$10,000.00 CONTEST WINNERS ANNOUNCED

DISK INSIDE

COMPUTE!'s Atari ST DISK & MAGAZINE

$12.95
February 1987
Issue 3
Vol. 2, No. 1

$17.95 Canada
ISSN 0888-8442
02617

Snapshot *NEO/DEGAS*
Instantly capture any ST screen on disk in NEOchrome *or* DEGAS *format.*

Extended Formatter
Boost the capacity of your single- and double-sided disks by more than 15 percent.

Picture Puzzler
Turn any NEOchrome- *or* DEGAS-*format picture into a mind-boggling jigsaw puzzle—then reassemble it with the mouse.*

Features and Columns

3	**The Editor's Page**	*Robert C. Lock & Tom R. Halfhill*
7	**ST News & Notes**	*Arlan R. Levitan & the Editors*
15	**Readers' Feedback**	*The Editors & the Readers*
55	**Programming in C: Choosing a Compiler**	*Sheldon Leemon*
62	**New Products**	*The Editors*

The Disk

22	**MollyScope: A Graphics Demo**	*Philip I. Nelson & Tim Victor*
24	**File Lister**	*Richard Smereka*
28	**Desktop Clock**	*David Plotkin*
32	**Mouse Editor**	*Guy Davis*
38	**Snapshot *NEO/DEGAS***	*Philip I. Nelson*
45	**Extended Formatter**	*Richard Smereka*
50	**Picture Puzzler**	*Douglas N. Wheeler*
60	**Atari Art: Finnish**	*Steve Rehrauer*
64	**How to Use the Disk**	*The Editors*

02
0 71486 02617 4

Plus Reviews On Disk

Calendar* and *Cornerman	*Thomas M. Castle*
Paintworks	*Tom R. Halfhill*
Modula-2	*George Miller*
TextPro	*Neil Randall*
Leader Board	*David Florance*

"A LIVING TAPESTRY . . ."

NOW AVAILABLE ON ATARI ST

"The world of Ultima III can only be compared to a living tapestry — complex and beautiful . . . This is the best fantasy game in computing. Indeed, it is one of the best fantasy worlds in which to live. Lord British is a veritable JRR Tolkien of the keyboard." — Popular Mechanics

"Exodus: Ultima III, with a superior plot to match its superior gaming system, is a great game. It upgrades the market; in several ways it sets new standards for fantasy gaming state of the art." — Softline

"Exodus: Ultima III is Lord British's magnum opus — so far. It's fun and exciting to play and constantly intriguing. And the ending is marvelously unexpected and not a bit disappointing — except that it is the ending, and as with a good book, you'll probably wish there were more." — Softalk

Available on: Apple, Atari, Com 64, IBM, Macintosh

ORIGIN SYSTEMS INC. 340 HARVEY ROAD, MANCHESTER, NH 03103-3317 (603) 644-3360

Apple, Atari, Com64, and IBM are trademarks of Apple Inc., Atari Inc., Commodore Business Machines, and IBM, respectively.
Ultima and Lord British are trademarks of Richard Garriott. Copyright 1984 by Origin Systems, Inc.

Now, nothing can keep you from your appointed rounds.

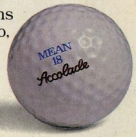
Laugh at the weather. Putt in the middle of the night. Tell your secretary to hold all calls. With Accolade's MEAN 18, all the excitement and challenge of real golf is right on your computer.

MEAN 18 delivers the kind of realism and playability you've come to expect from Accolade. This is golf the way it was meant to be enjoyed... without spending your day decoding the instruction manual. You can hit a bucket of balls at the driving range, play from the pro or regulation tees, even ask your caddy to suggest your clubs.

Once you've mastered MEAN 18, there's the challenge of playing on three of the world's legendary golf courses, all capable of bringing any touring pro to his knees. With The Course Architect, you can even design your own grueling course complete with menacing bunkers and greens on the edge of an ocean.

Available for IBM, Atari ST and Amiga systems.

Accolade, 20833 Stevens Creek Boulevard, Cupertino, California 95014. Telephone 408-446-5757.



Mean 18.

"IF YOU WANT

THE BEST GRAPHICS PACKAGE FOR THE ATARI ST,

GET DEGAS!" — JACK POWELL, ASSOCIATE EDITOR, ANTIC MAGAZINE

New! D·E·G·A·S Elite

DESIGN & ENTERTAINMENT GRAPHIC ARTS SYSTEM

For Those Who Want Advanced Features

The professional ST graphics package. All the powerful design features that made DEGAS a critical success. Plus, fantastic new capabilities. Now you can create high-quality production artwork for business reports, ads, displays, newsletters and corporate communications.

ADVANCED FEATURES:

- *Up to 8 MULTIPLE WORK SCREENS let you work on several pictures simultaneously*
- *CUT and PASTE between pictures in different screens*
- *BLOCK SAVE entire pictures or portions of pictures to disk — create your own CLIP ART reference files*
- *SCALE, FLIP and ROTATE whole pictures or portions.*
- *GRID SNAP aligns your picture elements with expert precision, for ultra-clean layouts*
- *Automatically generates COLOR SHIFT between any two colors*
- *COLOR CYCLING creates movement and virtual animation*
- *Incredible new advanced features including; color animation, block move, text size and font style, color fill patterns, new drawing capabilities, stretch, rotate and much, much, more!*
- *Works with PaperClip Elite word-processor to provide a virtual desktop publishing system*

ONLY $79.95* Not Copy Protected

ONLY $39.95* Not Copy Protected

DEGAS: Design and Entertainment Graphic Arts System

"allows you to take full advantage of your ST's stunning graphics capability, to produce nearly anything you can imagine … created specifically for the ST, sure to become an ST standard."
— ANALOG MAGAZINE

Produce business graphics, posters, newsletters, cartoons — even original works of art. DEGAS makes it easy to exercise your imagination.

DEGAS KEY FEATURES:

- *DRAW by moving the ST mouse — it's your paintbrush, with 15 built-in brush patterns*
- *more than 500 colors to choose from*
- *one command FILLS any outline with a pattern — includes 60 pre-designed patterns, from grids to dots to solid color*
- *total flexibility: create and store your own custom brush patterns, colors, fill patterns and more*
- *powerful TEXT capability lets you combine words and pictures*
- *choose the ideal letter size and weight from the built-in DEGAS TEXT FONT — or design your own font*
- *draw an accurate LINE, CIRCLE, DISK, BOX or FRAME by simply setting two points — DEGAS does the rest automatically*
- *RAYS and K-LINE draw a series of connected lines*
- *MAGNIFY any picture or portion*
- *MOVE or COPY any figure, anywhere on the screen*
- *advanced graphic design tools include MIRROR, SHADOW and AIRBRUSH*
- *one command saves your DEGAS creations to disk*
- *works in all three Atari ST resolution modes*

"Overall Performance: Excellent • Graphics Quality: Excellent • Ease of Use: Easy Value: Excellent • Documentation: Excellent • Error Handling: Excellent •" — FAMILY COMPUTING

DEGAS and DEGAS Elite.

For Atari ST's. Compatible with most popular dot matrix and color printers.

• BATTERIES INCLUDED, an ITM company, 30 Mural Street, Richmond Hill, Ontario, Canada, L4B 1B5. (416) 881-9941, Customer Information (416) 881-9818
• If you can't find this product at your local retailer, you may order it direct from us at the full suggested list price plus $5.00 for postage and handling. For product orders please call 1-800-387-5787 (U.S. only). • With all Batteries included products you can have the latest version update of your program by returning the original disk and $10.00.
• Write to us for our full color catalog of products for the APPLE, APPLE MACINTOSH, ATARI, ATARI ST, COMMODORE, COMMODORE AMIGA, and IBM SYSTEMS.

©1986 Batteries Included. APPLE, APPLE MACINTOSH, ATARI, ATARI ST, COMMODORE, COMMODORE AMIGA, AND IBM are registered trademarks respectively of APPLE COMPUTERS INC., ATARI CORPORATION, COMMODORE BUSINESS MACHINES INC., AND INTERNATIONAL BUSINESS MACHINES INC. *ALL PRICES SHOWN ARE IN U.S. DOLLARS. RETAILERS MAY SELL FOR LESS!

You can upgrade the original Degas to the new Degas Elite by returning your disk and $40.00 (U.S.) to Batteries Included.

BATTERIES INCLUDED

Integral Solutions

Publisher	James A. Casella
Founder/Editor In Chief	Robert C. Lock
Senior Editor	Richard Mansfield
Managing Editor	Kathleen Martinek
Executive Editor	Selby Bateman
Editor	Tom R. Halfhill
Assistant Editor	Todd Heimarck
Production Director	Tony Roberts
Editor, COMPUTE! & COMPUTE!'s GAZETTE	Lance Elko
Assistant Editor, COMPUTE!	Philip Nelson
Assistant Editor, COMPUTE!'s GAZETTE	Rhett Anderson
Technical Editor	Ottis R. Cowper
Assistant Technical Editors	George Miller, Dale McBane
Assistant Features Editor	Kathy Yakal
Programming Supervisor	Patrick Parrish
Editorial Programmers	Tim Victor, Tim Midkiff
Copy Editors	Tammie Taylor, Karen Uhlendorf
Submissions Reviewer	Mark Tuttle
Programming Assistants	David Florance, David Hensley, Troy Tucker
Executive Assistant	Debi Nash
Administrative Assistants	Julia Fleming, Iris Brooks, Mary Hunt, Sybil Agee
COMPUTE!'s Book Division Editor	Stephen Levy
Assistant Editors	Gregg Keizer, Ann Davies
Director, Book Sales & Marketing	Steve Voyatzis
Production Manager	Irma Swain
Art & Design Director	Janice R. Fary
Assistant Editor, Art & Design	Lee Noel
Mechanical Art Supervisor	De Potter
Artist	Dabney Ketrow
Typesetting	Terry Cash, Carole Dunton
Illustrator	Harry Blair
Director of Advertising Sales	Peter Johnsmeyer
Associate Advertising Director	Bernard J. Theobald, Jr.
Production Coordinator	Kathleen Hanlon
Promotion Assistant	Caroline Hanlon
Customer Service Manager	Diane Longo
Dealer Sales Supervisor	Orchid Tamayo
Individual Order Supervisor	Cassandra Green
Receptionist	Anita Armfield
Warehouse Manager	John Williams

James A. Casella, President, COMPUTE!
Richard J. Marino, Vice President, Advertising Sales
Christopher M. Savine, Director, Finance & Planning

Editorial offices:	324 West Wendover Avenue Suite 200 Greensboro, NC 27408 USA
Corporate offices:	825 7th Avenue New York, NY 10019 212-265-8360
Customer Service:	800-346-6767 (In NY 212-887-8525)
Hours:	9:30 A.M.–4:30 P.M. Monday–Friday

Advertising Sales Representatives

New England & Mid Atlantic	Bernard Theobald (212) 315-1665
Midwest & Southwest	Jerry Thompson Lucille Dennis 312-726-6047 (Chicago) 713-731-2605 (Texas) 303-595-9299 (Colorado) 415-348-8222 (California)
West, Northwest & British Columbia	Jerry Thompson Lucille Dennis 415-348-8222
Southeast & International	Harry Blair 919-275-9809

Call Peter Johnsmeyer, *Director of Advertising Sales or* Bernard J. Theobald, Jr., *Associate Advertising Director (212) 315-1665*

Send all advertising materials to:
Kathleen Hanlon
324 West Wendover Ave., Suite 200
Greensboro, NC 27408

COMPUTE! Publications, Inc. abc
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies
ABC Publishing, President, Robert G. Burton
1330 Avenue of the Americas, New York, New York 10019

The Editor's View

$10,000.00 Programming Contest Winners

Given the amount of time you had to work on entries for our ST programming contest, and given our expectations that we would receive some truly great submissions, you'll be pleased to know that we have been overwhelmed by some rather exceptional entries. You, the readers, will ultimately be the real winners, because you can look forward to issues and issues of them in the coming months.

Our First Prize winner is Mike Duppong of Pocatello, Idaho. At 19, Mike is the youngest of the major prize winners, and we're sure he'll put his $5,000.00 to good use. He's a second-year student at Idaho State University majoring in electronic technology. Mike has been programming since the seventh grade; he used to work with his brother's Atari 800. His winning entry, *Laser Chess*™, is an exceptionally challenging strategy game as well as an outstanding program. For creativity in both concept and programming, Mike was selected the overall grand prize winner.

Robert Birmingham of Miami, Florida won the Second Prize of $2,500.00 with his excellent entry, *Art-ST*™. This sophisticated drawing application is a programming masterpiece. Birmingham is a freelance programmer whose hobbies include astronomy and cycling.

Karl Schweitzer of Roslindale, Massachusetts won the $1,000.00 Third Prize for an extremely useful RAM disk utility that is almost indestructible. Schweitzer is the technical support manager for Stop & Shop Companies, a retail chain in New England.

We also awarded three Honorable Mentions at $500.00 each: to Richard Smereka of Toronto, Ontario, for *ST-Shell*™, a command-line DOS interface with batch file capabilities, published in our December 1986 issue; Mike Kerekes of Austin, Texas, for *3D-Edit*™, an impressive computer-aided design program; and Douglas N. Wheeler of Travis Air Force Base, California, for *Picture Puzzler*™, which turns any *NEOchrome*- or *DEGAS*-format picture into a jigsaw puzzle which can be reassembled with the mouse. *Picture Puzzler*™ appears in this issue.

Beginning next issue, we'll start publishing the remaining winners as well as other contest entries. Thank you all for your enthusiasm, support, and interest. In the meantime, though the contest is over, keep those article submissions coming.

—Robert C. Lock, Editor in Chief

Atari Goes Public

Last September, the Atari Corporation announced it was going public with an offering of 4.5 million shares of common stock at an anticipated price of $11.50 to $13.50 per share. As a signal of Atari's comeback, it was a significant announcement—but even more interesting was what it revealed about the new Atari's past, present, and future.

For one thing, it was further evidence of Atari's dramatic corporate turnaround and the growing confidence in Atari as a player in the personal computer industry.

COMPUTE!'s Atari ST Disk and Magazine is published bimonthly by COMPUTE! Publications, Inc., 825 7th Ave., New York, NY 10019 USA. Phone: (212) 265-8360. Editorial Offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 6 issues, $59.95. POSTMASTER: Send address changes to: **COMPUTE!'s Atari ST Disk and Magazine**, P.O. Box 10775, Des Moines, IA 50347-0775. Second class application pending. Entire contents copyright ©1986 by COMPUTE! Publications, Inc. All rights reserved, ISSN 0888-8442.

The COMPUTE! subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE! P.O. Box 10955, Des Moines, IA 50950. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE! are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of COMPUTE! Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1986 COMPUTE! Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication in COMPUTE! will be returned if author provides a self-addressed, stamped envelope. Programs (on tape or disk) must accompany each submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper- and lowercase, please) with double spacing. Each page of your article should bear the title of the article, date and name of the author. COMPUTE! assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of COMPUTE!.

But even if you don't follow the stock market—much less invest in it—there are plenty of reasons for paying attention to this development. When a privately held company goes public, all kinds of information that used to be secret suddenly becomes a matter of public record.

One requirement of a company making the transition from private to public is that it must file a prospectus with the U.S. Securities and Exchange Commission. This document basically provides a snapshot of the company's current status: its financial history, its business goals, and its outlook for the future. Atari's prospectus makes fascinating reading, both for the information it reveals and for the frankness with which it evaluates Atari's position in the microcomputer marketplace.

In a section entitled "Risk Factors," for instance, the prospectus describes the unpredictable nature of the industry; Atari's extremely short history of profitability (only two quarters when the document was filed); stiff competition from such companies as IBM, Apple, Commodore, Tandy, and Compaq, which have well-established product lines; Atari's current incompatibility with MS-DOS—the leading operating system for business applications—and the resulting software gap; the onslaught of low-priced MS-DOS clones; the need for constant technological innovation to keep pace with the industry; the intense competition for distribution channels; and Atari's dependence on a single overseas manufacturing plant, which subjects the company to possible economic or political disruptions.

