familiar with C, so give yourself a quick pat on the back for a job well done. Now put those thinking caps back in place. All set?

A review of GEM.

Last month, we took a brief look at what GEM really is. We stated that GEM (Graphics Environment Manager) is made up of many libraries of functions, each of which handles certain portions of the system's activities. These libraries are grouped into two major units, called the AES (Applications Environment Services) and the VDI (Virtual Device Interface). The AES contains the functions we need to handle windows, dialog boxes, menu bars and event processing. The VDI controls most of the ST's graphic capabilities, as well as providing some mouse and cursor control functions.

What's so hot about GEM, anyway? Why all the hoo-hah?

You've been using your computer for quite a while now, and you know one great advantage of GEM already: its ease of use. The system is designed in a logical, almost real-world sort of way, supplying icons that represent activities we're used to in everyday life, like file drawers and trash cans. That's why GEM's main screen is called a desktop. We can access calculators, documents, writing utensils, clocks, calendars, appointment books—and any of a hundred other items you might find on your desk.

But another advantage of programming in GEM is its portability. It's been said that GEM is the most portable operating system in existence. This means your programs can easily be ported to other machines using the GEM en-

vironment, so your programming efforts are even more valuable.

Presenting the VDI.

The VDI plays an important role in making your graphics programs operate on many different devices. Unfortunately, as of this writing, one of the crucial elements in the graphics interface is still unavailable. GDOS (Graphics Device Operating System) is the portion of the VDI which links the graphics functions to the drivers needed to assure that the graphics operate properly on all graphics devices. GDOS also makes it possible to load different fonts into your ST, using the standard VDI functions.

At this time, however, we're concerned only with one device: the screen.

The VDI functions.

The VDI provides the programmer with a series of functions to let him quickly draw many graphic shapes. This makes development of programs that rely heavily on graphics a breeze. If you programmed an 8-bit Atari (or still do), think of all the work involved in drawing a circle. The VDI provides a function that will draw any size circle we want—with a single call. There are also functions for drawing ellipses, lines, rectangles, rounded rectangles, arcs, pie slices and a number of other useful graphics.

And it doesn't stop there. Each graphic function has a group of related attributes that may be set before the graphic is drawn, allowing various types of lines, fills and colors.

This month's sample program shows how to call most of the VDI's graphics functions. It was developed using the Megamax C compiler, but is also compatible with Alcyon C. If you don't like to type, you can get a copy of the program on this month's disk or from the **ANALOG Computing** Atari User Group on Delphi.

When the program is run, the first screen will show the

// C-manship *continued*

different types of line styles available to you through the VDI. Each time you press a key, the program will display another set of graphics generated by a VDI function.

The sample program.

Let's take a look at the listing and see what's going on. The first thing we must do when writing a GEM program is initialize the application. We do this with the call:

```
appl_init();
```

This tells the AES about our application and sets aside the resources the AES needs to function.

Next, we must make the call:

```
handle=graf_handle(&gr_hwchar,
&gr_hhchar,&gr_hwbox,&gr_hhbox);
```

This returns the handle for the currently open device or workstation, as well as the size of the system font. Because GEM is capable of having many programs in memory at once, each requires some identification, to keep commands for one program from messing up another. This is accomplished by assigning each program a *handle*. The variable handle in the above call is an integer value that identifies to the current workstation.

The graf_handle() call also returns some information about the system font. We must declare four variables of type integer to hold this information, then pass their ad-

resses to the function. In the above call, gr_hwchar will get the width of a character cell in pixels; gr_hhchar will get the height of a character cell in pixels; gr_hwbox will get the width, in pixels, of a box large enough to hold a single character; and gr_hhbox will get the height, in pixels, of a box large enough to hold a single character. We won't be using any of this information now, but you should be aware of why we supply these variables.

Let's get virtual.

The graf_handle() call returns the handle to the physical workstation. What we really need for our program is a handle to a *virtual* workstation. It's kind of tough to explain the difference, but I'll give it a shot.

A particular device may have many virtual workstations, but only one physical workstation. The physical workstation is directly associated with the device itself, usually the screen. You can think of a virtual workstation as a "pretend" device. It has its own section of memory, and keeps its data and status completely separate from all other virtual workstations. When you activate an application (such as clicking on a desk accessory), it is bound to the physical workstation. In a sense, it becomes the physical workstation.

We get the handle for our virtual workstation with the call:

```
v_opnvwk(work_in,&handle,work_out);
```

It expects the system attributes to be in the work_in array. Those of you not sure why we need the two arrays work_in and work_out should refer to last month's *C-manship*.

Polylines.

Now that we've got our workstation set up, we can get down to business. The first graphic we'll experiment with is called *polylines*. Those of you who are up on your linguistics know that the prefix *poly* means "many." Poly-lines are one or more lines connected from point to point, allowing the programmer to draw complex shapes with a single function call. The function call looks like this:

```
v_pline(handle,num_pairs,pxy);
```

The variable handle is, of course, the handle returned from the v_opnvwk() call. Every function we use requires this handle. That way, we're sure we won't mess with another application which may be in memory at the same time. If we're writing a desk accessory to be used with a word processor, for example, we want to be positive we don't change anything in the word processor application; otherwise, we're liable to have an irritated user—to say the least.

The parameter pxy is an array of integers which holds each of our polyline's points in X,Y pairs. For instance, if we wanted to draw a box, pxy might look like this:

```
int pxy[]={24,18,176,18,176,118,
24,118,24,18}
```

The integer parameter num_pairs is the number of coordinate pairs in the pxy array. By the way, the pxy values are pixel values; in other words, in a low resolution screen we'd have possible values of 0-319 for the X-coordinates and 0-199 for the Y-coordinates.

As I mentioned previously, there are a number of attributes we can set for each of the VDI graphics functions.

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For polylines, we can set the color, type and width, and the end style.

We set the color with:

```
vsl_color(handle,color);
```

Here, color is an integer from 0 to the device maximum (low resolution=15, medium resolution=3, and high resolution=1). If we use a number higher than the maximum, the function will default to color 1. On the ST, the default color palette, starting with 0 and ending with 15, is white, black, red, green, blue, cyan, yellow, magenta, white, black, light red, light green, light blue, light cyan, light yellow and light magenta. The function will return the color value chosen.

If we're drawing a line at the smallest width, we can choose between six system line types with:

```
vsl_type(handle,type);
```

Here, type is an integer value from 1 to 7 as follows:

1 solid	_____
2 long dash	— — — — —
3 dots
4 dash dot	— . — . — . — .
5 dash	— — — — —
6 dash dot dot	— . . — . . — . .
7 user defined	

Type 7 lets you set up your own line types, but we're not going to get into that now.

When you're drawing lines, you can also choose an end style with the call:

```
vsl_ends(handle,end1,end2);
```

In this case, end1 and end2 are integer values from 0 to 2. A value of 0 will yield a square end, 1 will get you an arrow, and 2 will result in a rounded end. The variable end1 is the beginning style, and end2 is the ending style.

Finally, we can set the thickness of our lines with the call:

```
vsl_width(handle,width);
```

The variable width must be an odd positive integer. The line will be set to the closest width less than or equal to the value of width. The value chosen is returned from the function.

Rounded rectangles.

We can employ `v__pline()` to draw a standard square-cornered box, but the VDI also supplies a function which will let us draw rectangles with rounded corners. The function is called in this manner:

```
v_rbox(handle,pxy);
```

Once again, we tell GEM where to draw our rectangle with the pxy array, except this time we have to supply only the pixel coordinates of the lower left and upper right corners. The line attributes, color, style and width, are used with `v__rbox()`, allowing a wide variety of rectangles.

Filled rounded rectangles.

If you want a solid, rounded rectangle, you can make this function call:

```
v_rfbox(handle,pxy);
```

The pxy array is used the same way as in `v__rbox()`, supplying the function with the lower left and upper right corners. The body of the rectangle is filled with the ac-

tive fill pattern, which we'll see how to set later on. The default is a solid fill.

Circles.

Want to draw a circle? No sweat! Just use this function call:

```
v_circle(handle,x,y,radius);
```

The integer parameters x and y are the pixel coordinates of the circle's center, and radius is, obviously, the circle's radius (also an integer). The `v__circle()` function, like `v__rfbox()`, uses the current fill attributes.

Polymarkers.

Polymarkers are a number of predefined shapes you can use in your graphics. You call the function this way:

```
v_pmarker(handle,number,pxy);
```

The integer parameter number is the number of markers you wish to draw. Coordinates for each marker are stored in the pxy array, one X,Y pair for each marker.