Of course, most of these risk factors were widely known before. Not so well known were the specifics of Atari's financial history since Commodore founder Jack Tramiel acquired the failing company from Warner Communications in mid-1984.

Through December 1985, the new Atari lost a total of $77 million. During the first six months of 1986—the most recent period for which data was available when the prospectus was filed—Atari showed a net income of $12.4 million. This was quite a turnaround from the net loss of $26.6 million during the same period in 1985. As the prospectus admits, however, this does not necessarily indicate how Atari will fare in the future.

One of Atari's stated goals for going public is to repay debts, including $36.1 million still owed to Warner. Another goal is to raise working capital. Research and development expenditures have been steadily increasing. In one section, the prospectus says, "Within the next 12 months, the company intends to introduce additional microcomputer enhancements using the current ST operating system and compatible with current ST applications software, including products offering additional internal memory capacity and substantially enhanced color resolution and spectrum capacity; a dedicated graphics coprocessor that will generate graphics at up to five times current speeds; and a Unix-based multiuser, multitasking microcomputer system."

Another part of the prospectus which discusses the upward compatibility of GEM software mentions that "If the company were to introduce a monitor with 1280 × 960-unit resolution, the same word processing program would operate on the improved system." Since it's no secret that Atari is also working on a low-cost laser printer, it appears that Tramiel is serious when he declares that Atari is aggressively pursuing the desktop publishing market created by Apple.

Here are some other items of interest from Atari's prospectus:

• Although Atari was claiming last June that it had sold more than 200,000 STs worldwide, and was expecting to sell 500,000 by the end of the year, the actual worldwide sales as of September 15, 1986 were more conservatively pegged at "over 150,000."

• The new Atari inherited from the old Atari a vast inventory of leftover products valued at more than $135 million—mainly videogame machines, eight-bit computer hardware, software, and other odds and ends. You know what's happened to this inventory if you've been watching the mail-order ads for the last year or so. The closeout sales of 800XL computers, VCS 2600s, and other paraphernalia have brought Atari more than $200 million and have played a major role in keeping the company afloat while it launched the XE and ST lines. Although the leftovers once accounted for as much as 97 percent of the new Atari's sales, they now make up less than 9 percent.

• All Atari products—except for such devices as disk drives and monitors that are bought from other sources and relabeled—are manufactured at a single 200,000-square-foot plant in Tam-Shui, Taiwan.

• Atari has about 1180 employees, including around 800 at the Taiwan plant. About 80 Atari employees are involved in engineering and product development, mostly in the U.S.

• Four Tramiels help run Atari. Jack Tramiel (age 58) is chairman of the board, chief executive officer, and director. His sons are Sam (36), president; Leonard (31), vice president for software development; and Garry (26), secretary, assistant treasurer, and vice president for administration.

• The most highly paid Atari executive in 1985 was Sam Tramiel, who received $162,000 in cash compensation. None of the other Tramiels received more than $89,000 in cash compensation, but Jack Tramiel owns 12.7 million shares of Atari, Sam owns more than 560,000 shares, and Garry owns more than 750,000 shares.

• Since May 1984, Jack Tramiel has loaned a total of $12.3 million to Atari out of his own pocket. All of the loans were repaid with 12 percent interest by June 30, 1986. He also helped bankroll the development of the ST computers with $500,000 in 1984, and sold his interest in the technology back to the company for $575,000 in 1986. In addition, he bought more than $3 million in promissory notes which Atari had issued to the Tandon Corporation for the purchase of disk drives. About $2.7 million had been repaid by September 1986.

—Tom R. Halfhill, Editor

VISIT EXOTIC LANDS AND WIN OVER THE NATIVES.

There is a place, probably a long, long way from where you're sitting right now, where grown men actually wear dresses and throw telephone poles in the air as a sign of athletic prowess.

It is true.

There is another rather bizarre land where grown men actually throw *themselves* in the air as a sign of athletic prowess.

Right off the edge of a cliff.

We're talking, of course, about Scotland's famous Caber Toss and the death-defying divers of Acapulco.

Two of the events you'll find in *World Games*,™ the newest sequel in our bestselling "Games" series.

Here's your chance to dash around the globe as a big-time international athlete competing in 8 extraordinary sports.

Go stomach to stomach with a 400 pound sumo. Jump barrels in Germany.

Anyone who can throw a telephone pole long distance is entitled to wear a dress.

You haven't lived until you've taken a log out for a spin.

Try Canada's ridiculously difficult log roll. Or ski the brutal, wintry slopes of France.

Then it's back to the good old US of A to ride a bucking bull. And off again to bully Moscow with some heavy-duty weight lifting.

If you manage to upset enough countries, your name will be permanently inscribed in the World Hall of Fame.

This then, is a challenge of global proportions.

One to eight players. Amiga, Apple II & compatibles, Atari ST, C64/128, IBM & compatibles.

EPYX®

The question is, are you ready to go the distance?

One for all.

Affordable, Compatible, and Full-Color Capable!

Besides being the one printer for all the PC's pictured above, the OKIMATE® 20 is also the one for all your printing needs.

Want to spruce up your homework with colorful charts and graphs? The OKIMATE 20 is for you.

Need crisp "Near Letter Quality" printing for business correspondence? The OKIMATE 20 is for you.

Maybe you want expanded or fine print, italics, underlining, superscripts, or subscripts? You guessed it, the OKIMATE 20 is for you, too.

In fact, no matter what you have in your PC, you can put it on paper with the OKIMATE 20.

With this versatile printer you also get such high-end features as built-in type fonts, a 24-element printhead and the ability to make transparencies for overheads.

All at a very low-end price: $268* complete with "Plug 'n Print" personality module.

For the name of the OKIMATE 20 retailer nearest you, simply call 1-800-OKIDATA.

*Suggested retail price. Dealer price may vary.

OKIDATA®
an OKI AMERICA company
We put business on paper.

Registered Trademarks: OKIDATA, Oki America, Inc., Marque déposée, Oki America, Inc.; PLUG 'N PRINT, Oki America, Inc.; OKIMATE, Oki Electric Industry Company, Ltd.; Commodore and Commodore 64, Commodore Electronics, Ltd.; Apple, Apple Computer, Inc.; IBM, International Business Machines Corp.; Atari, Atari Inc. Trademarks: Amiga, Commodore-Amiga, Inc.; PCjr, International Business Machines Corp.

The Atari Expo Big Mac Attack

Thousands of Atari enthusiasts crowded into the San Jose Convention Center last fall to see the latest Atari hardware and software at the 1986 Northern California Atari Expo. The continuing success of the Atari ST was evidenced by the large number of new products and by the increasing sophistication and power of programs and peripherals.

But the biggest noise at the show, paradoxically, had more to do with Apple Macintosh software. The Expo marked the first public appearance of the Magic Sack, a Macintosh emulator for the ST formerly known as the MacCartridge or M-Cartridge (see "ST News & Notes," *COMPUTE!'s Atari ST Disk & Magazine*, October 1986). A plug-in cartridge engineered by David Small, the Magic Sack lets you run Macintosh software on an otherwise unmodified Atari ST. When you plug a set of Macintosh operating system ROMs into the Magic Sack cartridge, then stick the Magic Sack into the ST's cartridge port, you get what appears to be a fully functional Macintosh—and an improved one at that. The Magic Sack runs Macintosh software 20 percent faster than a Macintosh, and the ST's larger monochrome screen gives Macintosh applications over 46 percent more screen area.

Significantly, the Macintosh screen is not merely expanded to fit the larger monitor; you actually get additional resolution, an increase from the Mac's 512 × 342 pixels to the ST's 640 × 400. Many Macintosh programs can increase their window size to take advantage of this additional elbow room, just as they do when running on the larger screen of Apple's Lisa (later renamed the Macintosh XL). In addition, the Magic Sack can use all of the memory in an ST—up to four megabytes, compared to the 512K normally found in a Fat Mac.

The price for all this is $129, or $149 for the Magic Sack Plus, which includes an onboard clock that also works in ST mode.

A Rose By Any Other Name?

For several months after Small designed the cartridge, its release looked doubtful because of potential copyright infringement problems with Apple. It was simply too close to the real thing at a significantly lower cost. Since the cartridge is useless until Macintosh ROM chips are inserted, Apple promptly informed its dealers that Mac ROMs were for repair purposes only—not for sale to ST owners or anyone else. For a while it looked like the cartridge might be left out in the cold.

However, Apple realized that people could make illegal copies of the Macintosh ROMs by using EPROMs (Erasable/Programmable Read-Only Memories). So Apple and Small negotiated a truce. One condition of the truce is that Small is not allowed to publicly talk about it. However, the product changed in three ways after Apple and Small made peace. First, the name was changed from MacCartridge or M-Cartridge to Magic Sack. Second, the cartridge was modified so it would no longer work with EPROMs—only ROMs. Third, and most important, the cartridge is being marketed as a *Macintosh* enhancement, not an ST enhancement.

The official line from Data Pacific—David Small's Denver-based company—is that Macintosh owners can now buy a Magic Sack cartridge and an Atari ST, transfer the ROMs from their Macintosh into the cartridge, and enjoy greater speed and a larger screen. Meanwhile, presumably, the ROMless shell of the Mac sits useless, deprived of its brain.

Despite the official line, many ST owners are obviously very interested in buying the Magic Sack to run Macintosh programs, but there's the problem of getting those ROMs. At the Atari Expo, Small sold about 200 Magic Sacks in two days for a special show price of $100 each. Since the Atari Expo was sparsely attended by Macintosh fans, it's pretty safe to assume that most of those customers were ST owners. So where did they get their ROMs?

Right next door. Set up next to the Magic Sack exhibit was a booth sponsored by a computer store that was selling (among other things) Macintosh ROMs for $30 a set. So for about $130, ST owners were turning their STs into high-powered Macintoshes.

Nothing's Perfect

If all this sounds too good to be true, keep in mind that there are still some drawbacks to the Magic Sack. Perhaps the biggest problem is loading Macintosh software into a Magic Sack–equipped ST. Even if you can get your Mac ROMs, the ST can't read Macintosh disks.

Arlan R. Levitan & The Editors

Both computers use 3½-inch microfloppies, but the Macintosh drive motor runs at varying speeds so it can slow down when writing to the more tightly packed inner tracks of the disk. The ST drive runs at a constant speed, and thus cannot access these tracks.

The Magic Sack cartridge can format an ST disk to make it compatible with the track and sector format of the Macintosh, but the data is still written at a constant speed. As a result, you have three formats to deal with: the unreadable Macintosh disk, the Magic Sack Macintosh-like format, and the ST's own format, which is not readable by the Magic Sack (and vice versa).

The best solution may be to use the special Magic Sack disk drive, which plugs into the ST and can read standard Macintosh disks (although some copy-protection techniques might cause trouble). However, this drive is not expected to be ready until early 1987. Also, the first version will not be able to read double-sided Macintosh disks.

Lacking the Magic Sack drive, you have to transfer Macintosh programs to the ST via a special cable that comes with the cartridge. Even with this cable, however, you can't transfer copy-protected programs, so this limits your choice in software.

Another drawback is that the Magic Sack does not work with the new 128K Macintosh Plus operating system ROMs. Also, early customers have been reporting frequent crashes when using the Magic Sack.

Nevertheless, most agree that the Magic Sack is an intriguing, even tantalizing product.

The Blitter Is Coming

Another attention-getter at the Northern California Atari Expo was Atari's own exhibit, which dominated the center of the show floor. Although there was no sign of the two- and four-megabyte STs shown at a computer show in London (see "New STs Debut In Europe" elsewhere in this section), there were a pair of STs equipped with blitter chips. (The blitter is a coprocessor that significantly speeds up the ST's screen display.) One modified ST was running a demo of five flapping eagles winging across a seashore scene. An unmodified ST can animate only one eagle as smoothly. The other blitter-enhanced ST bounced colored balls quickly around the screen, mimicking a demo for the Commodore Amiga.

Indeed, the addition of the blitter chip gives the ST the high-speed image animation that is the Amiga's hallmark. A blitter (short for *bit-block transferrer*) is a chip specialized for high-speed memory moves, relieving the main microprocessor of that burden. Since all screen images (including text displays) are stored as numbers in memory, a high-speed memory mover yields high-speed graphics and text scrolling.

The ST's operating system has been enhanced to take advantage of the blitter at a basic level known as the *line A trap*. This means that all of the higher-level operating system functions which rely on these line A traps will automatically work with the blitter, with no modification required for application software. For one thing, GEM is far smoother. Lines, circles, and icons are drawn much faster. Windows move and resize at a zippier rate.

To confirm that application software should be compatible with the blitter, we tried running the "AstroPanic!" action game published in the October 1986 issue of *COMPUTE!'s Atari ST Disk & Magazine*. It ran noticeably more effectively, with less flicker. It didn't run much faster, though, since the speed of this particular game is more constrained by the fact that it was written in a compiled language (C) instead of machine language. Programs which write directly to screen memory will not take advantage of the blitter, so their speed will be unaffected. On the other hand, some programs may run *too* fast.

At this writing, it is expected that the blitter will be included in the new STs and will be offered as a dealer-installed upgrade for existing STs by late 1986/early 1987. The upgrade is a small piggyback board containing the blitter chip and a few ROMs. This board is soldered to the pins of the 68000 microprocessor on the ST motherboard. A new set of operating system ROMs is also required.

—Contributed by Charles Brannon

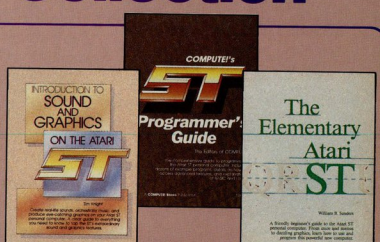
Games People Play

Watch for two exciting new games to be out soon for the ST. Both of them create game environments unlike anything else currently available for Atari computers.

XAnth, the folks behind the Fuji Boink demo, were showing an ST-based version of *MazeWars* at a show in San Francisco last fall. This multiplayer 3-D maze game can tie up to 15 STs together via the MIDI ports and allow participants to sneak up on and zap one another. If the ST version of *MazeWars* is marketed like the Macintosh version, you can expect a public domain *MazeWars* plus a full-featured version that will be sold commercially.

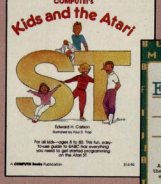
Meanwhile, Michtron is releasing an ST version of the animated arcade classic *Dragon's Lair*. This is the real thing—not a translation of the coin-op version. To play *Dragon's Lair* on the ST, you need a *Dragon's Lair* videodisc and a laserdisc player (Michtron recommends the Pioneer LD-700). The *Dragon's Lair* disc is available from video stores or from Michtron for $29.95. Also required is Michtron's *Dragon's Lair* software ($49.95) and an interface cable ($29.95).

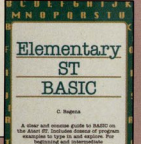
COMPUTE! Books' ATARI ST Collection



COMPUTE! Books offers you a superior line of titles for the new Atari ST. Packed full of useful utilities, exciting games, in-depth tutorials, and valuable applications, these clearly written books bring you fully tested information and entertainment for the whole family.

Look for these COMPUTE! books at your local book or computer store.





You can order directly from COMPUTE! by calling 800-346-6767 (in NY call 212-887-8525) or by sending your payment to COMPUTE! Books, P.O. Box 5038, F.D.R. Station, New York, NY 10150.

Please include $2.00 per book shipping and handling for U.S. and surface mail or $5.00 for airmail. North Carolina residents add 5 percent sales tax. New York residents add 8.25 percent sales tax.

Please allow 4–6 weeks for delivery from receipt of order.

COMPUTE! books are available in the U.K., Europe, the Middle East, and Africa from Holt Saunders, Ltd., 1 St. Anne's Road, Eastbourne, East Sussex BN21 3UN, England, and in Canada from McGraw-Hill, Ryerson Ltd., 330 Progress Ave., Scarborough, Ontario, Canada M1P 2Z5.

COMPUTE! Publications, Inc. abc
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies
825 7th Avenue, 6th Floor, New York, NY 10019
Publishers of COMPUTE!, COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, COMPUTE!'s Apple Applications, and COMPUTE!'s Atari ST Disk & Magazine.

COMPUTE!'s First Book of the Atari ST
Edited
A valuable collection of ready-to-type-in-and-use applications, games, and utilities. Graphics utilities like "ST Doodler," games like "Switchbox" and "Tug-a-War," and educational programs like "Hickory Dickory Dock" turn your Atari ST into everything from a business graphics machine to a powerful teaching tool. Tutorials show you how to add power to ST BASIC and how to add excitement to your own creations with sound effects. *A disk is available for $15.95 which includes all the programs in the book, 203BDSK.*
(September release)
$16.95 ISBN 0-87455-020-3

The Elementary Atari ST
William B. Sanders, 272 pages
A friendly, easy-to-use guide to the Atari ST, this book takes you through connecting your computer, loading programs, creating graphics and music, and writing your own programs.
$16.95 ISBN 0-87455-024-6

Elementary ST BASIC
C. Regena, 208 pages
A tutorial and reference guide to the ST's impressive graphics, animation, and sound with complete descriptions of ST BASIC's commands, syntax, and organization. *A disk is also available for $15.95 which includes programs from the book, 348BDSK.*
$14.95 ISBN 0-87455-034-3

COMPUTE!'s Kids and the Atari ST
Edward H. Carlson, 238 pages
Easy-to-understand instructor notes, lessons, assignments, and lively illustrations help both kids and adults painlessly learn to program on the Atari ST. The latest in the bestselling series by this author.
$14.95 ISBN 0-87455-038-6

COMPUTE!'s ST Programmer's Guide
Editors of COMPUTE!, 356 pages
A comprehensive reference guide to the Atari ST, this book explores in detail Logo and BASIC, the advanced features of the ST such as GEM and TOS, and every aspect of programming from concepts to actual program writing.
$16.95 ISBN 0-87455-023-8

Introduction to Sound and Graphics on the Atari ST
Tim Knight, 197 pages
Thorough descriptions of the Atari ST's color graphics and sound abilities, plus all the information needed to create a complete sound and graphics system.
$14.95 ISBN 0-87455-035-1

Enhanced for 520 ST – Better Graphics, Sound, Play Action!

Captain's Log . . . War Date 10.01.44

"Captain's Log, October 1, 1944. 0250 Hours. Fleet submarine USS Hammerhead proceeding Southwest at cruising speed. Our mission: intercept enemy convoy off the coast of Borneo. Disperse and destroy."

"0300 Hours. Two hours until dawn. Radar picks up convoy, escorted by two destroyers. We believe that one of the enemy's valuable oil tankers is part of convoy formation."

"0400 Hours. Lookouts on the bridge. Target identification party reports one tanker, 6,000 tons, troopship of 10,250 tons, with two *Kaibokan*-type escorts. Moving into attack position."

Atari 520ST screens shown

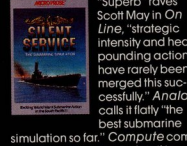
"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."

"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."

"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly . . . Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."

"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."

"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last tankers coming into 'scope view – an ideal target position. On my mark . . . Fire Tube 4! Fire 5!"



"Superb" raves Scott May in *On Line*, "strategic intensity and heart-pounding action have rarely been merged this successfully." *Analog* calls it flatly "the best submarine simulation so far." *Compute* comments "Silent Service's detail is astonishing." Join the more than 150,000 computer skippers who have volunteered for **Silent Service**, the naval action/tactics simulation – from MicroProse.

Silent Service is available for Commodore 64 ™128™, Amiga™, Apple II family, Atari XL/XE, Atari ST, IBM PC/PC Jr. and Tandy 1000, at a suggested retail price of $34.95 (Atari ST and Amiga, $39.95).

Commodore, Amiga, Apple, Atari, IBM, and Tandy are registered trademarks of Commodore Electronics, Ltd., Commodore-Amiga Inc., Apple Computer, Inc., International Business Machines Corp., and Tandy Corp., respectively.

Available from your local retailer. If out-of-stock, contact MicroProse directly for further information on our full range of simulation software, and to place Mastercard/Visa orders.

MICRO PROSE
SIMULATION • SOFTWARE

120 Lakefront Drive • Hunt Valley, MD 21030 • (301) 667-1151

New STs Debut In Europe

Atari introduced two new ST models in September at the Personal Computer World Show in London, England. The 2080ST and 4160ST, with two and four megabytes of RAM, respectively, were displayed but not functioning. Sources report that the motherboards of the new machines do indeed have sockets for the blitter chip, but may not ship with blitters installed. Instead, the blitter will likely be an option priced at about $130–$150 for some time to come. Although no prices for the computers themselves were announced, insiders peg the 4160ST at about 1300 pounds ($1820) in the United Kingdom. Final U.S. price tags will depend a lot on the fluctuating dollar/yen exchange rates and RAM chip prices.

Overseas sources also report that the price of the 1040ST in Germany has been slashed to spur sales. A 1040ST now lists at DM 2498 ($1250), down almost 25 percent from its previous price tag of DM 3298 ($1650). That puts the 1040ST at about $200 less than a 520ST (DM 2898) in Germany. It seems that Europeans have been shying away from the 1040ST in favor of the 520ST because they prefer separate power supplies, disk drives, and consoles. U.S. buyers, on the other hand, tend to prefer consolidated systems, which is one reason why 1040STs remain in relatively short supply in the U.S. while 520STs abound.

Less Is More

According to the classic biblical story, Noah managed to fit two of every kind of animal aboard his ark. Now there's a program called ARC for the ST that isn't quite as astonishing, but is pretty impressive just the same.

ARC (short for ARCHIVE) is a utility that can crunch and squeeze a bunch of long files into a single, much shorter file. ARC is a mainstay of telecomputing buffs in the MS-DOS and CP/M worlds because it drastically reduces the time required for downloading lengthy files. Harvey Johnson, of Palm Bay, Florida, spent two months creating an ST version of ARC, and it appears to work like a miracle.

Distributing programs like the ST–CP/M emulator would be much less easy without ARC. The emulator software consists of 29 files totaling 212,122 bytes in size. When crunched with ARC, they become a single file of only 126,336 bytes. Not only is there then half as much data to download, but you also save time because there's only one file to request. Once you've downloaded a compressed file, ARC lets you reverse the compaction and consolidation process, expanding and separating the files into their original form.

Better yet, ARCed files are completely transportable between different types of computers. For example, someone could use the Amiga version of ARC to pack several *Deluxe Paint* pictures into a single file, transfer the file to an ST via modem or null modem cable, unpack the file with the ST version of ARC, and then load the pictures with a program such as *DEGAS Elite* that supports the Amiga's IFF screen format. Or vice versa.

As the authors of other versions of ARC have done, Johnson has released his ST version of ARC as shareware. For more information, write to Johnson at 2398 Oakland Street NE, Palm Bay, FL 32907.

Free CP/M Emulator

Atari has made its CP/M (Control Program/Microcomputers) emulator for the ST available at no charge. Previously it was believed that the emulator would sell for about $50.

Implemented entirely in software, the emulator allows the ST to run most programs written for version 2.2 of the CP/M operating system. Until it was superseded by PC-DOS/MS-DOS a few years ago, CP/M was the most popular microcomputer operating system for small business and hobby applications. There are thousands of commercial and public domain programs that run under CP/M, including word processors like *Wordstar*, spreadsheets, database managers, small-business accounting programs, programming languages, utilities, and even some simple games. Of course, since the vast majority of CP/M programs are on 5¼-inch floppies, they have to be transferred to the ST via modem or special cables. But by the time you read this, some enterprising user groups will probably have collections of public domain CP/M programs available on 3½-inch disks at nominal cost.

The emulator's performance is roughly equivalent to a Z80-based CP/M system running at two megahertz—a tad on the slow side. The speed difference is less noticeable with programs that rely heavily on disk input/output, however, because they benefit from the ST's higher data transfer rates. The emulator can be downloaded from most electronic bulletin boards and information services and is also available through Atari user groups. **ST**

The Ear

News, rumors, and gossip heard around the ST community.

New ST BASIC

As this is written in late October, Atari is **finally ready** to ship the new ST BASIC. Revamped by MetaComCo, the new BASIC is two to three times faster than the old BASIC, has more accurate arithmetic functions, supports BIOS, XBIOS, and GEMDOS system calls, and adds additional graphics commands. MetaComCo is the British company that designed **AmigaDOS and ABasiC,** which was replaced by Microsoft's Amiga BASIC soon after the Amiga was introduced. Not surprisingly, there are similarities between MetaComCo's ST BASIC and ABasiC. The price of the new ST BASIC is expected to be $19.95 with manual.

GDOS At Last

Ever since the Atari ST first came out, many owners who are familiar with the way the Apple Macintosh works have missed having a variety of character fonts and GEM-supported external device drivers on the ST. The problem has been that the ST's operating system is **missing a critical part:** GDOS, or the Graphics Device Operating System. After months of delays, Atari finally shipped at least three different "release" versions of GDOS to software developers in early October, and they've been showing up in such packages as *DEGAS Elite*. The forthcoming *Microsoft Write* word processor also will rely heavily on GDOS for such things as variable-sized proportional fonts. Since it's **too late** to build GDOS into ROM with the rest of the operating system, it will be **loaded into RAM** by a program in the AUTO folder. Fonts and device drivers may reside elsewhere. At this writing, GDOS was expected to be generally available by December 1986.

No Insecticide For TOS

Contrary to recent rumors, we now hear that **no existing bugs will be fixed** in the revision of TOS (Tramiel Operating System) that supports the new blitter chip. Programmers had hoped that Atari would take the opportunity to correct some longstanding bugs in TOS, but apparently the only changes made were those necessary to insure the proper interaction of existing software with blitter graphics routines.

Where's Amy?

The on-again, off-again Amy sound chip is said to be **on again.** But whether it will ever grace the circuit board of an Atari ST is a matter of conjecture. Amy is a project left over from the days of the old Atari—a **potentially fantastic** sound chip that has been hampered by persistent hardware bugs. Now the latest story is that Atari has either sold the design outright or turned development over to a company called Sound Creations in Madison, Wisconsin. Sound Creation's first pass at making Amy work was **not entirely successful.** A second pass is now in progress, with NCR—the cash register and minicomputer company—in charge of chip fabrication. If Amy's troubles can finally be rectified, the chip will probably surface in a number of synthesizers and other musical devices. Roughly half of those in the know claim that Atari **retained exclusive rights** to Amy for use in personal computers.

Thunder, And Now Lightning

Never let it be said that Batteries Included turns a **deaf ear** to customers. Recently the Toronto-based software publisher received a complaint about *Thunder!*—the realtime spelling checker that instantly beeps when you misspell a word. The customer complained that he **couldn't hear the beep** because of a severe hearing impairment. So *Thunder!* author Mark Skapinker got to work and came up with a modified version of the program that **flashes the screen** when a word isn't recognized. The lightning version of *Thunder!* is now available for free to hearing-impaired purchasers who wish to exchange their regular version.

More Hard Luck

Owners of Atari SH204 hard disk drives who have used the edit partition feature supplied with the utility software may be **courting disaster** if they don't make regular backups on floppies or tape. Versions of the utility software prior to Revision 8 reportedly create partitions which can overlap—which may cause files to jump into the bit bucket. A fix should be available from local dealers by the time you read this.

Holiday Blowout?

One of the many rumors circulating this fall was that 520STs with single-sided drives would be going out the doors of Toys "R" Us stores for a **holiday blowout price of $250–$300.** Up to this point, the toy chain has been selling the computers at full list price.

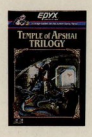
Whisper To The Ear

*Got something you want to get off your chest? **The Ear wants to hear.** Mail missives to The Ear, c/o* COMPUTE!'s Atari ST Disk & Magazine, *P.O. Box 5406, Greensboro, NC 27403. Or send electronic mail to CompuServe ID 70675,463, Delphi ARLANL, or The Source TCT987. All sources treated confidentially.* **ST**

Temple of Apshai Trilogy.™ The classic subterranean fantasy. Now, this all-time bestseller and its sequels "Upper Reaches of Apshai"® and "Curse of Ra"® have been given enhanced graphics and put on one disk. To make it easier than ever for you to, well, meet the grim reaper.

Create your own character with your own personality traits. Go for the glory. Or go for the gold. Map 12 levels of dark, underground mazes and nearly 600 rooms as you encounter skeletal bats, ghouls, zombies, and other unpleasant creatures of middle earth. And hear new sound effects that'll send chills down your monitor.

Includes an 80-page book on the complete lore of Apshai—the lost culture beneath the Sahara. Of course, it's all pure fiction. Or is it?



Amiga
Apple II
Atari
Atari ST
C64/128
IBM/ Compatibles
MAC

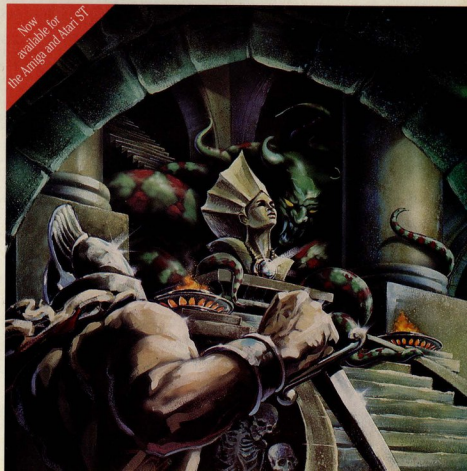
They make 'Dune' look like a day at the beach.

Rogue.™ This is one classic that's definitely not for beginners. Thousands have explored its 26 ominous levels. Maybe two have made it out in one piece. It's a world of underground mazes, bizarre places and magical treasures. Rogue has a mythology all its own, with one fatal reality. It's never the same game twice. So forget mapping. This one's on pure intuition and brainpower.

Enter the Dungeon of Doom. Your challenge is to recover The Amulet of Yendor, and make it back to Level 1. Not so simple, is it?

Oh, and just so you won't think we're bad sports, here's an enchanted sword. Hope you know how to use it.

Amiga
Atari ST
IBM/ Compatibles
MAC
Tandy 1000

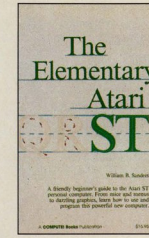


EPYX®

Temple of Apshai Trilogy screen from Commodore 64/128™ version of the game. Rogue screen from the Atari ST™ version of the game. ©Epyx, Inc.

Outstanding Artistic Instructive

books from COMPUTE!



You'll find expert information, useful applications, intriguing games, graphics, colorful art, music, programming guides, and more in these new Atari ST-specific books. Beginning to advanced ST users will benefit from the applications and tutorials in each book. And as always, the books are written in COMPUTE!'s clear, understandable style.

COMPUTE!'s ST Applications
Brian Flynn and John J. Flynn
$16.95 ISBN 0-87455-067-X
An excellent assortment of games and applications for business and home, written in BASIC. *COMPUTE!'s ST Applications* is an instant library of programs that every ST owner will want to have. All programs have been fully tested and are ready to type in and use on the Atari 520 or 1040 ST. *There is also an optional disk available for $15.95 which includes the programs in the book.*

COMPUTE!'s ST Artist
Selby Bateman and Lee Noel, Jr.
$16.95 ISBN 0-87455-070-X
A step-by-step guide to creating dazzling graphics and art on the Atari ST personal computer. Using *NEOchrome* and *DEGAS**, this book shows you how to get the most out of these excellent painting and drawing programs. Tips and techniques provide you with the most efficient ways of creating graphics and demonstrate how to produce colorful art. Examples illustrate each step and show off all the visual power of the Atari ST and its graphics software. Information is included on the newest versions of *NEOchrome* and *DEGAS Elite*. *There is an optional companion disk available for $15.95 which includes artwork from the book.*

COMPUTE!'s ST Applications Guide: Programming in C
Simon Field, Kathleen Mandis, and Dave Myers
$18.95 ISBN 0-87455-078-5
COMPUTE!'s ST Applications Guide: Programming in C is your complete tutorial to designing and writing effective ST application programs. Practical examples show you how to use GEM routines to develop professional-looking applications of your own. Explore topics such as disk files, menus, icons, the mouse, sliders, dialog boxes, programming desk accessories, music, and much more. For intermediate to advanced C programmers.