But what do these markers look like? You have a choice of six predefined shapes which (from 1 to 6, respectively) are dot, plus sign, asterisk, square, diagonal cross and diamond. To set the polymarker type, call:

```
vsm_type(handle,type);
```

Here, type is an integer from 1 to 6. If you should choose a value out of this range, the function will select the asterisk as a default. The value chosen will be returned from the function.

There are two other attributes which affect polymarkers: color and height. Color is set with the call:

```
vsm_color(handle,color);
```

Here, color is an integer from 0 to the device maximum. All the rules of the `vsl_color()` call apply in this case.

You can change the size of all polymarkers, except the dot (which always appears in the smallest size), with the call:

```
vsm_height(handle,height);
```



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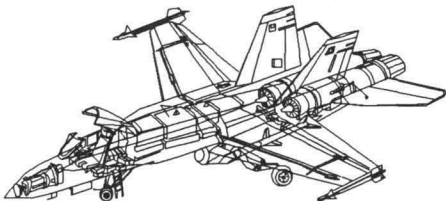
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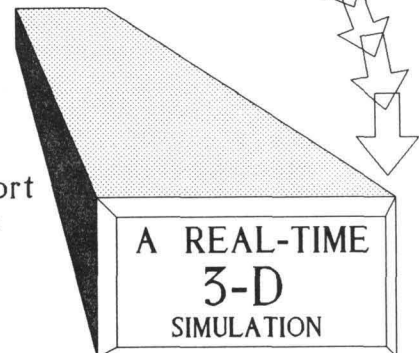


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//C-manship *continued*

Here, the integer parameter height is the polymarker's size on the Y-axis. Actual height will be the greatest height available on the device, less than or equal to the height parameter.

Filled rectangles.

Solid rectangles can be drawn with the call:

```
v_bar(handle,pxy);
```

As usual, the lower left and upper right corners are stored in the pxy array. The active fill attributes are used to color the body of the rectangle.

Ellipses.

An ellipse looks something like a squashed circle or a solid oval. You can draw it with the call:

```
v_ellipse(handle,x,y,xrad,yrad);
```

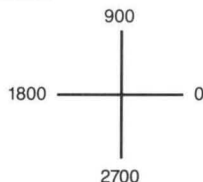
Here, the integers x and y denote the ellipse's center point, and the integers xrad and yrad are the X- and Y-radii in pixels. Once again, the active fill attributes are used.

Arcs.

Arcs are simple to draw, with this call:

```
v_arc(handle,x,y,radius,bang,eang);
```

The integers x, y and radius are the X,Y-coordinates of the center and the radius, respectively. The integers bang and eang are the beginning and ending angles of the arc, in tenths of a degree. The following diagram illustrates the possible angle values:



Pie slices.

Here's a handy function that'll help you draw those fancy pie charts. To draw a pie slice, use the call:

```
v_pieslice(handle,x,y,radius,
            bang,eang);
```

The parameters are the same as those for the arc function. The body of the pie slice will be colored by whatever fill pattern is active.

Fill patterns.

GEM supplies us with many patterns we can use to fill our figures. There's a series of functions to let us set these patterns up the way we want them. The first step is the function call:

```
vsf_interior(handle,style);
```

Here, style is an integer 0 to 4. The values are interpreted as follows:

- 0 Hollow (background color)
- 1 Solid
- 2 Pattern
- 3 Hatch
- 4 User-defined

If you choose style 0 or 1, you need go no further, but style 2 allows you to choose between twenty-four different patterns, and style 3 provides twelve hatch styles. You choose the pattern you wish to use, with the call:

```
vsf_style(handle,style);
```

Here, style is an integer value from 0 to 23. Consult your reference manual to see what these styles look like (or run the sample program).

The color of your fill is selected with the call:

```
vsf_color(handle,color);
```

All the rules for the vsf_color() function apply here, also.

Finally, you can choose between a visible or invisible border for your fill, with the call:

```
vsf_perimeter(handle,vis);
```

Here, vis is any integer. A value of 0 will give you an invisible border; any other value will cause the border to be drawn in the current fill color.

Use those tools!

Now that you've been introduced to many of the graphics functions available to you through the VDI, study the sample program to see them in action, then take some time and experiment with the VDI on your own. See if you can write a program to draw a simple picture, maybe a graph or two.

Next month, we'll continue with our exploration of GEM's VDI. **A**

(Listing starts on next page)

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Listing 1.
C listing.

```

/*****
/*      C-MANSHIP, ST-LOG #9
/*      LISTING 1
/*      DEVELOPED WITH MEGAMAX-C
*****/
#include <osbind.h>

int work_in[11], work_out[57];
int handle;
int contrl[12], intin[128];
int ptsin[128], intout[128], ptsout[128];
int gr_hwchar, gr_hhchar, gr_hwbox, gr_hhbox;

main()
{
    appl_init();
    open_vwork();
    do_pline();
    do_roundrec();
    do_froundrec();
    do_circle();
    do_pmarker();
    do_bar();
    do_ellipse();
    do_arc();
    do_pieslice();
    do_fill5();
    v_clrsvwk(handle);
    appl_exit();
}

open_vwork()
{
    int i;

    for (i=0; i<10; work_in[i++] = 1);
    work_in[2] = 2;
    handle = graf_handle(&gr_hwchar, &gr_hhchar, &gr_hwbox, &gr_hhbox);
    v_opnvwk(work_in, &handle, work_out);
}

do_pline()
{
    int pxy[4];
    int color, end, type, width;

    pxy[0] = 30; pxy[1] = 20;
    pxy[2] = 280; pxy[3] = 20;
    end = 0; width = 1;
    v_clrwkw(handle);
    for (color=1; color<5; ++color) {
        vs1_color(handle, color);
        vs1_ends(handle, end, end);
        vs1_width(handle, width);
        v_pline(handle, 2, pxy);
        pxy[1] += 10; pxy[3] += 10;
        end += 1; width += 2;
    }
    vs1_width(handle, 1);
    vs1_ends(handle, 0, 0);
    vs1_color(handle, 1);
    for (type=1; type<7; ++type) {
        vs1_type(handle, type);
        pxy[1] += 10; pxy[3] += 10;
        v_pline(handle, 2, pxy);
    }
    cconin();
}

do_roundrec()
{
    int pxy[4];
    int color, width;

    pxy[0] = 10; pxy[1] = 10;
    pxy[2] = 300; pxy[3] = 190;
    width = 1;
    v_clrwkw(handle);
    vs1_type(handle, 1);
    for (color=1; color<7; ++color) {
        vs1_width(handle, width);
        vs1_color(handle, color);
        v_rbox(handle, pxy);
        width += 2;
        pxy[0] += 20; pxy[1] += 20;
        pxy[2] -= 10; pxy[3] -= 10;
    }
    cconin();
}

do_froundrec()
{
    int pxy[4];
    int color;

    pxy[0] = 10; pxy[1] = 10;
    pxy[2] = 300; pxy[3] = 190;
    v_clrwkw(handle);
    for (color=1; color<7; ++color) {
        vsf_color(handle, color);

```

WHAT IS ST-CHECK?

Most program listings in **ST-Log** are followed by a table of numbers appearing as DATA statements, called "ST CHECKSUM DATA." These numbers are to be used in conjunction with **ST-Check** (which appeared in **ANALOG Computing/ST-Log** issue 41).

ST-Check (written by Clayton Walnum) is designed to find and correct typing errors when readers are entering programs from the magazine. For those readers who would like copies of the article, you may send for back issue 41 (\$4.00).