The Elementary Atari ST
William B. Sanders
$16.95 ISBN 0-87455-024-6
A clear, easy-to-use guide to the Atari ST, this book takes you through everything from connecting your computer, loading programs, and creating graphics and music, to writing your own programs.

* A product of Batteries Included.

Order your Atari ST book today. Call toll-free 800-346-6767 (in NY 212-887-8525), or write COMPUTE! Books, P.O. Box 5038, F.D.R. Station, New York, NY 10150.

NC residents add 5 percent sales tax and NY residents add 8.25 percent sales tax.
Shipping and handling: $2.00 U.S. and surface mail; $5.00 airmail.
Please allow 4–6 weeks for delivery.

COMPUTE! Publications, Inc.
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies

COMPUTE! books are available in Canada from McGraw-Hill, Ryerson Ltd., 330 Progress Ave., Scarborough, Ontario, Canada M1P 2Z5.

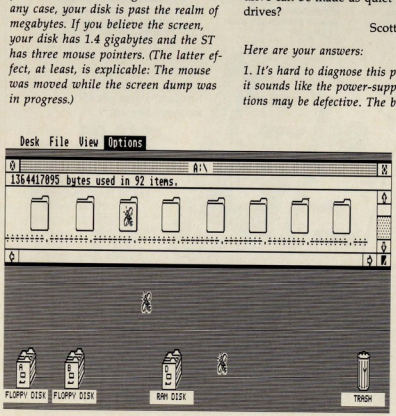
Do you have an ST-related question or problem? Have you discovered something that could help other ST users? We want to hear from you. Write to ST Feedback,* COMPUTE!'s Atari ST Disk & Magazine, *P.O. Box 5406, Greensboro, NC 27403.

A Gigabyte On A Floppy

Attached is a screen dump from one of my latest sessions with the Atari 520ST. Something apparently went wrong with the disk drive. I'm not looking for the reason it happened; I figured it was gremlins or digital voodoo. After rebooting and reformatting, the disk worked fine.

Dan Kurilla

Things like this happen, especially if you're experimenting with writing directly to disk sectors. Strange directories can be caused by overwriting the directory sectors or the file allocation table. Sometimes it's just a computer crash; if you reboot, the disk might be OK. In any case, your disk is past the realm of megabytes. If you believe the screen, your disk has 1.4 gigabytes and the ST has three mouse pointers. (The latter effect, at least, is explicable: The mouse was moved while the screen dump was in progress.)



A Cluster Of Questions

I have several questions I would like to ask:

1. I am having a problem when I reset my computer; the screen becomes blurred and distorted. After fiddling with the power supply connections and resetting several times, the problem goes away. What is causing this problem?

2. Can the 520ST be upgraded to one megabyte without additional boards?

3. Was most of the GEM environment written in C?

4. I've heard a lot of talk about switching between resolutions on a color monitor without going to Set Preferences. Can this be done? How does *The Pawn*'s combination of resolutions work?

5. Is the new ST BASIC going to cost us? If so, how much?

6. Is there any way the old SF354 drive can be made as quiet as the new drives?

Scott Johnstone

Here are your answers:

1. It's hard to diagnose this problem, but it sounds like the power-supply connections may be defective. The best way to isolate a problem of this type is to find someone else with an ST (such as your local dealer) and try substituting various components one at a time—the power supply, the computer, and the monitor. The only other possibility we can think of is that the external power supply or line cord is too close to the monitor, which could distort the video image.

2. It's not possible to upgrade a 520ST to one megabyte of random access memory (RAM) without adding an extra memory board. In other words, it's not as simple as inserting a cartridge or plugging RAM chips into vacant sockets. An additional board must be piggybacked onto the existing motherboard (main circuit board). This requires some tricky soldering and is best left to a qualified technician.

3. Most of GEM was indeed written in the C programming language. When Atari transferred the operating system to ROM (Read Only Memory) in late 1985, parts were rewritten in 68000 machine language to improve performance and reduce code size. The entire operating system had to fit into 192K of ROM, and word is that this was accomplished with only a few bytes to spare.

4. It is possible to switch between the color screen modes under program control without selecting Set Preferences from GEM's Options menu. A typical example is NEOchrome, *which always forces the ST into the low-resolution mode, even when run from medium resolution. When you exit* NEOchrome, *it returns you to the mode from which it was run. It's also possible for a program to display more than one mode on the screen at once, as you've noticed in Firebird's* The Pawn, *a graphics adventure game that uses the low- and medium-resolution modes simultaneously. This requires a programming trick called a* raster-scan interrupt. *When the electron beam inside the monitor's cathode ray tube reaches a certain point on the screen, the program tells it to switch to the different resolution.* NEOchrome *uses a similar trick to display more than the usual number of simultaneous colors*

The rumor is not true...
Electronic Arts supports Atari ST!

SKYFOX
Fast selling flight simulator-combat game. High speed animation, see enemy jets in sharp detail. Rave reviews.

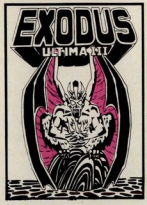
CHESSMASTER 2000
The most powerful chess program in home computing. 12 levels of play, 100 classic game library.

FINANCIAL COOKBOOK
Answers all your home finance questions; saves you time and money. A must for personal bookkeeping.

GOLDEN OLDIES
Adventure...Eliza...Life...Pong. Have fun playing the classics in their original, uncut, endorsed versions.

ORGE
All-out war against an incredible fighting machine on the nuclear battlefields of tomorrow. Full color graphics.

AUTODUEL
Fantasy role-playing with cars and car combat instead of dragons and dungeons. Action packed towns and freeways.



ULTIMA III EXODUS
A smash best seller...the epic fantasy role-playing masterpiece. Advanced color visuals throughout. New strategies.

THE NEW TECHNOLOGY COLORING BOOK

by The Software Toolworks

THE NEW TECHNOLOGY COLORING BOOK
The first color-by-number system designed for a computer paint program. 27 futuristic topics, all ages.

If you can't find these Electronic Arts products at your dealer, call your CSS sales rep and we'll give you the name of a dealer in your area.

Don't miss a sale!

We carry 13,000 titles so you don't have to. Let your customers browse through the retail catalogue, sell it to them, let them decide what additional items they want. Take the order and if you don't have it in stock we'll ship it to you. It's that extra service that keeps your customers.

Be sure to get your catalogue. 13,000 titles, hardware and computer accessories for:

$19.95

We'll send you business.
CSS is selling its $19.95 retail catalogue through ads in national magazines. When customers call in to find out where to buy we send them to dealers in your area. Become one of our dealers and we'll send you the business.

CSS COMPUTER SOFTWARE SERVICE

WE'VE GOT ***THE MOVERS***
495-A Busse Road • Elk Grove Village, IL 60007
(312) 439-4444 • Toll Free: 1-800-422-4912
In Illinois: 1-800-331-SOFT

in its palette box. (Normally, only 16 colors can be displayed at once in low resolution.) Raster-scan interrupts are also used on the Commodore 64 to display more than the usual number of colors or sprites. You'll also find a similar technique—called display list interrupts*—on the eight-bit Atari computers.*

5. The revised version of ST BASIC was expected to be available by September 1986, but at this writing (late October) it has been delayed again. At this point, Atari hasn't announced its upgrade policy for the new BASIC, but we hear rumors it may cost around $20.

6. Among the several drives we use, we haven't noticed much variation in noise level, except that the 1040ST's internal double-sided drive is somewhat noisier than the external drives. (This could be due to resonance within the computer's case.) Atari apparently did switch suppliers for its floppy drives sometime in the first half of 1986, though, because earlier drives had a somewhat small disk-eject button and later drives have an eject button that is about half the width of the drive slot (as seen on the 1040ST). The earlier drives were manufactured by a U.S. company (Tandon), and the current drives are made somewhere in the Far East, according to information in the public stock prospectus released by the Atari Corporation in September. In any event, we haven't noticed any difference in performance among any of the drives. If your drive is unusually noisy, it's possible that a technician could quiet it down by lubricating the head rails.

Windows And Page Breaks

The following ST BASIC command works, although it's not documented in the manual:

OPENW *WN,PX,PY,VX,VY*

where *WN* is the window number (0–3), *PX* and *PY* define the top left corner of the window, and *VX* and *VY* are the bottom right corner.

Also, I've found a trick to prevent *1ST Word* from advancing an extra page at the end of printing. First, put a hard page break at the end of your document (press F7 or click on the bar with the page numbers). Remember how many pages your document contains. When you print it, click on the box that says the last page is 999 and change it to the number of pages you want to print.

Alain Dussault

Thanks for the tips. Your discovery about OPENW could be used in a short program that moves the windows around the screen. After loading BASIC, just run the configuration program; the windows will take the size and shape you've chosen.

Four-Meg Floppy

I would like to inquire about the new four-megabyte 3½-inch disk drive for the ST. When will it be released and at what cost?

Geoff Langdon

We haven't heard anything about a four-megabyte floppy drive for the ST. It's unlikely that Atari is preparing to release one, because Atari buys its drives from independent suppliers and no microfloppy drives currently available can squeeze that much data on a single disk. The technology for that kind of storage density is still experimental, though not unheard-of.

There are plans, however, for a new four-megabyte ST computer. At a trade show in London last fall, Atari exhibited versions of the ST with two and four megabytes of RAM. These should be released in the U.S. in late 1986 or early 1987.

If you need more disk storage than is available with the existing floppy drives, you might consider a hard disk drive. Hard drives are available from Atari and other manufacturers with capacities of 10, 20, 30, 40, and even 60 megabytes.

Highlighted Lines

When I'm using the *1ST Word* word processor, the fluorescent yellow background for cut-and-paste operations sometimes turns red. Although this doesn't seem to affect the program's performance, I would like to know what is causing this. Is there a problem developing with my computer?

Ronald R. Weldin

There's nothing to worry about. The highlighting color sometimes metamorphoses from yellow to red. There is, though, a reason for it. In medium-resolution mode, four colors are available. The default colors when you first enter medium res are black, white, red, and green. 1ST Word *changes the four colors to black, white, yellow, and green. Yellow replaces the usual red.*

If you happen to boot the system with a disk containing the CONTRO-L.ACC accessory, the Control Panel will be available in the far-left menu under the Atari logo. If you open the Control Panel while working on a 1ST Word *file, the accessory remembers that the four default colors are black, white, red, and green, and resets them. Thus, even if you don't change anything, merely opening the Control Panel changes yellow to red. To return to yellow, open the Control Panel again, click on the red color box, and move the R and G slide controls all the way to the top.*

Copying Between *1ST Word* Files

The ST is my first computer. I've already gotten a lot of use from *1ST Word*, but really haven't taken advantage of all its features. I know I should be able to edit from one document to another, but I'm unable to figure it out and it apparently wasn't important enough to be explained in the documentation.

Can you help me out? Assume I don't know anything and you won't be far off.

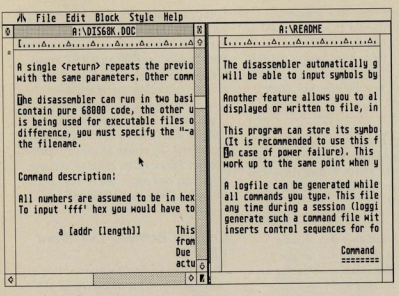
Zane Smith

To copy text from one document to another, it's necessary to have both documents opened at once in separate windows on the screen. This requires only a few simple steps.

To begin, run 1ST Word *and load the first document into memory as usual. Next, drop down the File menu and select Open. You'll see the standard file selector that lists the available* 1ST Word *files on the disk in the drive. Pick the second document and load it, just as you loaded the first one.*

At this point you should see two text windows on the screen, each with a different document. (Actually, it's possible to have the same document in both windows by loading it twice, but you'll probably have no reason to do this.) You can switch between the two documents by clicking once anywhere within the inactive window, just as you can switch between directory windows on the GEM desktop. If the inactive window is hidden behind the active window, use the sizer in the lower right-hand corner to change the dimensions of the window, or click and drag the title bar of the visible window to a position where the second window can be seen. (See the accompanying figure.)

Now you're ready to copy some text from one document to another. The section you want to copy is called a block,



and you have to define and cut it before you can copy. One way to define a block of text is to position the cursor at the start of the block, drop down the Block menu, and select the Start Block option. Then move the cursor one character past the end of the block you want to copy, drop down the Block menu again, and select End Block. If you're using a color monitor, the defined block should change color. On a monochrome monitor, the defined block is marked by a shaded background.

A faster way to define a block is to bypass the menus altogether. Using the mouse, position the cursor at the desired starting position; then click and hold the left mouse button. While holding down the button, drag the mouse to the line that marks the end of the block. A pointing hand and dotted-line "lasso" indicate the area you're defining. (See figure below.) When you release the mouse button, the area is defined. You can define parts of lines or groups of lines this way, but for odd-shaped blocks you'll have to use the previous method.

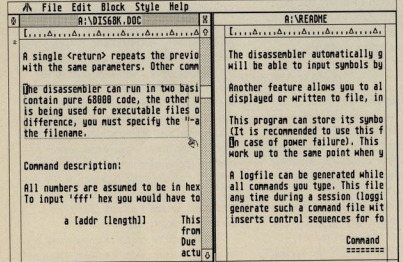
If you make a mistake while defining a block, drop down the Block menu and select Hide Block. This undefines the text.

Once you've defined a block of text, the next step is to cut it. Drop down the Block menu and select Cut Block. This does not remove the defined text from the screen; instead, it copies the block into a buffer (a temporary holding area in memory). An alert box will inform you that the block has been copied into the buffer.

Now move to the other document and position the cursor where you want to insert the block of text. Drop down the Block menu once again and select Paste Block. This copies the text from the buffer into the other document.

If you want to remove a block of text from a document after defining it, drop down the Block menu and select Delete Block.

An annoying quirk of 1ST Word's *cut-and-paste operation is that special type styles such as boldface, italics, lightface, and underlining are changed to roman (normal text) when the block is copied. You can change the text back to a special type style by defining the desired block, selecting the style you want with the Style menu or function keys, and then selecting Restyle from the Style menu.*



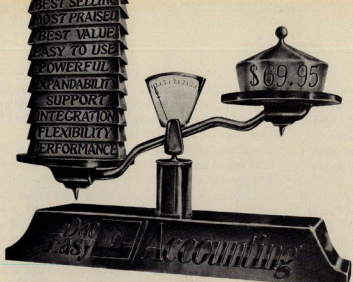
Are Mice Nice?

We have owned a 520ST for approximately one year. After trying various word processing programs and reading many articles, comparison charts, and ads in your magazine for word processing programs, we have the following comments as to the nature and quality of the programs now available for our machine.

Our primary question is: What makes the mouse/GEM system so great that it is used in the majority of ST programs? We purchased our ST primarily for word processing, and we have discovered that using a mouse is Mickey Mouse. Having tried six programs, and having looked at two others, our conclusion is that the software companies must think that the average ST user wants a word processing program for letters home to Mom or book reports for school. A truly professional word processing program should be written for the serious writer; the user's hands should remain on the keyboard at all times. For instance, in order to use the underlining feature in a mouse-driven program we tried, we had to go through the following steps:

1. Stop typing.
2. Find the mouse.
3. Locate the arrow on the screen and move it to the drop-down menu (and hope the right one is triggered).
4. Click the appropriate choice.
5. Follow the instructions in the box.
6. Move the mouse to the appropriate selection in the box and click the choice.
7. Return to typing (if everything was done right).

And those were the steps necessary just to *begin* underlining. To end underlining, the steps need to be repeated! One or two keystrokes could easily replace these steps.



Perfect Balance

Now the scales are in your favor. Dac-Easy Accounting gives you the best price plus tremendous performance. That means value, and the experts agree. Dac-Easy Accounting was recognized by *InfoWorld* as 1985's overall "BEST SOFTWARE VALUE."

No other accounting package can match the explosive user base or the unanimous acclaim from industry experts. Dac is the perfect choice for your first accounting system or for upgrading from a single module system. Either way compare, and you will join over 150,000 people who have computerized with Dac-Easy.

PERFORMANCE

Accurate information when you need it is what performance is all about. Fast, flexible reports give you what you need to know to manage cash-flow, turn inventory and increase profits . . . Listen to the skeptics-turned-believers.

"Dac-Easy Accounting is so inexpensive . . . we were skeptical . . . We expected to find a program that couldn't compete on a feature-by-feature basis . . . We were wrong."
InfoWorld, 1985

EXPANDABILITY

You never have to worry about outgrowing the Dac-Easy Series which offers Atari software products, support, and ten different business forms. All of our products are top performers offered at amazing prices.

Dac-Easy Payroll is designed to solve all your personnel and payroll management problems, outperforming systems costing thousands more. And it can either stand alone or integrate perfectly with Dac-Easy Accounting to form a comprehensive business management program.

Also available are Dac-Easy Forms and Fast Forms which offer the finest selection in continuous, multi-part forms and checks.

FLEXIBILITY

Dac offers the rare ability to handle either service or product-oriented companies without sacrificing features.

"Dac-Easy Accounting is everything its designers say it is . . . It is also flexible enough to fulfill the accounting needs of almost any type of business."
Journal of Financial Computing, 1985

SUPPORT

Subscribe to our toll free support agreement and join the best support program in the industry. Our friendly 12 person support staff are trained to answer your accounting and technical questions. No excuses, and no delays.

Find out for yourself why Dac-Easy is the fastest selling accounting package in history. Call us today!

FEATURES

General Ledger
- Unlimited multi-level accounts with screen inquiry for three years
- Pencil and pen correction option
- Automatic budgeting by department
- Unlimited journals and departments
- Excellent audit trail and flexible financial statements

Accounts Receivable
- Open invoice or balance forward per customer for unlimited number of customers
- Multi-sorted mailing labels
- Statements and invoices support automatic finance charges and special comments
- Detailed history for three years for number of invoices, sales, cost, and profits
- Customized aging report
- Automatic sales forecasting

Accounts Payable
- Checks handle multiple invoices, unlimited allocations and cash available protection
- Multi-sorted vendor labels and directories
- Customized aging report
- Automatic forecasting of purchases

Inventory
- Average, last purchase, and standard costing
- Physical inventory with perpetual comparisons
- Accepts fractional measure such as dozens
- Automatic forecasting of product needs
- Automatic forecast of product sales
- Detailed three-year history for every product
- Automatic pricing, alert and activity reports
- Screen inquiry for on-hand/on-order/sales/cost/profit/turns/GROI/etc.

Purchase Order
- Inventory and non-inventory items
- Allows up to 99 lines
- Per line discount in %
- Accepts generic deductions
- Accepts back orders and returns
- Purchase journal

Billing
- Service or Inventory invoicing on plain or pre-printed forms with remarks
- Prints sales journal
- Allows return credit memo

Forecasting
Unique program that automatically forecasts using your three-year history:
- Revenue and expense accounts
- Vendor purchases
- Customer sales, cost and profit
- Inventory item usage
- Four different forecasting methods

OVER 80 ROUTINES AND 300 REPORTS

INTEGRATION

Dac-Easy's seven modules work together perfectly. Enter data once and it's posted to the other modules automatically. Also, most modules can be used stand-alone.

ALSO AVAILABLE FOR IBM & APPLE II

Dac-Easy Accounting is also available for the Apple II series. On the IBM compatible machines we have seven software products including Dac-Easy Accounting, Dac-Easy Payroll, Dac-Easy Word II, Dac-Easy Mate, Dac-Easy Port, Dac-Easy Accounting Tutor, and Dac-Easy Payroll Tutor.

Minimum hardware requirements
Atari 520 ST or 1040 ST, one double-sided disk drive, 132 column printer in compressed mode. The Atari 520 ST must have the upgraded memory or the TOS in ROM chips installed in the system.

Dac Easy Accounting

Now Available for the Atari ST Series

TO ORDER CALL TOLL FREE
1-800-992-7779
Ask for Operator #427
IN TEXAS CALL
1-214-458-0038
or mail the order form below.

Mail to:
dac software, inc.
4801 Spring Valley Rd
Bldg. 110-B
Dallas, TX 75244

Yes, please rush me the following Dac products:

Product	Qty.	Price	Total
Dac-Easy Accounting	___	69.95	___
Dac-Easy Payroll	___	49.95	___
Add Shipping Charge			7.50
Texas Residents Add Sales Tax (6¼%)			
		TOTAL	

☐ Check ☐ Money Order
☐ AMEX ☐ VISA ☐ MASTERCARD

Account # _____
Expires _____
Signature _____
Name _____
Company _____
Address _____
City _____
St. _____ Zip _____
Phone _____
Type of Business _____
No. of Employees _____

30 Day Money-Back Guarantee
Dac Software offers an unconditional guarantee on all Dac-Easy products (less shipping charges). There is a $10 restocking fee if the disk seal is broken. This guarantee is available on all products bought directly from Dac Software.

#427

Word Count Fix

Editor's Note: As mentioned in our last issue, some readers experienced problems with the "Word Count" desk accessory published in the October 1986 issue of COMPUTE!'s Atari ST Disk & Magazine. *Word Count wouldn't work unless installed as the first (or the only) item on the Desk menu. As promised, we're now providing a fix for the problem.*

This issue's disk includes a new version of Word Count which was linked using updated Personal Pascal *libraries provided by Optimized Systems Software. These new libraries correct problems related to setting up and maintaining desk accessories that existed in the previous versions of the libraries.*

You'll find the revised Word Count on disk under the filename WRDCOUNT.AC. To install it as a desk accessory, it must be copied to your startup disk and renamed to WRDCOUNT.ACC. See the original article in the October 1986 issue for additional details.

According to OSS, the updated libraries will be made available to registered Personal Pascal *owners as part of a $10 upgrade. OSS points out, however, that the upgrade is of use only to programmers who are writing desk accessories. Because a major revision of* Personal Pascal *is in the offing, OSS suggests that most programmers will want to wait until that time to avoid paying for two upgrades. When the new release is ready, all registered* Personal Pascal *owners will be notified by mail regarding upgrade availability, procedures, and fees.*

Encryptor Update

Editor's Note: The October 1986 issue of COMPUTE!'s Atari ST Disk & Magazine *included an article and program entitled "Encryptor." If you want to protect a file for security reasons, Encryptor lets you encode it so that only someone who knows the password you selected can decode and read the file.*

Encryptor works correctly when ASCII files are encrypted and decrypted, but it does not correctly handle nontext files such as pictures or programs. Some readers attempted to encrypt such files and discovered that sometimes the files could not be decrypted.

If you aren't interested in C programming and don't have a C compiler, you can skip the following explanation and simply use the modified version of the program on this month's disk. You'll find it under the filename NEWCRYPT.TOS. As a bonus, it is much smaller than the original version. If you have any files encrypted with the original version, they will have to be decrypted with that version; the new program cannot properly decode them. Also, the new Encryptor cannot recover parts of nontext files which were scrambled by the earlier version.

The problem is twofold, but was relatively easy to fix once discovered. The first problem in the original version of Encryptor arises from a feature of the Megamax C *language in which the program was compiled. Atari text files use two characters between lines, a carriage return (character 13) and a linefeed (character 10). The C language traditionally separates lines with a linefeed only. When a file containing a 13 plus a 10 is read into memory, the 13 is discarded. When a 10 is written to disk, it's expanded to a carriage return plus a linefeed. The trouble starts when a file to be encoded contains a 13 and 10 or a plain 10. In both cases, it's treated as a single 10. When the file is later decrypted, a 13 and 10 are written back to disk. In some cases, this is correct. In others, the 13 is spurious.*

The solution is to open the file for binary reading and writing, which turns off the translation feature of Megamax C. *In the following lines from the source code, the letter* b *has been added to the fopen() functions:*

```
file_ptr1 = fopen ( filename, "br" );
file_ptr2 = fopen ( "qqqq", "bw" );
```

A second, more serious problem is caused by the way the original file is read. The encryption routine occurs within a while() loop which continues reading through the file until an end-of-file (EOF) character is found. Unfortunately, a program or data file may contain an EOF character before the actual end of the file. Thus, the encryption routine ends before the whole file is encoded and the last part of the file is lost.

The solution is for the encryption program to read the size of the file and then use the length within a for() loop, insuring that all bytes are read and translated. To fix the source code, declare two variables and an array at the beginning of main():

```
int  dtabuff[22];
long length, l;
```

Next, add the following lines after the prompts for the filename and password (after the second scanf()). They initialize the variable called length *to the size of the file.*

```
Fsetdta( dtabuff );
Fsfirst ( filename, 0 );
length = *(long *)(dtabuff+13);
```

Finally, remove the while() and replace it with a for() loop. Note that the fgetc() function has been moved inside the braces.

```
/* while ( ( c = fgetc ( file_ptr1 ) ) !=
EOF ) */
for (l=0;l<length;l++)
{
c = fgetc (file_ptr1);
```

In addition to these changes, we reduced the size of Encryptor by recompiling it with Cconws(), Cconrs(), and Cconin() in place of the original printf(), scanf(), and getchar(). This conserves disk space and allows the program to load faster.

Other unnecessary and bothersome features in most word processors are the windows and icons. Why should we lose 25 percent (and sometimes more) of the edit screen to a border and some icons that, for the most part, do nothing more than get in the way? It seems that in the process of making things simple to use, as in GEM and the mouse system, we end up wasting more time than we save. There should be some balance between reason and the ease of use that allows for the greatest productivity with a reasonable investment in time to learn the system.

The type of word processor that would make us very happy is one that ignores GEM and kills the mouse. We would like to see full-screen editing without cute little windows using up one-third of the screen. We wouldn't mind taking the time to learn key commands from a well-written manual with a quick reference section. When this happens, if ever, we will be one of the first in line with cash in hand.

Ed and June Wysocki

The graphics-oriented user interface and all it entails—including the mouse controller, windows, icons, and menus—have been controversial since their debut in the word of personal computing four years ago with Apple's Lisa, and later, the Macintosh. The main arguments in favor of this approach are that it's easier to learn, easier to remember, faster to use, and uniform across different applications. The main arguments against it are that it's clumsier to use, slower, and consumes more computer memory and processing speed. There is validity to both arguments.

For someone who uses a computer for a certain application almost every day, it is faster to simply type a keyboard command rather than to drop down a menu and make a selection. On the other hand, there are those who use a computer or a certain program much less frequently, and for them it may be easier to select an option from a menu rather than try to remember which series of keystrokes invokes the command.

Ideally, an application program should provide both menus and keyboard commands. Some word processors on the ST do a fairly good job of this. For example, 1ST Word, *which is included with every ST system, allows you to switch underlining on or off in two ways. You can either drop down the Style menu and choose the Underlining option, or you can simply press the F2 key. There are similar keyboard equivalents for italics, boldface, lightface, insert mode, deleting lines, centering, indenting, paragraph reformatting, and so on. Although there are no keyboard commands for such actions as search-and-replace, this isn't something that's used very often, and it would be difficult to invent meaningful keyboard sequences for all of the options offered by* 1ST Word*'s search-and-replace menu—forward or backward searching, case matching, and single, partial, or global searching.*

Your comments about window borders wasting screen space are a little puzzling, because we're not familiar with any word processors for the ST that consume one-quarter of the screen with such borders. Also, we're not aware of any ST word processors that display icons on the screen—unless you're talking about the function-key reminders in 1ST Word, *which are easily hidden by clicking on the full-screen button.*

Several full-screen text editors are available for the ST. The most comprehensive that we've seen is Let's Write *from Mark Williams Company, 1430 W. Wrightwood, Chicago, IL. The retail price is $79.95. The heart of this package is the MicroEMACS editor, which originally was developed for the IBM PC. This editor has none of the GEM-based features normally found in text editors for the ST, but is the most powerful package available, if you're willing to spend the time required to learn the necessary keystrokes. However, as a spokesman at Mark Williams stated, "This is not a package for writing a letter home to Mother."*

At any rate, your experience reinforces one theory about how to approach the purchase of a personal computer. If you have one important application in mind—such as word processing—and you have definite ideas about how that application program should work, it may be advisable to shop for the appropriate software first, then buy whatever computer it runs on. If you strongly object to using a mouse, menus, icons, and windows, you may be happier with, say, an IBM PC or compatible. There are a quite a few very powerful word processors available for inexpensive IBM compatibles that rely exclusively on keyboard commands. Alternatively, you can wait until Atari introduces its promised IBM emulator, which may run the software you desire.

ST

GOOD STUFF!

Free Shipping! • Newsletter • Free Order Line • Quick Service • Full Warranty

"Power without the Price!"™ Atari brought you the hardware. We present the software! All available now! With each order we include a copy of our monthly newsletter, and catalog with scores of products for your ST, all at low-low discount prices. We want to be your source for ST information, software and accessories!

Diskette Prices:
1-4 — $8.95 each
5-9 — $7.95 each
10-18 — $6.95 each
19+ — $6.50 each
These prices include free shipping!!!

ST01♦ Forth Language, public domain Forth 83 with example files and utilities.
ST02♦ 68000 Assembler. Create your files with the powerful EMACS editor, also on this disk. Includes example programs.
ST03♦ Pictures & Music. Pictures in NEOCHROME format and music to use with Music Studio.
ST04♦ A handy collection of desktop accessories, including a very powerful scientific calculator, calendar, a puzzle, ramdisk, file editor and more.
ST05♦ A super terminal package allows you to communicate with Compuserve, our bulletin board, or hundreds of others. Full upload & download capabilities. Easy to use!
ST06♦ Games I. A half dozen good games ready to play. Very nice!
ST07♦ Financial Disk. Many financial functions including printing amortization, interest calculations over 30 functions in all! A SUPER VALUE!!!
ST08♦ ST-Slideshow, Full TI-59 Programmable Calculator, and some Utilities.
ST09♦ Backgammon game, RAMdisk, Yahtzee, Mastermind & Picture file Utilities.
ST10♦ A disk full of pictures in the DEGAS, Neochrome & MacPaint format.
ST11♦ Deluxe Piano, NEO editor, Disk Format Utilities (allows more info in disks), A command processor (Get out of GEM and into CPM 68K)
ST12♦ Disk Cataloging systems. A database for keeping track of your disks.
ST13♦ Slideshow – 26 different graphics pictures with music to run as a demonstration. Good to show off your ST.
ST14♦ LOGO programs, 30 LOGO programs to run and study, a real help in learning LOGO.
ST15♦ C files, a number of C programs including source code to study and learn from. Learn C!
ST16♦ XLISP, learn this exciting language of artificial intelligence. Includes language, documentation files, and 11 sample programs.
ST17♦ Picture Slideshow with a number of girly pictures. Tastefully done but fun!

COMMSPEC — 300/1200 Baud Hayes compatible external modem with a 1 yr warranty. Includes correct cable and complete communications software. Includes FREE access to our bulletin board with 100's of free programs, yours for the taking! $129.95

dmMAN – dBASE III™ for the ST! Imagine the power! Over 90 commands, 100 functions, 10 databases and 90% compatible with dBASE III™. Ashton Tate charges $695 for the IBM, ours is only $125.00

CALL OUR ST BULLETIN BOARD!!!
(517) 628-2943 6pm-8am EST

COMPUTER SOLUTIONS
P.O. BOX 354
MASON, MICHIGAN 48854
1-800-874-9375 ORDERS ONLY!
1-517-628-2943 MI AND INFO

MollyScope:
A Graphics Demo

Philip I. Nelson, Assistant Editor
Tim Victor, Editorial Programmer

Just for fun, here's an entertaining demonstration program that creates an infinite variety of twisting shapes, colors, and patterns. It runs on any ST in any screen resolution, but looks best in the 16-color mode.