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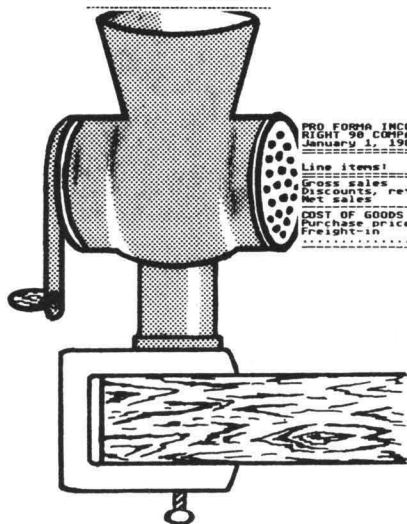
Line Items: Month: Jan-85
Gross sales \$38,000
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Net sales 37500

COST OF GOODS SOLD
Purchase price 22000
Freight-in 500

WRITE

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January 1, 1985 to December 31, 1985

Line Items:	Month:	Jan-85	Feb-85	Mar-85	Apr-85	May-85	Jun-85
Gross sales		\$38,000	\$38,000	\$38,000	\$38,000	\$38,000	\$38,000
Discounts, returns & allow.		500	500	500	500	500	500
Net sales		37500	37500	37500	37500	37500	37500
COST OF GOODS SOLD							
Purchase price		22000	22000	22000	22000	22000	22000
Freight-in		500	500	500	500	500	500

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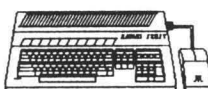
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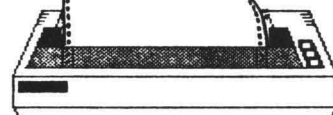
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```

    v_rfbbox(handle,pxy);
    pxy[0] += 20; pxy[1] += 20;
    pxy[2] -= 10; pxy[3] -= 10;
}
cconin();
}

do_circle()
{
    int color, radius;

    v_clrwk(handle);
    radius = 100;
    for (color=1; color<8; ++color) {
        vsf_color(handle,color);
        v_circle(handle,150,100,radius);
        radius -= 15;
    }
    cconin();
}

do_pmarker()
{
    int color, height, type;
    int pxy[2];

    v_clrwk(handle);
    pxy[1] = 10;
    for (type=1; type<7; ++type) {
        vsm_type(handle,type);
        height = 2; pxy[0] = 10;
        for (color=1; color<6; ++color) {
            vsm_color(handle,color);
            vsm_height(handle,height);
            v_pmarker(handle,1,pxy);
            height += 16; pxy[0] += 60;
        }
        pxy[1] += 35;
    }
    cconin();
}

do_bar()
{
    int pxy[4], color;

    pxy[0] = 10; pxy[1] = 190;
    pxy[2] = 300; pxy[3] = 10;
    v_clrwk(handle);
    for (color=1; color<6; ++color) {
        vsf_color(handle,color);
        v_bar(handle,pxy);
        pxy[0] += 25; pxy[1] -= 20;
        pxy[2] -= 20; pxy[3] += 10;
    }
    cconin();
}

do_ellipse()
{
    int color, xradius, yradius;

    v_clrwk(handle);
    xradius = 150; yradius = 100;
    for (color=1; color<11; ++color) {
        vsf_color(handle,color);
        v_ellipse(handle,150,100,xradius,yradius);
        xradius -= 15;
    }
    cconin();
}

do_arc()
{
    int color, radius, bang, eang;

    v_clrwk(handle);
    vsi_width(handle,3);
    bang = 900; eang = 0; radius = 10;
    for (color=1; color<6; ++color) {
        vsi_color(handle,color);
        v_arc(handle,150,100,radius,bang,eang);
        bang += 60; eang -= 60; radius += 20;
    }
    cconin();
}

do_pieslice()
{
    int color, radius, bang, eang;

    v_clrwk(handle);
    radius = 100; bang = 3200; eang = 600;
    for (color=1; color<6; ++color) {
        vsf_color(handle,color);
        v_pieslice(handle,150,100,radius,bang,eang);
        radius -= 15; bang -= 200; eang -= 100;
    }
    cconin();
}

do_fills()
{
    int pxy[4], style, i, num, x;