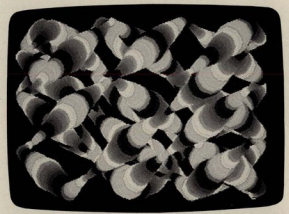
Who says computing always has to be practical? Sometimes it's fun to load up a game or even a graphics demo that turns the machine into the high-tech equivalent of a lava lamp. That's why, one afternoon, we wrote "MollyScope"—as a programming exercise, true, but also just for fun.

MollyScope was partly inspired by two popular graphics demos on the Commodore Amiga: the *Molly* program on the original dealer demo disk, and Electronic Arts' *Polyscope* program that is included with every Amiga. MollyScope was a quick project that's not as extensive as these two programs, but it does create somewhat similar patterns.

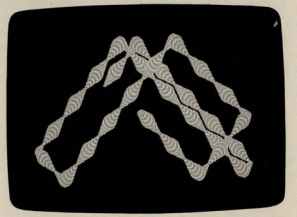
You'll find two files on the magazine disk for MollyScope. MOLLY.PRG is the executable program file, and MOLLY.C is the C source code. If you're a programmer, you might find the source code interesting; it's liberally commented. As written, the source file compiles and links with either *Alcyon C* or *Megamax C*; it may require slight modifications with other compilers.

To run MollyScope, simply set your system to the desired screen resolution and execute MOLLY.PRG. The program checks the screen mode and adjusts itself accordingly. It works best in low resolution because 16 colors can be displayed simultaneously. In medium resolution it displays 4 colors, and in high resolution it substitutes fill patterns for colors. (See the accompanying figures.)

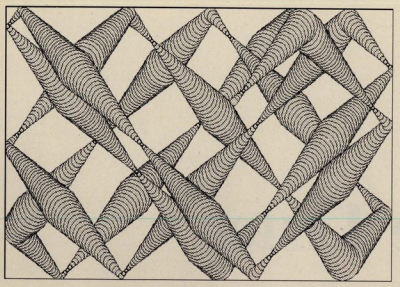
Pressing the space bar clears the screen and starts a new cycle from a random location. Each restart also randomly selects a new direction and increment value. The increment determines the amount of space between each new circle. When this value is small, the shape is rotund and slow-moving; when the increment is larger, the shape speeds up and becomes elongated. Since color cycling produces no visible effect on the hi-res monochrome screen, the program changes fill patterns as a substitute. Each time you press the space bar, the program selects the next pattern in a series of over 20 system patterns.



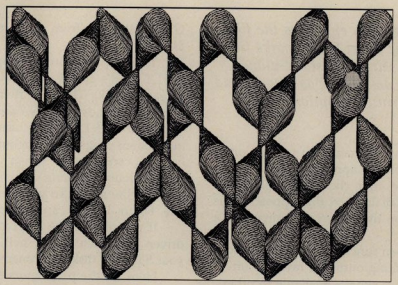
"MollyScope" looks best when taking advantage of the low-resolution mode's 16 simultaneous colors.



In medium resolution, "MollyScope" displays its twisting, flowing shapes in four colors.

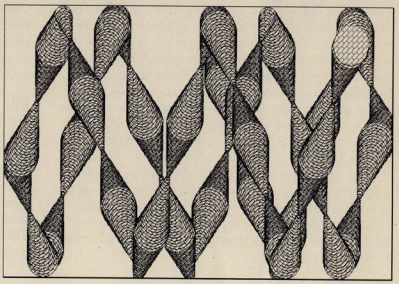


In high resolution, monochrome fill patterns are substituted for colors, as seen in these three screen snapshots.



To terminate MollyScope and return to the GEM desktop, press the Return key.

In lo-res mode, particularly, MollyScope looks as if it must be a complicated program. But in fact, it's quite simple. Though the entire screen seems to be moving and flowing, only the leading edge of the shape is being redrawn. The program simply draws a series of filled circles, one at a time. If you look closely, it's obvious that previously drawn shapes never change in shape—only in color. The flowing effect is created by shifting the color palette in just the right way to create the illusion of forward movement.



File Lister

Richard Smereka

Here's a utility that greatly enhances the file-listing functions of the Atari ST. It works in any screen mode and runs as a stand-alone program on the GEM desktop or as a command with "ST-Shell." A printer is optional but recommended.

Normally when you want to examine a text file on the Atari ST, you click on the appropriate icon or filename with the mouse, then click on the Show or Print buttons inside the dialog box that appears. This either displays the file on the screen or dumps it to a printer.

Although this built-in function is sufficient for most purposes, the resulting output is raw and unformatted. A quick look at what's available in other operating systems reveals that there's plenty of room for improvement. That's the reason behind "File Lister," an enhanced file-viewing utility. It adds several extra features to control the appearance of the final output. The program runs on any ST in any screen mode, but for obvious reasons works best in the 80-column modes (medium-resolution color and high-resolution monochrome). It can be used as a stand-alone application from the GEM desktop, or as a command with a command-driven disk operating system such as "ST-Shell" (*COMPUTE!'s Atari ST Disk & Magazine*, December 1986).

To generate hardcopy with File Lister, you'll also need a compatible printer. File Lister requires no special printer driver to control the printed listing, but the printer must be capable of interpreting the form-feed character (character code $0C) to advance to the next page.

Preparing File Lister

There are two different ways to install File Lister, depending on whether you plan to use it from the GEM desktop or from a command-line interface such as ST-Shell.

To use it from the desktop, name the file LIST.TTP (it's already stored in this form on the magazine disk). The .TTP filename extension is important. It stands for *TOS Takes Parameters*, which signals to the ST that File Lister is a Tramiel Operating System program that requires certain parameters before it can function. When you run a TTP application by double-clicking on its icon, a dialog box pops open on the screen so you can enter these parameters. Figure 1 shows an example of this box.

If you plan to use File Lister from a command-driven DOS such as ST-Shell, copy LIST.TTP to your ST-Shell disk and rename it LIST.PRG.

Here are the parameters expected by File Lister:

[*options*] [*D:*][*pathname*\]*filename.ext*

The only parameter that's absolutely required is *filename.ext*—the name of the ASCII text file you wish to view or print. The parameters within brackets are optional and must be separated from each other by at least one space. (Do not type the brackets.) Let's take a look at what these parameters do.

File Lister Options

The most obvious parameters let you specify a disk drive and pathname. If the file you wish to examine is on another drive, substitute the drive identifier for *D:*. If the file is in a folder, enter the *pathname* between backslash characters. For example, if you're running File Lister from drive A and the file you want to view is called READ.ME in a folder called TEXTFILE on drive B, you enter:

B:\TEXTFILE\READ.ME

If you're not sure how to use pathnames, refer to the user's manual that came with your ST, or see the "Readers' Feedback" column in the December 1986 issue of *COMPUTE!'s Atari ST Disk & Magazine*.

Only NRI teaches you to service all computers as you build your own fully IBM-compatible microcomputer

NEW! Train with the newest Sanyo 880 Series Computer—it's fully IBM-compatible and runs almost twice as fast!

With computers firmly established in offices—and more and more new applications being developed for every facet of business—the demand for trained computer service technicians surges forward. The Department of Labor estimates that computer service jobs will actually *double* in the next ten years—a faster growth rate than for any other occupation.

Total systems training

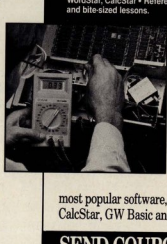
No computer stands alone... it's part of a total system. And if you want to learn to service and repair computers, you have to understand computer *systems*. Only NRI includes a powerful computer system as part of your training, centered around the new, fully IBM-compatible Sanyo 880 Series computer.

As part of your training, you'll build this highly rated, 16-bit, IBM-compatible computer system. You'll assemble Sanyo's "intelligent" keyboard, install the power supply and disk drive and interface the high-resolution monitor. The 880 Computer has two operating speeds: standard IBM speed of 4.77 MHz and a remarkable turbo speed of 8 MHz. It's confidence-building, real-world experience that includes training in programming, circuit design and peripheral maintenance.

No experience necessary—NRI builds it in

Even if you've never had any previous training in electronics, you can succeed with NRI training. You'll start with the basics, then rapidly build on them to master such concepts as digital logic, microprocessor design, and computer memory. You'll build and test advanced electronic circuits using the exclusive NRI Discovery Lab®, professional digital multimeter, and logic probe. Like your computer, they're all yours to keep as part of your training. You even get some of the most popular software, including WordStar, CalcStar, GW Basic and MS DOS.

Your NRI total systems training includes all of this: NRI Discovery Lab® to design and modify circuits • Four-function digital multimeter with walk-you-through instruction on audio tape • Digital logic probe for visual examination of computer circuits • Sanyo 880 Series Computer with "intelligent" keyboard and 360K double-density, double-sided disk drive • High resolution monochrome monitor • 8K ROM, 256K RAM • Bundled software including GW BASIC, MS DOS, WordStar, CalcStar • Reference manuals, schematics, and bite-sized lessons.



NRI is the only technical school that trains you on a total computer system. You'll install and check keyboard, power supply, disk drive, and monitor, following step-by-step directions.

Send for 100-page free catalog

Send the coupon today for NRI's 100-page, full-color catalog, with all the facts about at-home computer training. Read detailed descriptions of each lesson, each experiment you perform. See each piece of hands-on equipment you'll work with and keep. And check out NRI training in other high-tech fields such as Robotics, Data Communications, TV/Audio/ Video Servicing, and more.

SEND COUPON TODAY FOR FREE NRI CATALOG!

NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue, NW, Washington, DC 20016

We'll give you tomorrow.

For Career courses approved under GI Bill ☐ check for details.

☑ **CHECK ONE FREE CATALOG ONLY**

- ☐ **Computer Electronics**
- ☐ TV/Audio/Video Servicing
- ☐ Satellite Electronics
- ☐ Robotics & Industrial Control
- ☐ Data Communications
- ☐ Industrial Electronics
- ☐ Communication Electronics
- ☐ Electronic Design Technology
- ☐ Telephone Servicing
- ☐ Digital Electronics Servicing
- ☐ Basic Electronics
- ☐ Electricians
- ☐ Appliance Servicing
- ☐ Small Engine Repair
- ☐ Air Conditioning, Heating, & Refrigeration
- ☐ Locksmithing & Electronic Security
- ☐ Building Construction
- ☐ Automotive Servicing
- ☐ Photography
- ☐ Bookkeeping & Accounting

Name (Please print) Age

Street

City/State/Zip

Accredited by the National Home Study Council

457-107

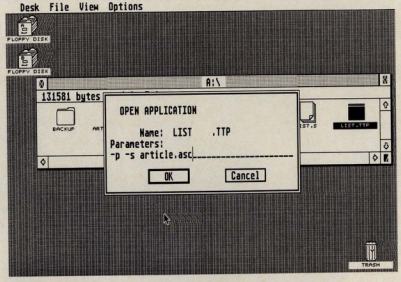


Figure 1: When run from the GEM desktop, "File Lister" opens up a dialog box so you can enter the filename and options.

To specify additional *options*, refer to the list below:

−p printer output (default: printer output off)
−n print line numbers (default: line numbers off)
−z pad line and page numbers with zeros (default: zeros on)
−s screen output (default: screen output on)
−w screen wait after 18 lines (default: wait on)
−f full printer format (default: printer format on)
−t TTP pause before returning to desktop (default: pause off)

You can use these options in any combination and in any order, as long as they're separated from each other by at least one space (except the drive identifier and pathname, which must be together with the filename). The options are like switches—by default they assume an automatic position, on or off. When included in the command line, their normal default state is reversed.

The options may be freely mixed, although some options depend on the state of others. For example, giving the *−f* option on the command line will have no effect unless the *−p* option is on because there is no sense in changing the printer format if no printer output is requested.

Detailed Examples

Following are some typical ways in which you might use File Lister. Remember to name the program LIST.TTP if you're running it from the GEM desktop, or LIST.PRG if you're running it from ST-Shell.

Desktop example: SAMPLE.TXT
ST-Shell example: LIST SAMPLE.TXT

This simply lists the text file SAMPLE.TXT to the screen, pausing every 18 lines for a keypress to continue scrolling.

Desktop example: −p SAMPLE.TXT
ST-Shell example: LIST −p SAMPLE.TXT

The *−p* option tells File Lister to send the text file to the printer *as well as* to the screen (the *−s* screen option is turned on by default). Note that normally the printer format option *−f* is also switched on, so you get the full printer format (we'll cover option *−f* in a moment).

If, for any reason, File Lister cannot properly communicate with the printer (for instance, if the printer is not powered up or online), you'll see the error message *Trouble Communicating With Printer* and the list request will be terminated.

Desktop example: −p −n SAMPLE.TXT
ST-Shell example: LIST −p −n SAMPLE.TXT

This example lists SAMPLE.TXT on the printer *and* prints line numbers at the beginning of each line of text. Among other things, this feature is useful when you're documenting or debugging source code. The line numbers range from 1 to 9999 and are padded with leading zeros (0001, 0002, and so on; see Figure 2).

Desktop example: −p −n −z SAMPLE.TXT
ST-Shell example: LIST −p −n −z SAMPLE.TXT

This command lists SAMPLE.TXT on the printer, prints line numbers at the beginning of each line of text, but turns off the extra zeros and pads the numbers with spaces instead.

Desktop example: −p −n −z −s SAMPLE.TXT
ST-Shell example: LIST −p −n −z −s SAMPLE.TXT

This lists SAMPLE.TXT on the printer with line numbers that are padded with spaces instead of zeros, but turns off screen output. Note that since screen output is normally on, the *−s* option turns it off when included in the command line.

Desktop example: −p −n −f SAMPLE.TXT
ST-Shell example: LIST −p −n −f SAMPLE.TXT

This lists SAMPLE.TXT on the printer and the screen with line numbers padded with zeros, but the

```
File Lister
File: MOLLY.C                                              Page 0001

0001
0002 /* MOLLY.C: Atari ST graphics demo for any resolution */
0003 /* by Tim Victor and Philip Nelson, October, 1986    */
0004
0005 #include <osbind.h>
0006
0007 int handle;
0008 int input[13],output[57];
0009 int intin[100],intout[100],ptsin[100],ptsout[100],contrl[12];
0010 int width,height,colors;
0011
0012 int xlate[] = {                    /* Translate VDI colors to hardware */
0013       0,2,3,6,
0014       4,7,5,8,
0015       9,10,11,14,
0016       12,15,13,1
0017       };
0018
0019 int pal[] = {                      /* Palette for color cycling        */
0020       0x700,0x720,0x750,0x770,
0021       0x370,0x070,0x072,0x075,
0022       0x077,0x037,0x007,0x207,
0023       0x507,0x707,0x703
0024       };
0025
0026 main()
0027 {
0028     int i,rez,style;
0029     int draw_tone,draw_color;
0030     int pal_phase,pal_tone;
0031     int pts[4],savepal[16];
0032     int xpos,ypos,rad;
0033     int xdir,ydir,rdir;
0034     int most = 28;
0035
0036     for (i=0;i<10;++i)
0037         input[i] = 1;
0038     input[10] = 2;
0039
0040     handle = 1;
0041     v_opnvwk(input,&handle,output); /* Open virtual workstation */
0042     v_hide_c(handle);               /* Hide mouse */
0043
0044     width = output[0];      /* Current workstation width */
0045     height = output[1];     /* Current height */
0046     colors = output[13]-1; /* Number of colors not counting backgrnd */
0047
0048     pts[0]=pts[1]=0;
0049     pts[2]=width;
0050     pts[3]=height;
0051     vs_clip(handle,1,pts);          /* Turn on clipping */
0052
0053     /* Save current color palette */
0054     for(i=0;i<16;++i) savepal[i] = Getcolor(i,-1);
0055
```

Figure 2: Here's a page of source code dumped to a printer with the line numbers and header provided by "File Lister."

−f option turns off the full printer format. The full printer format consists of 55 lines per page with a header at the top of each page consisting of the filename and page number. Since the full printer format is turned on by default, the *−f* option turns it off when included in the command line.