    pxy[0] = 50; pxy[1] = 30;

```

```

    pxy[2] = 250; pxy[3] = 170; num = 25;
    for (i=2; i<4; ++i) {
        vsf_color(handle,i);
        vsf_interior(handle,i);
        for (style=1; style<num; ++style) {
            vsf_style(handle,style);
            v_clrwk(handle);
            v_bar(handle,pxy);
            for (x=0; x<32000; ++x);
        }
        num = 13;
    }
    cconin();
}

```

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**ST**

The best ST games of 1986

by Bill Kunkel, Arnie Katz and Joyce Worley

It hasn't taken long for the ST to establish itself as the coming power in computer entertainment. Designers are tripping over each other in a race to acquire expertise on Atari's hot number, and publishers have started to take the rapidly expanding universe of owners seriously.

System dominance wasn't built in a day. So far, wholly original games are rarer for the ST than for micros like the Commodore 64 and Apple II. As with any new system, most ST games are translations, but what translations they are! In almost every case, they represent a substantial improvement over previous editions.

There are five originals in our overview of the year's top entertainment software. It's a wonder there are so many, this soon after the ST's introduction.

There are still gaping holes in the basic ST software library. Where, for example, are the sports games? But the catalog is already rich in graphic adventures, illustrated text adventures, action-strategy contents and arcade games.

Epyx gets credit for two of the year's best mouse-driven adventures. That's only fitting, since Epyx (then Automated Simulations) practically invented the genre with the popular **Apshai** games.

All three **Apshai** graphic adventures—**Temple of Apshai**, **Upper Reaches of Apshai**, and **Curse of Ra**—are included on the **Temple of Apshai Trilogy** from Epyx, 1043 Kiel Ct., Sunnyvale, CA 94089. These fantasy titles have all been around a while, but the ST breathes new life into them.

On-screen visuals are greatly enhanced, characters are generated by a speedy "click-and-pick" generator, and there are new selectors for armor and weapons.

Pull-down menus for combat and other options (search, heal, speak, etc.) help all the **Apshai** adventures play more smoothly than ever. The actual content is timeless: **Apshai** is a multi-level dungeon liberally stocked with both treasures and monsters.

The other Epyx entry is **Rogue**, a fast-play dungeon-looting contest in the **Apshai** tradition. The most significant innovation here is the ability given the player to toggle back and forth between close-up and full-level visual displays.

Rogue's been produced for several systems, but the ST adaptation is clearly the showcase edition. No previous version featured a close-up display, for example, and only the ST variant individually depicts each treasure and monster with a different, beautiful drawing. **Rogue** is a quick, entertaining dungeon expedition on other systems; on the ST, it's a masterpiece.

Phantasie (from Strategic Simulations), though introduced in 1985, attains elevated status on the ST. Players who've seen this game on other systems are bound to be impressed by the intelligent simplicity of the click-on character generator and pull-down menus, but they'll be positively amazed at the rich color graphics and full-screen combat sequences.

Overhead, "schematic" views of towns and cities are forever banished, thanks to the large memory and outstanding graph-

King's Quest II.



A look back at
the year's top
entertainment
software.



Mean 18.

ics capabilities of the ST. Characters can explore towns displayed in full color and three dimensions. Entering a building is as easy as pointing the cursor at the door and clicking.

When it comes time to battle the minions of evil, **Phantasie** doesn't wimp out, either. The combat screen depicts every monster facing off against the individually-rendered members of the player's party.

Phantasie vividly demonstrates some of the things which will be routine in the new generation of games for 68000-based home computers. It's a full-scale fantasy world in which five-character parties can adventure overland and in dank dungeons, with extensive, if not total, graphic displays. Strategic Simulations, 883 Stierlin Road, Building A-200, Mountain View, CA 94043-1983 — (415) 964-1200.

Another classic which has made an auspicious ST debut is **Ultima II** (Sierra), one of the handful of programs which can be played in all three ST resolutions.

For those of you just returning from an extended trip to Jupiter, **Ultima** is the most popular adventure series in computer entertainment history. Its virtues meld perfectly with the ST. As with the other graphic adventures, pull-down windows and mouse-controlled movement eliminate the need to learn extensive lists of command codes for movement, spell casting and other necessary activities.

The content of Lord British games has always stayed ahead of their presentation, despite a fair degree of programming skill. The ST edition of **Ultima II** preserves the meat of the game, but dresses it up in a sharp new suit of clothes.

Kings Quest II: Romancing the Throne and **The Black Cauldron** are also Sierra adventures, but of a distinctly different stripe. These Roberta Williams creations combine elements from illustrated adventures (such as **Oo-Topos** and **The Pawn** described below), with graphics reminiscent of the flashiest coin-ops.

Romancing the Throne, the sequel to the enormously popular **King's Quest**, is much the better of the two titles. The player, as King Graham of davertry, must set off in search of a beautiful maiden, imprisoned in an evil tower of quartz.

The Black Cauldron is an adaptation of the animated Walt Disney feature film, in which a magical pig must be saved from the clutches of a sinister arch-villain. Although it's ostensibly for youngsters, adults are likely to enjoy this lighthearted fantasy epic with its beautiful electronic illustrations.

While **King's Quest II** employs most conventions of the illustrated adventure, including the verb-noun command format, **Black Cauldron** further simplifies the order-entry process for young players. Any desired action can be triggered with the "status", "look", "action" and "use" orders.

Sierra On-Line Inc. (of Coarsegold, CA 93614 — (209) 683-6858) didn't try to add much to the original designs for the ST disks. Nevertheless, **King's Quest II** and **Black Cauldron** are worth including on any "best of the year" list as they stand.

Don't get the idea that illustrated adventures are "old fashioned." One look at Magnetic Scrolls' brilliant creation **The Pawn** (Firebird P.O. Box 49, Ramsey, NJ 07446) is all that's necessary to prove there's still

a lot of life left in this game format. For one thing, there's nothing old-fashioned about either its graphics or its parser. Both are absolutely at the cutting edge.

The pull-down illustrations embellishing this fantasy adventure look more like fine oil paintings than did the blocky doodles previously accompanying games of this type. Subtle shading and deft linework usher in a new era. Cartoonish drawings that look like pages from a coloring book will never be "good enough" for professionally published illustrated adventures again.

The parser is the most sophisticated we have seen, capable even of understanding multiple uses of the same word. Try a sentence like "plant the plant in the planter" on others, and watch the smoke pour out of the console.

The Pawn is also significant because it's a program which made its debut for the ST, where it drew considerable attention and interest. A sequel, **Guild of Thieves**, also written by the British design group Magnetic Scrolls and published by Firebird, should already be available by the time you read this. (A preview suggests it is a strong candidate for inclusion in the 1987 "best of" survey.)

The next illustrated adventure entry, **Oo-Topos** (Polarware), represents neither startling innovation nor eye-popping graphics. It is, though, a marvelous example of solid storytelling supported by appropriate illustrations.

When first published several years ago by the now-defunct Sentient Software as a text adventure, its big selling point was its author. Michael Berlyn was the first es-

// Best ST games of 1986 *continued*

established science fiction writer to try a hand at software design. It also had the novelty of a primitive action contest imbedded within the plot structure.

This new version, rewritten by Michael and his wife Muffy (aka Brainwave Creations), features angular, high-tech illustrations by Raimund Redlich and Brian Poff, which effectively capture the essence of this science fiction story. The Berlyns have a sure touch with a phrase, and **Oo-Topos** is a rousing good sf yarn, told with style and skill. It's available from Polarware, 2600 Keslinger Road, P.O. Box 311, Geneva, IL 60134 (312) 232-1984.

A Mind Forever Voyaging represents Infocom's first attempt at a text adventure written exclusively for the 68000 computers. The player becomes PRISM, an artificial intelligence in a 21st-century society.

PRISM is powerful, true, but the computer is a "child" with the knowledge and experience of an 11-year-old. Before the machine's inventors can use it to implement a new social order combining maximum economic opportunity with futuristic technology, PRISM must learn about the world and grow up. The quest for maturity is the voyage in this mature and unusual adventure.

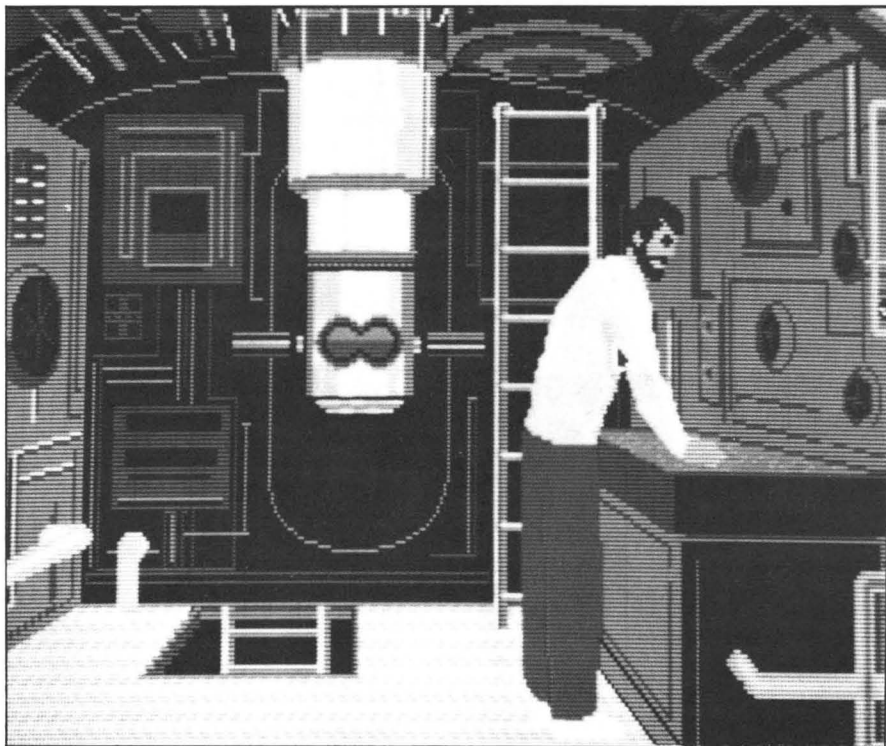
As always, Infocom games are not to every taste. Many players prefer adventures with full sound and graphics. But for those who enjoy a first-rate text adventure in which the scenes unfold inside the computerist's head, **A Mind Forever Voyaging** provides a literate and adult playing experience. Infocom is at 125 CambridgePark Drive, Cambridge, MA 02140 — (800) 262-6868, ext. 17Y.

Forbidden Quest (Priority) is a science fiction text adventure which takes place on a spaceship. The setting is the far future, after a bitter civil war has shattered interstellar civilization. Although it's against the law, the player sets out in the spaceship *Paradox* to find a rumored alien culture with the knowledge and power to set our species back on the right track.

The prose game makes use of the ST's GEM interface by incorporating pull-down menus, including a hint section and click-on commands. With the disk are several beautiful, full-color drawings, by the late, great Wally Wood, illustrating key moments in the adventure. Priority Software, P.O. Box 221959, Carmel, CA 93922.

For ST users who enjoy more than a dollop of strategy in their adventures, there are the heartily recommended **Hacker II: The Doomsday Papers** (Activision) and **Sundog** (FTL Games). Both contain elements of adventuring and role-playing, but emphasize coordinated planning more than most quest programs.

The Doomsday Papers is the sequel to the popular **Hacker**, both written by Steve Cartwright, from Activision, Drawer 7288,



Silent Service — using the ST's capabilities to their fullest.

Mountain View, CA 94039 — (800) 227-9759. This time, the computerist—now a veteran of the world-saving clash with Magma Ltd.—is contacted by the U.S. Government. Uncle Sam has another mission and gives the player a computerized spy system that includes four independent monitors, a VCR, three robots and the ability to pick up images from any surveillance camera or monitor.

A Russian scientist has developed a diabolical plan to overthrow our nation. The document outlining the sinister stratagem is kept in a vault, deep within a super-secure Siberian military installation. All the player must do to Save the World for Democracy is penetrate that installation, using his computer savvy, and filch the document with the help of his computer.

Hacker II is a lively, challenging contest so realistically presented that the player will almost think he's really saving the free world. ST graphics capabilities allow the creators to uncannily reproduce the grainy black-and-white monitor images which comprise most of the game's visual output.

Sundog: The Frozen Legacy takes the player through futuristic cities, into battles with space brigands, and through space to eighteen different planets. The player has inherited the freighter *Sundog* from an uncle, who died under mysterious circumstances. To win, the hero must complete three tasks: find the location of the new colony the uncle had promised to aid, acquire and deliver supplies the new settle-

ment will need, then locate the cryogenically frozen colonists and transport them to their new home.

The graphics are simply gorgeous. The computerist uses the mouse to move the hero through three-dimensional towns and cities and explore the various planets. FTL Games/Software Heaven, Inc., 7907 Ostrow Street, Suite F, San Diego, CA 92111 — (619) 453-5711.

Adult ST owners who want a little titillating fun will certainly want to take a peek at the ST version of **Strip Poker**, from Artworx. The basic disk includes a pair of charming young ladies, both of whom play a solid game of poker, provide occasional quips and look good in and out of their clothing. Extra disks with more women (and men) anxious to bet their shirts are expected within the next few months.

Strip Poker makes good use of mouse control. For example, a player need only click on an electronic card to discard it. For those who play their cards right, **Strip Poker** is a real hoot. Contact Artworx Software Co., Inc., 1844 Penfield Road, Penfield, NY 14526 — (716) 385-6120.

Backgammon fans will find something extra waiting in **HippoBackgammon** (Hippopotamus Software, 985 University Ave., Suite 12, Los Gatos, CA 95030 — (408) 395-3190): artificial intelligence. This added AI lets the user teach the program to improve or adapt its style of play.

Data is broken up into "neurons" (which determine the strategic value of each point)

and "cortex" (which concerns overall strategic philosophy). On-screen commands permit the user to easily and quickly manipulate this information. The color graphics are attractive, and the extensive pull-down menus simplify both the playing and AI processes.

Computer wargamers won't believe their eyes when they see **Silent Service** (MicroProse). Silas (**Castle Wolfenstein**) Warner programmed the ST edition, and he has exploited the system's extra memory and graphics brilliantly.

The player is a submarine commander who can set the course or scan the seas through the stunning periscope display. The sights and sounds of submarine warfare are skillfully replicated to create an unparalleled sense of realism. It's all here: the whoosh of torpedoes as they leave the tubes, the spectacle of a successful hit and the hollow reverberations as depth charges explode all around the sub.

Run silent, run deep, but definitely run to your computer store and give this title the once-over. MicroProse, 120 Lakefront Drive, Hunt Valley, MD 21030 — (301) 771-1151.

ST sports fans, unfortunately, have been this year's forgotten users. amazingly enough, there have been no baseball, boxing, tennis, basketball, or football games published for the ST. Even more incredibly, there have been no less than three golf simulations! The good news is that two of the three were well enough done to merit inclusion in this year's listing: **Leader Board** (Access Software, Inc., 2561 S. 1560 West, Woods Cross, UT 84087 — (801) 298-9077) and **Mean 18** (Accolade, 20833 Stevens Creek Blvd., Cupertino, CA 95014 — (408) 446-5757).

Leader Board offers realistically detailed visuals with smooth animation, while **Mean 18** includes three courses (Augusta, Pebble Beach and St. Andrews) and a user-friendly course architect to design customized links.

Both games utilize overhead and behind-the-golfer perspectives, and let duffers pick their club to suit the demands of each hole. While these two titles take slightly different approaches to simulating course action, both achieve excellent results.

The best arcade-style games this year are both MichTron products: **Time Bandit** and **Major Motion**. In **Major Motion**, players ride around in an army terrain assault vehicle, dodging enemy fire.

Time Bandit, on the other hand, is a cheerful, twenty-level jaunt through a macro-maze. The landscape is dotted with almost two dozen icons, representing games-with-a-game. For example, move onto the familiar-looking "gobbler" icon, and you're catapulted into a delightful maze-chase contest. **Time Bandit** proves the classic arcade themes are still viable,

even on computers with more than 500K in available memory.

MichTron is located at 576 S. Telegraph, Pontiac, MI 48053 — (313) 334-5700.

The final title on the 1986 honor roll is not only difficult to classify, it's hardly a "game" at all. **The Activision Little Computer People Discovery Kit**, by Rich Gold, David Crane and Sam Nelson, is a new kind of computer entertainment based on the clever notion that little humanoid folks live inside all computers. This software, therefore, provides a house (which computerists view in side perspective) for the little person who lives in the machine.

With such an attractive home, it's usually not long before a unique Little Person—like Cabbage Patch Dolls, no two are exactly alike—soon moves in and goes about the business of fashioning a full, albeit scaled-down, lifestyle. In addition to simply observing this cross between an animated dollhouse and an ant farm, the user can interact with his Computer Person to a limited degree, by providing food and playing simple card games.

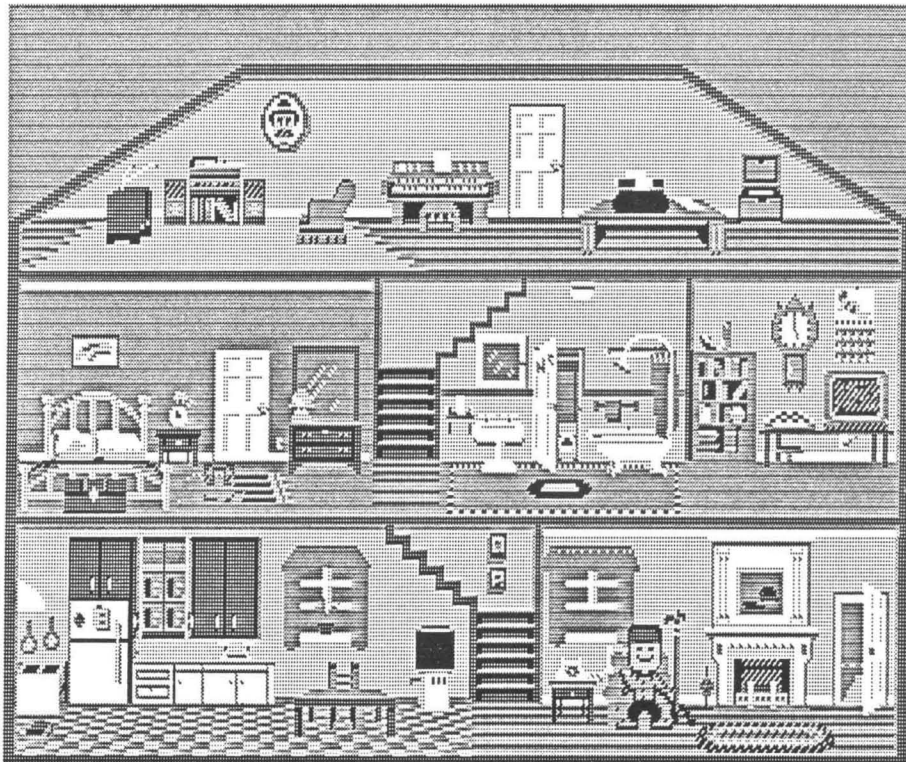