Desktop example: −w SAMPLE.TXT
ST-Shell example: LIST −w SAMPLE.TXT

This command lists SAMPLE.TXT on the screen *without* waiting for a keypress every 18 lines. In other words, the text scrolls by at full speed. This is useful when you want to quickly scan through a file. Note that if the *−s* option is off, *−w* has no effect.

You can also activate this option *after* you've started listing a file on the screen. Normally when File Lister displays a file, it pauses every 18 lines and prints this message: *A = Abort, N = No Wait, Any Other Key to Continue.* Pressing A aborts the listing and returns you to the GEM desktop or ST-Shell. Pressing N turns off the wait feature, and any other key resumes the listing.

Desktop example: −t SAMPLE.TXT
ST-Shell example: LIST −t SAMPLE.TXT

This makes File Lister pause after it has finished displaying a file; normally, it's useful only when you're running File Lister as a TTP application from the GEM desktop. If you don't include this option, File Lister exits to the desktop so quickly that you might not see any messages that are generated before it quits. The *−t* option forces a pause. If you're running File Lister from ST-Shell, this option is unnecessary because the text remains on the screen when the command prompt reappears.

File Lister Batch Files

If you're using File Lister with ST-Shell, you can set up a series of batch files in advance with your favorite listing options. Then, rather than typing in a long list of options on a command line, you can simply execute the appropriate batch file. Note that to take advantage of this you must have a copy of ST-Shell or another command-driven DOS with similar batch file capabilities.

For instance, you could have two main batch files: one to list a file to the screen, and another to dump a file to the printer. Look at this one-line batch file:

```
list −n %1
```

Let's call it SCREEN.BAT. To call this batch file from ST-Shell, all you'd type at the screen prompt would be SCREEN SAMPLE.TXT. This would display the text file SAMPLE.TXT with zero-padded line numbers, pausing for a keypress every 18 lines.

Here's an example of a one-line batch file for listing to the printer:

```
list −p −n −z −s %1
```

Let's call it PRINT.BAT. When you enter the command PRINT SAMPLE.TXT at the ST-Shell prompt, this batch file dumps SAMPLE.TXT to the printer with space-padded line and page numbers, and suppresses screen output.

About The Program

File Lister was written in machine language instead of a high-level compiled language in order to minimize the size of the program. It also runs faster than a program written in a compiled language, although the limiting factor is more likely to be the speed of the printer and screen scrolling.

The small size of File Lister is important, because it leaves room on an ST-Shell disk for a number of utilities of this type. (See "Extended Formatter" elsewhere in this issue.) These utilities are really extrinsic or external DOS commands, just like those found in MS-DOS, PC-DOS, CP/M, and Unix.

If such utilities were written in a compiled language, they might be about 10K each. There would be only enough room on a single-sided disk for about 25–30 of them. But if each utility were a maximum of 2.5K (as this one is), there'd be room for about four times as many on the disk. Of course, shorter utilities also load faster and use less memory.

ST

Desktop Clock

David Plotkin

With this desk accessory you can display a digital clock on your screen while running any other GEM application program. The article also lends advice on writing desk accessories in Personal Pascal. *The program works on any ST in any screen mode: low- or medium- resolution color and high-resolution monochrome.*

It's easy to lose track of time when working with a computer, and nearly everyone has experienced the surprise of discovering that it's suddenly three hours past bedtime. But now it's easy to keep an eye on the clock while working with your word processor, spreadsheet, database, or telecommunications program.

"Desktop Clock" is a simple desk accessory that's always instantly available within any program that supports GEM (Graphics Environment Manager). When summoned from the Desk menu, it pops open a small window with a digital clock. The clock can be repositioned anywhere on the screen and does not interfere with the main application program running in the background. It operates on a 12-hour cycle and indicates a.m. or p.m. You can make the clock disappear and reappear at will. You can even make it reappear if it is hidden behind another window.

Installing The Clock

The program file for Desktop Clock can be found on the magazine disk under the filename CLOCK.AC. *This is not an executable file*—it cannot be run from the magazine disk or by clicking on the filename or icon from the GEM desktop. Instead, it must be installed on your boot disk as a *desk accessory*, a program that is automatically loaded into memory when you first switch on your ST. A desk accessory remains in memory even when it isn't running. To activate a desk accessory, you must select it from the Desk menu which is present in all application programs that support GEM. (Sometimes the Desk menu is titled with an Atari logo symbol; in any case, it's always the menu at the far left of the screen.)

Installing Desktop Clock requires only a few simple steps:

1. Copy the file CLOCK.AC from the magazine disk to your boot disk—that is, the disk you insert in drive A when you first switch on the computer.
2. Rename CLOCK.AC to CLOCK.ACC by selecting Show Info from the File menu. (If you're not sure how to rename a file, consult the manual that came with the ST.) The .ACC extender is important—programs with filenames ending in .ACC are recognized by the computer as desk accessories and automatically loaded into memory during bootup. If you happen to be using the disk-based version of TOS (pre-ROM), you'll have to rename the file DESK*x*.ACC, where *x* is a number between 1 and 6 not being used by some other desk accessory (for example, DESK5.ACC).
3. To install Desktop Clock, turn off the computer and wait a few seconds. Then switch the computer back on, making sure the bootup disk with CLOCK.ACC is in drive A. (Note that desk accessories must always be installed with this *cold start* procedure—a *warm start* triggered by pressing the reset button does not reliably install a new accessory.)

Using The Clock

That's all there is to it. When you drop down the Desk menu from the GEM desktop, you should now

ATARI ST SPECTACULAR

ATARI 520 ST SYSTEM PACKAGE*

*Including RGB or Monochrome Monitor, Mouse, Disk Drive, Basic, Logo, Neochrome, 1st Word, TOS on ROM, and RF Modulator

CALL MONOCHROME SYSTEM

CALL RGB/COLOR SYSTEM

ATARI 1040 ST SYSTEM PACKAGE*

*Including RGB or Monochrome Monitor, Mouse, Double-sided Disk Drive, Basic, Logo, Neochrome, 1st Word, TOS on ROM, and Built-in Power Supply

CALL FOR CURRENT PRICE

***All ST System Packages are sold with a ComputAbility 90 day warranty.**

SUPRA 20 MEG 3.5 INCH HARD DRIVE
only
$659

ATARI SF 314 DISK DRIVE
Double sided/ 1 Megabyte storage
$199

PRINTERS

NX-10 209	SD-15 .419	Powertype 229
NL-10 .Call	SR-10 . 459	Panasonic 1080I . 219
NX-15 329	SR-15 . 559	Panasonic 1091I . 279
SD-10 . 309		Citizen 120D . . . . Call

OKIMATE 20 COLOR PRINTER & ATARI ST PLUG & PRINT
$199
This is a shipped price anywhere in continental USA

ST MODEM PACKAGE
NEW AVATEX 1200HC MODEM
1200 Baud-Hayes Compatible
+
ST MODEM CABLE
+
ST TALK TELECOMMUNICATIONS PACKAGE
$159

WE RECEIVE ST PRODUCTS ON A WEEKLY BASIS. IF YOU DON'T SEE IT HERE . . . CALL

SUPER SPECIALS*

Defender of the Crown . 31.95

MINDSCAPE

S.D.I. . . . 31.95

*SUPER SPECIAL PRICES EFFECTIVE NOW THRU JANUARY 31, 1987

ATARI 520 ST • ATARI 1040 ST SOFTWARE

ABACUS
Textpro 37.95
Datatrieve 37.95
FortnMT 37.95
Assempro 37.95
Textdesigner 37.95
Assempro 37.95
PC Board Designer 299.95
Abacus Books . . . . . Call

ST GRAPHICS
Degas 27.95
Degas Elite 52.95
Easy Draw 54.95
PC Board Designer 299.95
Painworks 49.95
Super Graphics 33.95
New Tech Color Book 16.95
Graphic Artist 149.95
Real Cadd . . . . . CALL
Aegis Animator ST 49.95

INFOCOM ST
Forever Voyaging 29.95
Baby Doo 23.95
Cuthroats 25.95
Deadline 31.95
Enchanter 25.95
Hitchiker 25.95
Infidel 28.95
Leather Goddess 25.95
Moonmist 25.95
Planetfall 25.95
Seastalker 25.95
Sorcerer 28.95
Spellbreaker 31.95
Starcross 31.95
Suspect 28.95
Suspended 31.95
Trinity 25.95
Wishbringer 25.95
Witness 25.95
Zork I 25.95
Zork II or III 28.95

ST WORD PROCESSORS
Final Word 89.95
Paperclip Elite 64.95
Habawriter 54.95
Regent Word II 64.95
Wordwriter ST 52.95
Thunder 27.95

HIPPODROMUS
Call for demo and prices

MICHTRON
Alt 34.95
BBS . . . . . Call
Business Tools 34.95
Calendar 20.95
Cornerman 34.95
DOS Shell 27.95
Echo 27.95
Flipside 27.95
Goldrunner 27.95
Kissed 34.95
M-Copy 54.95
M-Disk 27.95
Major Motion 27.95
Mi-Term 34.95
Michtron Utilities 39.95
Mudpies 27.95
Softspool 27.95
Solitaire 27.95
The Animator 27.95
Time Bandits 27.95
Mighty Mail 34.95
Easy Record 54.95
Intro to Logo 34.95
Personal Money Mgr 34.95
Pinball Factor 27.95
Football Wizard 27.95
Financial Future 27.95
Eight Ball 20.95
Dot Driver 34.95
Laser Driver 34.95
Super Conductor 49.95

ST LANGUAGES
Personal Pascal 49.95
Fast Basic 89.95
Fast C Compiler 99.95
Fast Fortran 199.95
Mark William's C 129.95
Metacomco Pascal 84.95
Macro Assembler 59.95
Lattice C 99.95
Fast Cobol 199.95
MCC Assembler 59.95
Metacomco BCPL 109.95
Cambridge Lisp 139.95
Modula II 54.95
Metacommco Make 49.95
Menu + ... 223.95
BCPL 99.95

ST BUSINESS
VIP Professional 169.95
VIP Lite 99.95
Swiftcalc ST 52.95
Iggur Portfolio 129.95
Synsoft General Ledger 44.95
SBM Point of Sales 84.95
Sierra One Write (ea.) 69.95
Financial Cookbook 34.95
DAC Payroll 34.95
DAC Easy Accounting 49.95
Maxiplan . . . . . Call
Sylvia Porter Vol. I 52.95
Dollars and Sense 69.95
Home Accountant 44.95
BTS Spreadsheet 44.95

CASIO KEYBOARDS
CZ-101 279
CZ-230S 369

ST EDUCATIONAL
Decimal Dungeon 27.95
Fraction Action 27.95
Kindermania 27.95
Read & Rhyme 27.95
Animal Kingdom 27.95
Teddy-Bear/Rainy Day 24.95
Speller Bee 33.95
Kid Talk 33.95
Math Talk 33.95
First Shapes 33.95

EST. 1982
ComputAbility
P.O. Box 17882, Milwaukee, WI 53217
ORDER LINES OPEN
Mon-Fri. 11 a.m. - 7 p.m. CST • Sat. 12 p.m. - 5 p.m. CST
To Order Call Toll Free
800-558-0003
For Technical Info, Order Inquiries, or for Wisc. Orders
414-351-2007

FUJI DISKETTES
SS/DD 3.5 in. (10 Pk) . . . 15.95
DS/DD 3.5 in. (10 Pk) . . . 24.95
NOTE: Buy Fuji Diskettes at these low prices when added to any other order

ST ACCESSORIES
Flip'n' File 8-Micro 19.95
Dustcovers . . . . . Call
3.5 Disk Drive Clean Kit . . . . . Call
Mouse Pad 8.95
Mouse House 6.95
RCA 6 Way
Noise/Surge Prot. 34.95
Anti-Glare Screen 19.95

ST UTILITIES
Macrodesk 27.95
Deskmaster 27.95
Music Studio 39.95
Abacus Books . . . . . Call
Time Link 34.95
ST Music Box 31.95
Midiplay 34.95
Micro-Cookbook 32.95
CZ Droid 74.95
ST Track 49.95
Right 90 . . . . . 19.95
Mr. Boston Bartender 12.95
Mail List 14.95
Macro-Manager 49.95

ST TELECOMM
PC Intercom 79.95
ST Talk 17.95
I.S. Talk 39.95
Home Pak 24.95

ST PRINT UTILITIES
Typesetter 24.95
Rubber Stamp 24.95
Printmaster 24.95
Art Gallery I 19.95
Art Gallery II 19.95
Fontwriter 27.95
Megafont ST 24.95

ST DATABASES
DB Man 99.95
Regent Base 64.95
Data Manager ST 52.95
DB Master One 99.95
Zoomracks II 99.95

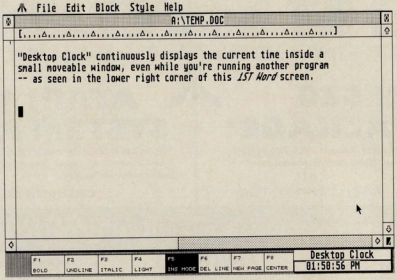
ST ADVENTURES
Hacker I 29.95
Hacker II 33.95
9 Princes/Amber 33.95
Sundog 24.95
Winnie The Pooh 19.95
Black Cauldron 27.95
Ajahai Trilogy 27.95
Universe II 47.95
The Pawn 29.95
Starquest 33.95
Crimson Crown 16.95
Alternate Reality 33.95
OO-Topos 16.95
Fantasies 33.95
Coveted Mirror 16.95
Golden Pass 29.95
Guild of Thieves 29.95
Dungeon Master 27.95
Tass Times 33.95
Mercenary . . . . . Call
Autoduel 34.95
Ogre 27.95
Gateway 33.95
Defender of Crown 33.95
Sinbad the Sailor 33.95
Balance of Power 33.95
King of Chicago 33.95
S.D.I. 33.95
Ultima II or III 33.95
King's Quest II or III 33.95

ST ARCADE GAMES
Bridge 4.0 . . . . . 20.95
Winter Games 27.95
Rogue 27.95
Super Huey 27.95
Phantasie 27.95
Mean 18 . . . . . 29.95
Leader Board 27.95
Brattacus 33.95
Donald Duck 20.95
Silent Service 27.95
Flight Simulator II 34.95
Champ. Wrestling 27.95
World Games 27.95
Video Vegas 24.95
Blazing Paddles 24.95
Strip Poker 27.95
Starglider 29.95
Alternate Reality 33.95
Little Comp. People 33.95
Smoothtalker . . . . . Call
Gato 33.95
Joust 24.95
Chessmaster 2000 . . . . . 32.95
Jet 34.95
Tenth Frame 27.95
Shanghai 29.95
3-D Helicopter 33.95
Micro League Baseball 39.95
W.M.F. Micro Wrestling 39.95
Skyfox 32.95
Breach 27.95
Star Raiders 24.95
Super Cycle 27.95
ST Pool 24.95
Indoor Sports . . . . . Call
F-15 Strike Eagle 27.95
High Roller Simulator . . . . . Call
TwoTwo Basketball 29.95
Mastertype 27.95
Hex 24.95
Love Quest 39.95
Deep Space 29.95
Arena 24.95
ST Karate 24.95
ST Protector 23.95
Space Station 24.95
Psion Chess 39.95

No surcharge for MasterCard MasterCard **or Visa** VISA

ATARI is a trademark of ATARI, INC

ORDERING INFORMATION: Please **specify system.** For fast delivery send cashier's check or money order. Personal and company checks allow 14 business days to clear. School P.O.'s welcome. **C.O.D. charges are $3.00.** In Continental U.S.A. include $3.00 for software orders, 4% shipping for hardware. Minimum $4.00. MasterCard and Visa orders please include card #, expiration date and signature. WI residents please include 5% sales tax. HI, AK, FPO, APO & Puerto Rico and Canadian orders please add 5% shipping. **minimum $5.00.** All other **foreign orders add 15% shipping, minimum $10.00.** All orders shipped outside the Continental U.S.A. are shipped first class insured U.S. mail. If foreign shipping charges exceed the minimum amount, you will be charged the additional amount to get your package to you quickly and safely. All goods are new and include factory warranty. Due to our low prices all sales are final. **All defective returns must have a return authorization number.** Please call (414) 351-2007 to obtain an R.A. # or your return will not be accepted. Prices and availability subject to change without notice.