Acquiring this program incurs some responsibility. You've got to treat your Little Person right, or he'll move out.

To forestall inevitable cries of anguish from our readers, we'd like to apologize to anyone whose favorite was left off this list. Similarly, we hereby tender our regrets to any publisher whose newest pride and joy just missed our deadline. Many games will get their (deferred) justice in future issues.

Also absent from the list is the hard boiled detective adventure **Borrowed Time** (Activision). Since Arnie Katz and Bill Kunkel wrote and plotted this illustrated mystery with Interplay Productions, modesty forbids its inclusion. We wouldn't mind if you checked it out, though.

The year just ended was a good one for ST entertainment software, but 1987 will be much better. Though software publishers are understandably reluctant to reveal the nature of upcoming releases, there's no question that the next twelve months will see a major upswing in quantity.

Quality should rise, as well. Programmers are only beginning to discover the full power of the ST, and games will become fuller and richer as game creators unlock more and more of this system's awesome power. ■



A new kind of entertainment for you and your computer —
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DEGAS?

No sweat!

A tutorial to help you get the most from **DEGAS**.

by Steve Rehrauer

An old (and probably about-to-be-misquoted) adage defines the road to success as "10 percent inspiration, 90 percent perspiration." Though a session with ST paint software **DEGAS**, by Tom Hudson and Batteries Included, doesn't leave me drenched with sweat, there is work involved! Wonderful pictures may dance in my head, but when it comes to coaxing them out onto a stark white screen... let's just say something is lost. (I understand that some lucky people, with more artistic talent than I, don't have this problem. If you're such a person, stop reading this now: go whip up a Mona Lisa or two, while the rest of us get our fingerpaints out.)

Okay, so maybe we won't ever see an ST monitor hanging in the Louvre with our signature on it. Do we cast our **DEGAS** disks in concrete and drop them in a bottomless pit? Do we make voodoo pincushions in Tom Hudson's likeness? Do we quit and go back to watching "Gilligan's Island" for the rest of our days? Never! (Well, maybe on weekends.)

As with anything we try, realistic goals, persistence and practice can do wonders. Especially practice. I'm not about to "walk" anyone through using **DEGAS** for the first time; the manual is quite good enough for that. And I can't help you create the next Last Supper on your ST; I couldn't even do a mediocre copy. But I do use **DEGAS** often, and perhaps what I've learned will save you time—and frustration.

If some of what I'm about to say seems obvious to you, please bear with me. It might not be helpful to you, but it might be to someone else. And if everything I say

seems yawningly obvious, then get back to your Mona Lisas!

For starters.

To begin with, here are some random tidbits of common sense; these can be discouraging to learn "the hard way."

Save your pictures as you work on them—often! Saves only take a few seconds. I learned this lesson the hard way. My penance for being too miserly with my time was losing two hours of work when my infant daughter crawled under the desk and unplugged my ST. Yes, I know this is one of the "eat your spinach; it's good for you" admonishments, and nothing teaches this lesson better than getting burnt. But, believe me, you don't want to get burnt; eat your spinach, anyway!

Choose a subject that fits the medium. Blunt example: you can't do justice to a rainbow with a monochrome monitor.

Low-resolution mode (color) is great for subjects that have a wide range of brilliant colors or highlights. But you can't always do justice to detail. Often, you must be inventive with shading to hide this fact. I usually have at least four "color pots" reserved for slightly different shades of other colors. A technique called "dithering" uses patterns of different colored dots to give the impression of a new color. (If you've seen newspaper photos, that's dithering; in the print business it's called half-toning.)

You can sometimes dither low-resolution pixels to fake extra colors, but I've usually found this resolution too coarse for that. Instead of a new color, what you see is what you really have: patterns of different-colored pixels.

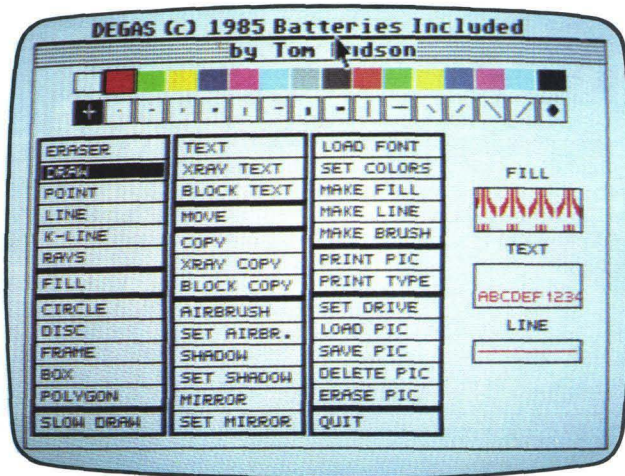
Medium-resolution mode (color) is often a kind of orphan among **DEGAS** users. You

can't quite get the detail of high resolution (monochrome), and don't have as many colors as in low resolution. Medium resolution is worth using, but you have to put a little more ingenuity into picking your subject. Obviously, you want something which has relatively few colors; you can only select four to work with, from the palette of 512. And, unless you choose colors very carefully, your subject shouldn't have the kind of smooth highlights you'd see on a polished surface. Dithering works well in medium resolution. "Earthy" colors—brown, black, yellow—seem to dither fairly well into to new shades.

High resolution is particularly good for doing high-contrast pictures with sharply defined detail. What looks good in black-and-white photography is often a decent candidate for **DEGAS** in high resolution. You can think of the high-resolution mode as having three basic colors: black, white and a "checkerboard" dithered pattern of the two, which gives an excellent gray.

The **UNDO** key is definitely, depressingly un-magic. It's great for small goofs. One notorious "oops" I can never seem to avoid happens while **FILL**ing an area that doesn't have a perfectly sealed border. The tiniest hole causes **FILL** to swiftly flood most of the picture with an unwanted pattern. In this and similar cases, thank goodness (and Tom Hudson) for a one-step **UNDO**.

But I also make a lot of mistakes with more quicksand than nuclear airburst about them; I have plenty of time to get in up to my neck. That Amazonian rain forest I skillfully and carefully drew looks great, but I guess the woolly mammoth I (equally carefully) added looks a bit out of place. The **UNDO** key is no help here, and



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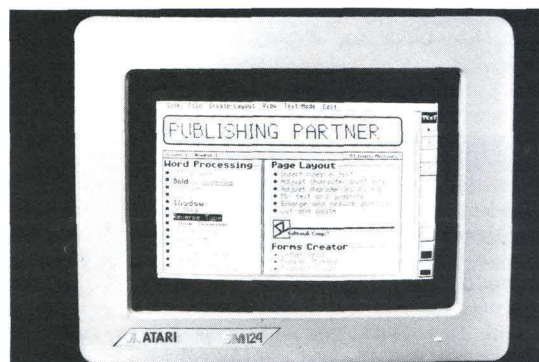
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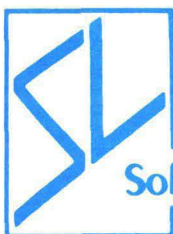
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// DEGAS? No sweat! *continued*

sometimes changes aren't easy to ERASE without ruining the rest of the picture.

I've learned the hard way to recognize when I'm about to try something that just may look awful ten minutes—and many changes—from now, and must be drastically undone. My primitive but effective solution is to save "snapshots" of a given picture at various stages in its development (SCENE1, SCENE2, etc). Better to waste space on a floppy than your own time!

In general . . .

Now, for some general tidbits that apply to any resolution.

While selecting a fill pattern, it's easy to accidentally click past the one you want. Since there's no way to back up when selecting a fill, you must flip through the thirty-odd patterns in the list to get back to the pattern you wanted, right? There is

a better way, if your desired pattern is near the start of the list. A fast way to get back is to: (1) select MAKE FILL from the menu; and (2) click on EXIT without changing anything. This will put the alterable (first) pattern in the current fill box.

Drawing parallel lines at angles can be tough to do by eye. To quickly make many such lines, draw one and COPY it.

Erasing a large area can take an annoyingly long time, even with the largest possible eraser. For a fast erase of a rectangular area: (1) select BOX from the menu; (2) select the background color; (3) return to the drawing screen and place the BOX's outline over the area to be erased; and (4) hold down the CONTROL key when you press the left mouse button.

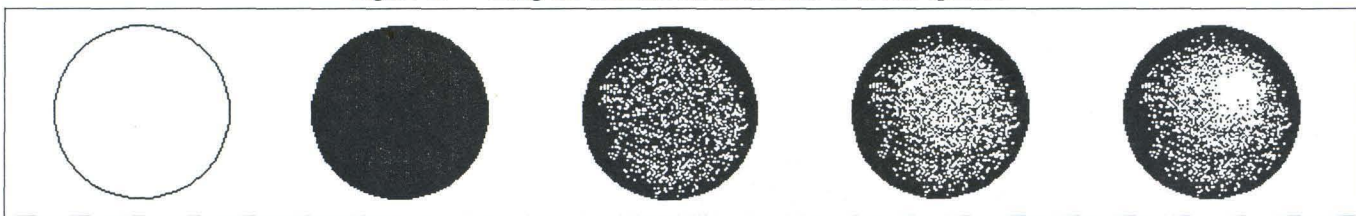
This draws a frameless box filled with the background color—one dab of a giant

eraser, no less. And to erase large, irregular areas, use the same steps, with POLYGON instead of BOX. You probably can't avoid having to erase some part conventionally, but this speeds things up.

AIRBRUSH makes good reflected highlights, as on spheres. Try making a circle, filling it with a dark color, then airbrushing with a lighter color. Start at the edges with a wide, low-flow airbrush, and apply it in a "bull's-eye" fashion. Work inward with smaller, higher flow brushes.

The sphere's center should have a solid bright spot of the airbrushed color; this gives the appearance of a light somewhere over your shoulder shining on the sphere. A larger bright spot makes the light seem closer. Try making the light look as if it's coming from different angles, by moving the bright spot around.

Figure 1. — Using the AIRBRUSH in DEGAS to create spheres.



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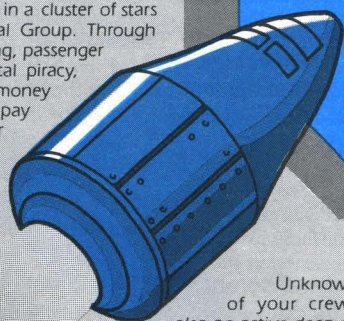
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For really detailed, realistic work, you must often (alas) resort to using the magnifier. Doing justice to something which is essentially a repeating pattern, like the scales of a fish, is especially tedious. A customized fill pattern sometimes looks a bit too regular, too *artificial* to do the job itself; real-world things have all sorts of little details and irregularities we don't usually notice until they're absent. But a fill pattern can make a darn good template to work with under the magnifier.

I once managed to do a fair job on a low-resolution picture of a goldfish; I created one fill pattern for the small scales of its back, and another for the larger scales elsewhere. Although I added color and detail to these by hand with the magnifier, drawing every scale completely by hand would have been a silly and needless waste of my time—I'd probably still be doing them.

Unfortunately, **DEGAS** doesn't have a drawing scratchpad. You'd best leave some corner of the picture blank until the very end; this portion can safely be used for any doodling or experimenting you might need to do. For myself, this is especially helpful in high-resolution mode, where my pictures tend to have many small, detailed objects. I can draw each object into my scratch corner, then COPY or MOVE it to where it belongs.

Some color-only tidbits.

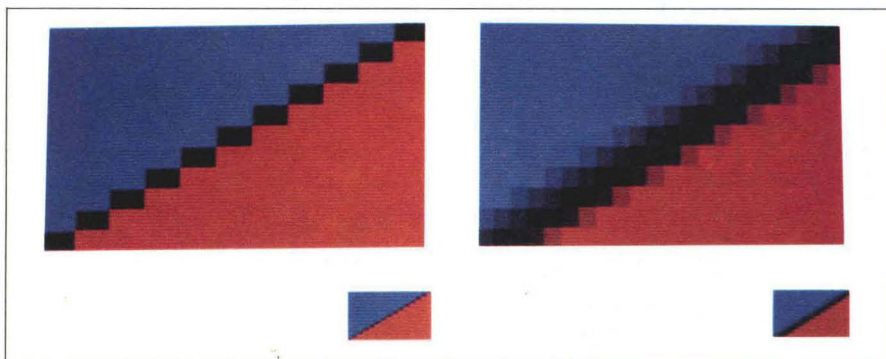
Sometimes you plan to set your background color to a very dark color, or black. But it isn't always convenient to work that way; it can make the **DEGAS** menu-screen difficult to read. You may plan to set the background color as the last step. If so, be aware that the background color can have a strong effect on the entire picture. You may find colors which looked fine with a white background appear *too* vivid and bright when set against a darker color. Rather than trying to adjust the other fifteen colors at the very end, it's a better idea to periodically use the VIEW option of SET COLOR to check the developing picture with the color you intend to use in your final background.

Sometimes you want to smoothly shade an object, to give it a three-dimensional effect. For example, perhaps you're drawing an object with curved sides, like a soda can, and you'd like its color to shade smoothly from light in the center to dark at the edges.

We can't really get true shading; our color palette isn't large enough for that. But we can get fairly close. To do so, we need colors that differ from each other by only a very small amount; the human eye is good at spotting contrasting colors. Obviously, the less difference between adjacent colors, the less noticeable the change from one color to the next.

When you create a color by moving the three sliders in SET COLOR, you're mixing the three primaries (red, green and

Figure 2. — Anti-aliasing in detail.



blue) that correspond to the three "color guns" of the RGB monitor. Any two colors on the ST are usually closest in appearance when they have the same proportion of primary colors. In terms of using SET COLOR, this means the positions of the three sliders are the same (relative to each other) between one color and the next.

For example, say you want to smoothly shade from white to black. The color white has all three sliders moved all the way up (each color gun is at full brightness). Dropping each of the sliders down one notch gives a light gray that's a very close match

to the white. (If you lower only the green and blue, you'll notice a definite pink tinge—if that's the effect you want, fine.) A total of eight such "true" shades are possible between white and black—including the colors themselves, since the sliders can move eight notches.

Jagged lines are a fact of life in **DEGAS** pictures. The display technology of in your ST is called "bit-mapped raster." This means that the ST builds the picture you see from a grid of tiny dots (pixels), using a beam of electrons sweeping across the phosphor-coated inner face of the monitor

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Universe II

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by Andy Eddy

Since the "Star Trek" series of the sixties, most every red-blooded American boy has envisioned himself as Captain Kirk at one time or another, in a rousing fantasy of Space Cowboys-and-Indians.

What never came across on your TV screen was all that's required of a starship captain: payroll allocation, maintenance of a sufficient supply of food, energy, weapons and manpower—among other responsibilities. After all, life isn't just exploring strange new worlds and smooching with alien women.

Universe II for the ST line allows you to indulge in that fantasy world of the starship captain, by putting you at the bridge of your own craft. The game takes you into space, but not just in the swashbuckling adventure you see on TV. On this ship, you have to remember your duties or else; if you don't, you'll have some severe consequences to deal with.

Your character's past history will help you out: you're a retired star cruiser, though you still take an occasional mission for the Federated Worlds, your home government. Currently, the tense relationship between the FW and its counterpart, the United Democratic Planets, is quickly crumbling. Your goal in **Universe II** isn't readily apparent, but is linked to the above political situation and will gradually be realized as you get critical clues and materials during your trek.

A major contributor to your success is the vidcomm, a receive-only unit which keeps you aware of the circumstances surrounding you. When you're in range of a

habitable planet, these transmissions can be read, providing you with tidbits of knowledge that you'll gradually use to put the puzzle together.

You're not likely to find a more comprehensive contest. Each step of the way you must handle such tasks as hiring and training of the crew (and the related cost), which crew member is on what shift (the day is broken down into three shifts or "watches," as in most jobs), upgrading the ship with essential hardware and computer programs—things of that nature.

There are certain procedures that can lessen your juggling. As captain, you must monitor the ship at all times. To that end, you're "asomnigenated," a process that enables you to work without sleep. This metamorphosis can, similarly, be done for any of your crew—at a cost—to benefit your payroll, by allowing you to carry a smaller staff.

The levels of training which people working under you have must also be considered. While it's cheaper to hire a Grade 1 laborer, his lower abilities may cause you to expend more energy making up for his inexperience. For example, when transferring your ship from place to place, an inferior navigator may leave your craft in a location that's less than desirable. A mixed blessing, though: each worker increases a grade (up to the maximum of 20) on his birthday. This makes your ship more efficient, but promotion also raises his wages and further taxes your payroll.

As you can see, the main consideration is how to maintain enough credits to keep the ship above water (so to speak). Fortunately, there are a number of ways to accomplish this, though they vary in success

and reward. All methods have their plus and minus sides: ferrying passengers from planet to planet for a fee is the simplest, but during travel you must place them into a hibernaculum, a type of refrigerator for storing your customers. It's normal to lose a few people upon "thawing," and this lowers the normal fare you'd receive. Ho hum... all in the day of a starship captain.

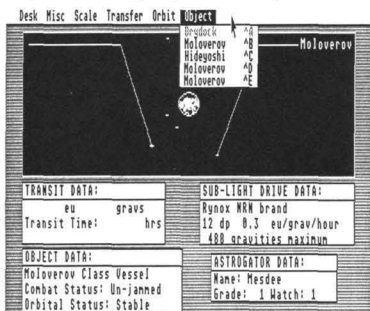
Another method of acquiring wealth is to buy and sell goods from one star group to another. This relies concurrently on the sophistication of the item and the planet you're buying from or selling to. As explained in the manual, it's unwise to try to sell materials too far above or below the technological level of the people you're dealing with—you won't get the best price. In your travels from place to place, you also have to be careful not to risk a fine by bringing illegal materials through customs, as some planets restrict trade in certain products.

Mining ore from planets and their atmospheres (which may also replenish your energy reserves), or simply attacking nearby ships for their goodies—both are alternatives, but require advanced strategies and substantial cash outlays to acquire the tools and bodies to be successful. The militaristic attack requires a large complement of marines, who may expire or reward you with the craft's contents.

While you have time to contemplate strategy during the game—as opposed to the instantaneous reactions required in arcade-type games—each move you make in **Universe II** will cause the Chronograph to tick ahead, giving the contest a real-time feel. Of course, it can give you a feeling similar to that of wallpapering alone... just

as you get one end taken care of, the other starts rolling toward you.

This is the most difficult feature of the game: trying to keep everything evenly balanced. Once something starts getting ahead of you, it's hard to catch up again. Luckily, you have the option of saving a game on the run. Since a contest will take quite a while to complete—if you do so at all—this is a necessity. You can keep a few games saved on your disk simultaneously, if you're really a glutton for punishment.



Universe II — new worlds to conquer.

The majority of the program runs under GEM, with menu bars for each segment, be it trading with the natives, launching a shuttle, checking your crew list, etc. The only exceptions to this setup are the text-adventure sections at each starport. Although integral to your success, I found these segments of *Universe II* a bit distracting. They require a totally different frame of mind than does the main body of the game.

The manual helps in most aspects, provided you can absorb all that its 100+ pages contain. It will take some time to attain a strong knowledge of the game, through careful study of the manual and attempts at various strategies. There is no fixed path—the case in most adventure games—and I've heard of players who've completed the game using different attack plans.

With a game of this scope, well-indexed documentation is mandatory. Unfortunately, there are some instances that will leave you fumbling through the guide, trying to find the right button to push to complete a task. This seems to be a problem with programs these days, but it's mitigated a bit in this case, due to the length and content of the manual.

The creators of *Universe II* have also taken into account different system configurations. The game comes on three single-sided disks, which results in a good deal of disk swapping on a single-drive system. As an alternative, the use of a double-sided disk, hard disk or RAMdisk to hold data files from disks B and C is provided. (Disk A, the main program disk, is write protected, but free updates are available.) A second drive will save some switching, but it's not necessary.

Universe II is garnering a good deal of attention, from the messages appearing on CompuServe's Gamers Forum and 16-bit SIG. Omnitrend also maintains a bulletin board at their home office, which attracts users from all over the country and permits them to pass tips back and forth. And there are some files uploaded which contain compilations of certain portions of the game (like what items are available for trade on different planets). The game has versions for most major computers—and runs identically on them—so that an IBM, Apple II or Macintosh user can give hints to Atari ST users (and vice versa) without worry of discrepancies between programs.

The programmers surely have worked their hardest to produce a game that doesn't slouch or tire. A great amount of detail comes out in the various aspects, such as ship diagrams in the purchasing stage, or navigational data when completing a warp drive. The fact that you can play it over and over, even after achieving victory, is a credit to their labors.

Keep in mind that *Universe II* is not for those who intend to dabble. Tom Carbone, one of Omnitrend's founders, figures it will

take at least 70-80 hours of playing time to complete the adventure and I don't doubt him. It immerses you in the world of outer space, and once there I don't think even Mr. Spock will be able to bring you back to Earth. **A**

Andy Eddy works as a cable TV technician in Connecticut, but has been interested in computers since high school. While his family's Atari 800 is three years old, he's been avidly playing arcade games since *Space Invaders* and is a former record holder on *Battlezone*.

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DEGAS? No sweat!

continued from page 83ST

in a fashion similar to the way your eyes move as you read this paragraph.

When you draw a line with **DEGAS**, you're really lighting some pixels in the grid. The line is "mapped" onto the grid; a point on the line can only appear where there's a pixel on the grid. Because the displayed line is forced to fit this grid, some points on it may be pushed slightly away from where they'd fall if the same line were drawn on paper. In effect, the line gets little "jaggies" in it. The human eye is sensitive enough to see those differences, and the line winds up looking like it has little stairsteps on it.

The problem is called aliasing. It plagues

computer graphics systems costing many times more than your ST. There are really only two ways around the jaggies: use display hardware with pixels so close together that the eye can't see changes between them (and even then, visible side-effects can arise), or fix it in software with a technique known as anti-aliasing.

We can't do anything about our display hardware (and probably couldn't afford to if we could), but we can use anti-aliasing. Simply put, it involves fooling the eye by using pixels of lighter shades to "spread" the edge between the line and its background. Place these pixels in the corners of the stairsteps. Do this all along the line,

and your eye will believe it sees less jaggedness. If the color contrast between the line and its background is high, you may need to use several shades, to smooth the line acceptably.

I hope at least some of these ideas will be of help. Above all else, the most important tip I can give is *don't give up!* **A**

Steve Rehauer, with a B.S. in Computer Engineering, is employed as a software engineer by Prime Computer. He's also involved in the design and implementation of a business BASIC compiler. His Atari interests date from the purchase of his 800, in 1979.

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FAX

BONUS DISK PROGRAM

A GEM text screen dump.

by Douglas Weir

FAX is a desk accessory (included on the ST disk version of this issue), which will dump the (text-only) contents of the active GEM window. FAX reads the screen memory, translates its contents into ASCII codes using a hash table, and sends the codes to your printer. It is not a graphics dump, so it can be used with any printer, whether dot matrix or daisy wheel.

FAX works in all three resolutions. It was written for use primarily with **1st Word**, but it will dump the desktop windows (when displaying text, not icons) and any other GEM window that contains only text. It so happens that the desktop word-aligns its windows in screen memory, and **1st Word** byte-aligns its windows. This makes it very easy for FAX to handle char-

acter data which is only a byte wide anyway.

However, the GEM routines do not force you to these alignments, and you can write a program with windows that can be moved a pixel's width horizontally as well as vertically. FAX will handle these windows, too. There is only one requirement: the text must be correctly aligned within the window. In other words, there must be an integral number of character-cell-widths from the window's left border to the beginning of text. It is difficult to write text routines that do not adhere to this standard—even the sloppy text-editing function in my own `www.c` (see the October **ST-Log**) sticks to it (after you have positioned the cursor with a carriage return). Still, any use of this version of FAX apart from **1st Word** or the desktop should be regarded as a bonus.

The special nontext symbols used by the desktop to denote sub-directories are not a problem for FAX. Depending on the resolution, all of the "dead" space on the left of the window, including the area where these symbols are displayed, is trimmed out of the window before processing starts. Similarly, FAX trims away the nonstandard left-hand "border" area in **1st Word** windows where page breaks are marked.

FAX was written in Megamax C, mostly using in-line assembly code. High-level C code (well, I like to think it was high level) was used for the surrounding desk accessory "shell" and sign-on window.

The .doc file accompanying FAX on the ST disk will give the few details you need to use the program. ☐

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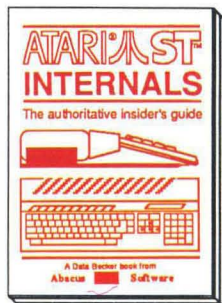
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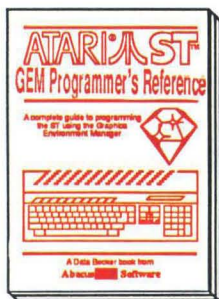
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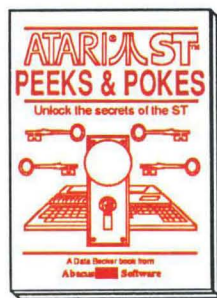
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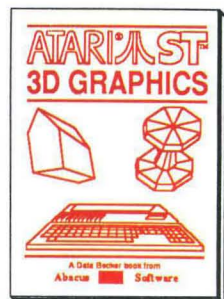
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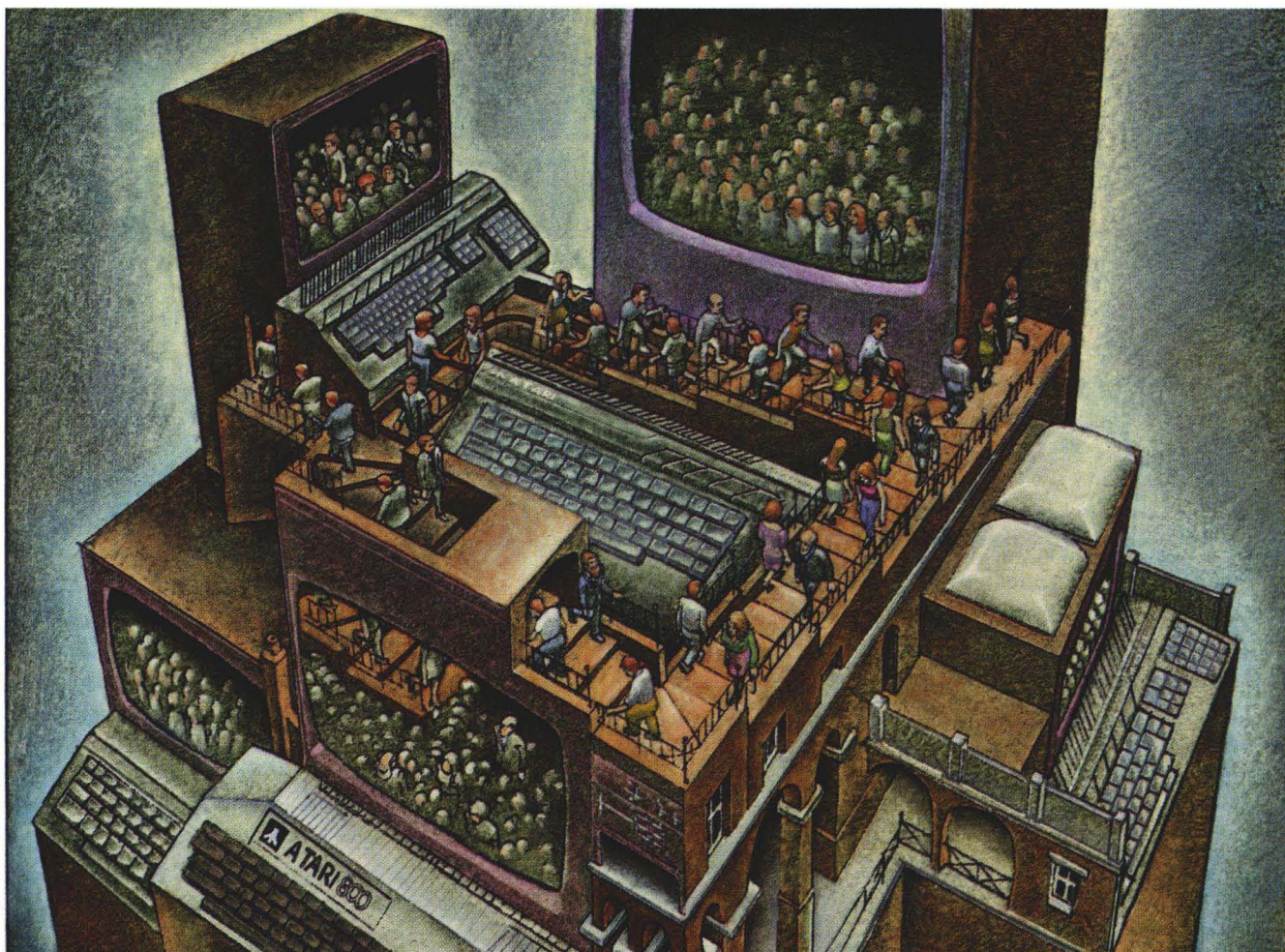
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