Desktop Clock works concurrently with any other GEM application, as seen in the lower right corner of this 1ST Word *screen.*

see a new selection labeled Clock, along with any other accessories you may have previously installed on the boot disk. To open the Desktop Clock, just select Clock from the menu.

Desktop Clock works just like any other GEM window. You can move it anywhere on the screen by clicking and dragging the title bar. You can make it disappear by clicking on the close gadget in the upper left corner of the window. You can move the clock on top of other windows, or move other windows on top of the clock. However, there are no sizing gadgets on the clock window; it always stays the same size so that it takes up a minimum amount of space on your screen.

If you close the clock window or hide it behind another window, you can make it reappear by selecting it again from the Desk menu.

Desktop Clock has no provisions for setting the system time. Therefore, to set the clock, you'll need to install the Control Panel desk accessory that came with the ST or use a program that prompts you to enter the time and date when booting up. (To learn how to use a batch file for this purpose, see the "ST-Shell" article elsewhere in this issue.)

Writing A Desk Accessory

The following discussion is of interest to programmers who'd like to learn how to write a desk accessory in *Personal Pascal*, the language in which Desktop Clock was written. The program source code is stored on the magazine disk under the filename CLOCK.PAS.

There are some differences between writing a desk accessory and writing a standard application program. Most of these differences are detailed in a supplement to the *Personal Pascal* manual which is available from Optimized Systems Software. If you haven't received this supplement, as well as the others detailing use of XBIOS, PORTS, and file management, contact OSS. The use of AC_Open, AC_Close, Menu_Id, and AP_ID is detailed in the OSS handout, but some other points are missing. The source code for Desktop Clock is pretty well commented to cover these points.

For example, take a look at the beginning of PROCEDURE Convert, which converts integers into strings. You'll see this statement:

```
Timeout := '                ';
```

This not only clears the string which will contain the digits for hours, minutes, and seconds, but also sets the current length of the string. Modifying the separate elements of the string, which is how Convert works, will *not* set the current length of the string.

This current length is used later by the function Concat to patch together minutes, hours, and seconds to form the string Time, which will be printed on the screen. If the current length of each string has not been set by an expression like the one above, the length is likely to be some random number, and the Concat function will attempt to patch together some very long strings and stuff them into a string (Time) which is not large enough to hold them. The result will be a string overflow error when the program runs.

Also at the beginning of PROCEDURE Convert, you'll notice a VAR declaration of string Timeout which defines it as TYPE shortstring. In the initial program declarations, shortstring is declared as TYPE string[2]. I've taken this approach because *Personal Pascal* does not let you use a statement such as Timeout:String[2] as part of a PROCEDURE call.

Updating The Window

PROCEDURE Do_Redraw is responsible for redrawing the clock window whenever necessary. In fact, Do_Redraw is used to make *any* adjustments to the clock window, even when merely printing new digits to update the time. This is because Do_Redraw contains all the safeguards necessary to keep the screen nice and neat:

1. The Boolean variable *bckgrnd* determines whether the white background in the clock window should be redrawn. It is redrawn only if part of the window was hidden and is now visible. If the time just needs updating, the white background is not redrawn, because there is a noticeable flicker if the program continuously redraws the background and changes the time.
2. The statement containing Set_Window is very important. It makes sure that the update takes place in the clock window. Just opening a window or bringing it to the front does not automatically select that window for graphics and text. It's better to be safe.
3. Notice how the calls to Paint_Rect (paint the window background) and Frame_Rect (frame the window) assume that the entire window is being redrawn, even though only part of the window may actually need redrawing. GEM and Set_Clip make sure that only the appropriate portion of the window is affected.

PROCEDURE Event_Loop monitors events and takes action based on what event occurred. It first tests for messages, then acts on the messages as they are received. This is the procedure that takes care of opening and closing windows, bringing windows to the front, and moving and resizing the window. As mentioned above, however, the Desktop Clock window does not allow resizing, since it's hardly necessary.

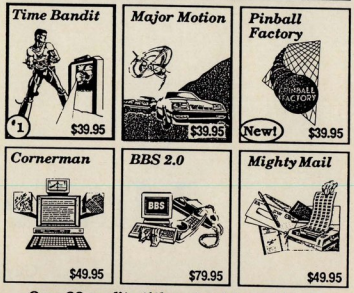
At the end of the event loop, the timer event is handled outside the CASE statement for messages. This way, the program checks to make sure that the clock window is open before responding to the timer event. Why? Because a desk accessory—unlike other programs—can get timer events even when the accessory is not active (no window is open). If the program did not test for an open window, you'd see the time printed on the screen background, which is not what we want.

After a timer event, the program updates the time and redraws the window as discussed above. Thus, the program must keep track of the x and y coordinates of the window, as well as the height and width.

ST

Desktop Clock was written using *Personal Pascal* from Optimized Systems Software. Portions of this program (the linked libraries) are copyright 1986 by OSS and CCD. Used by permission of OSS.

ATARI ST BEST SELLERS!



Over 30 quality titles. Send for our latest catalog. Dealer inquiries welcome.

MichTron

576 S. Telegraph, Pontiac, MI 48053
Orders and Information (313) 334-5700

SHAPING THE FUTURE OF THE ATARI ST

MT C-SHELL Multi-tasking/ Multi-user Unix-like Operating System. Electronic Mail. Print Spooling. Runs TOS Programs. $129.95

MICRO MAKE Unix-like software maintenance utility $34.95

MICRO C-SHELL The full featured shell that started it all. Still the best. $49.95

NEW! **HARD DISK ACCELERATOR** Makes your ST's disk up to 3 times faster. $39.95

MICRO C-TOOL The perfect companion to MICRO or MT C-Shell. Many Unix-like tools. $24.95

MICRO RTX Real-time multi-tasking kernel for the Atari ST.

Beckemeyer Development Tools
476 Santa Clara Avenue
Oakland, CA 94610
415 452 1129

Mouse Editor

Guy Davis

With this utility, programmers can create custom mouse cursors for use in their own application programs. Numerous options make it easy to design shapes on a gridlike sketchpad, and the new cursor can be tested and then saved on disk. It works on all STs in all screen modes: low- or medium-resolution color and high-resolution monochrome.

If you're writing application programs that support GEM (the Graphics Environment Manager), one final touch that's sure to grab attention is a custom mouse cursor. Imagine, for instance, a notepad program with a cursor shaped like a pencil, or a drawing program with a cursor that changes at appropriate times into a paint brush, spray can, eraser, or pen. GEM gives you the capability of redefining the mouse cursor within an application, but does not give you the tools necessary to make the job easy.

That's why you need "Mouse Editor." It's a utility program that makes designing custom cursors a snap. You can draw the new shape pixel by pixel on a magnified sketchpad, then rotate it, flip it, or reverse it. When you're satisfied with the results, you can test the new cursor by viewing it in actual size and moving it around the screen with the mouse. Finally, you can save the shape on disk for inclusion in your own programs.

Mouse Editor won't let you redefine the cursor for use on the GEM desktop—GEM lacks that capability. However, it is a handy tool for those who write their own application programs in a wide variety of languages.

Video Graph Paper

On the magazine disk you'll find four files associated with Mouse Editor: MOUSE.PRG, MOUSE.PAS, ARROW.MSE, and FUJI.MSE. The Mouse Editor program itself is MOUSE.PRG; simply double-click or open this filename/icon to run Mouse Editor. MOUSE.PAS is the source-code file for MOUSE.PRG, which is written in *Personal Pascal*. The source code is mainly of interest to Pascal programmers who want to study how Mouse Editor works. ARROW.MSE and FUJI.MSE are two predefined mouse cursors included on the disk for demonstration purposes. In a moment, we'll describe how to load and view these cursors.

When you run Mouse Editor, you'll see a window containing a 16 × 16 grid. This is the sketchpad or graph paper on which you'll create your new mouse cursor. Each square in the grid represents a blown-up view of a pixel on the screen. To draw a shape on the sketchpad, simply point the mouse cursor at one of the grid squares and click the left mouse button. The square changes from the background color to black. To erase a pixel, click on its square again; it returns to the background color.

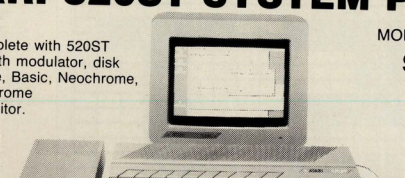
Like almost any GEM window, the sketchpad can be resized and moved anywhere on the screen. When you resize the window, the 16 × 16 grid automatically rescales itself to the new dimensions. This lets you adjust the sketchpad's magnification. (See Figures 1 and 2.)

At the top of the screen, you'll notice four menus. Starting at the left, the Desk menu contains the usual desk accessories (if you booted any) and a copyright notice. The File menu contains three fairly

ATARI SPECIALISTS

ATARI 520ST SYSTEM PACKAGE

Comes complete with 520ST computer with modulator, disk drive, mouse, Basic, Neochrome, and monochrome or color monitor.



MONOCHROME SYSTEM
$569.00
COLOR SYSTEM
$759.00

CALL FOR PRICING ON 1040 SYSTEMS!

SUPRA DISK
20 Meg HARD DRIVE
$649.00

SUPRA MODEM
MODEL 1200ST $149.00

ATARI 314
1 Meg Double Sided DISK DRIVE
$219.00

ANCHOR
Direct Connect MODEM
300/1200 Baud
$129.00

— PRINTERS —

CITIZEN
MSP-10 (80 col.).....$299.00
MSP-15 (132 col.).....$419.00
MSP-20 (80 col.).....$349.00
MSP-25 (132 col.).....$529.00
Premier 35.....$499.00

C.ITOH
Prowriter 1550.....$269.00
Prowriter 8510SP.....CALL

EPSON
Homewriter 10.....$99.99
LX-86, FX-85, FX-286.....Call
EX-800, EX-1000, RX-100.....Call
LQ-800, LQ-1000.....Call

NEC
ELF360 Spinwriter.....$389.00
3000 Series Spinwriter.....$779.00
Pinwriter 560, 660, 760.....Call

JUKI
6000 Letter Quality.....Call
6100 Letter Quality.....Call
6200 Letter Quality.....Call
5510 Dot Matrix.....Call
5510C Color Printer.....Call

OKIDATA
Okimate 20.....$109.00
ML-182, ML-192, ML-193.....Call
ML-292, ML-293.....Call

PANASONIC
KX-1090.....$199.00
KX-1091.....$229.00
KX-1092.....$339.00

TOSHIBA
P321 24 Wire.....$489.00
P351 24 Wire.....$1049.00

STAR MICRONICS
LV-1210 120 cps.....$199.00
NX-10 120 cps.....$249.00
NL-10 Font Comp.....Call

V.I.P PROFESSIONAL $99.99

SOFTWARE

ACCESS
Leaderboard.....$29.99
ACTIVISION
Hacker.....$29.99
Borrowed Time.....$34.99
BATTERIES INCLUDED
D.E.G.A.S.....$27.99
ELECTRONIC ARTS
Financial Cookbook.....$37.99
HABA/ARRAYS
Hippo-C.....$44.99
Business Letters.....$29.99
Write Your Own Will.....$29.99
Haba Writer.....$37.99
Habadex Phonebook.....$27.99
Mail Room Manager.....$39.99

INFOCOM
Cutthroats.....$29.99
Deadline.....$34.99
Enchanter.....$29.99
Hitchhiker's Guide.....$29.99
Infidel.....$34.99
Planetfall.....$29.99
Sea Stalker.....$29.99
Sorcerer.....$34.99
Starcross.....$34.99
Suspect.....$29.99
Suspended.....$34.99
Wishbringer.....$29.99
Witness.....$29.99
Zork I.....$29.99
Zork II.....$29.99
Zork III.....$29.99

MINDSCAPE
Deja Vu.....$37.99
MIRAGE
Express.....$34.99
MUSE SOFTWARE
Final Word.....$99.99
Hex.....$27.99
PC Intercom.....$79.99
O.S.S.
Personal Pascal.....$49.99
PENQUIN SOFTWARE
Crimson Crown.....$29.99
SIERRA-ON-LINE
Ultima II.....$39.99
King's Quest.....$37.99
SUBLOGIC
Flight Simulator II.....$37.99

ATARI 520ST Hardware/Peripherals
Atari 520 CPU.....$369.00
Atari 124 Monochrome Monitor.....$149.00
Atari 1224 14" Color Monitor.....$329.00
Atari 354 Single Sided Drive.....$149.00
Atari 20 MB Hard Disk.....$699.00
Atari 804 Graphic Printer.....$219.00

BLANK DISKETTES & ACCESSORIES
AMARAY
Disk Tub 3½".....$9.99
MAXELL
(10) 3½" SS/DD.....$18.99
(10) 3½" DS/DD.....$29.99
SONY
(10) 3½" SS/DD.....$18.99
(5) 3½" DS/DD.....$9.99
CURTIS Surge Protectors & Accessories
Emerald.....$39.99
Ruby.....$59.99
Diamond.....$29.99
Safety Strip.....$19.99
Sapphire.....$49.99
Universal Printer Stand.....$14.99

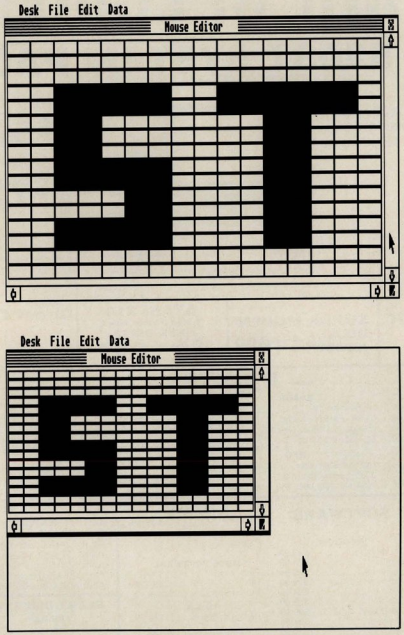
When you want to talk computers. When you want to talk price.

COMPUTER MAIL ORDER

Call toll-free: 1 800 233-8950
Outside the U.S.A. 717 327-9575 Telex 5106017898
Educational Institutions call toll-free 1 800 221-4283
CMO. 477 East Third Street, Dept. A612, Williamsport, PA 17701
All major credit cards accepted.

POLICY: Add 3% (minimum $7.00) shipping and handling. Larger shipments may require additional charges. Personal and company checks require 3 weeks to clear. For faster delivery use your credit card or send cashier's check or bank money order. Pennsylvania residents add 6% sales tax. All prices are subject to change and all items are subject to availability. Defective software will be replaced with the same item only. Hardware will be repaired or replaced at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee.

Figures 1 and 2: The sketchpad grid in "Mouse Editor" can be resized to different magnifications.



obvious selections: Load Mouse (load a previously saved shape), Save Mouse (save the shape currently displayed on the sketchpad), and Quit (exit Mouse Editor to the GEM desktop). The other two menus, Edit and Data, require some explanation.

Manipulating Shapes

The Edit menu contains seven selections that will be useful when designing your cursor. The first selection, Reverse Image, redraws the current shape as a mirror image of itself. Flip Image turns the shape upside down. Rotate Right turns the shape 90 degrees in a clockwise direction; if you do this four times, the shape ends up as it started. Rotate Left turns the shape 90 degrees in a counterclockwise direction. Clear Mouse erases the current shape on the sketchpad, allowing you to start from scratch.

The last two options on the Edit menu let you view and test a custom mouse shape without going to the trouble of writing a program. When you pick Test Mouse, the normal arrow cursor turns into the custom shape currently displayed on the sketchpad. By manipulating the mouse controller, you can move the custom cursor anywhere on the screen. You can even use it to select other menu items and continue designing your custom shape. (See Figure 3.)

COMPUTER CREATIONS

No Delays On Orders
Paid By Personal Check

YOUR ATARI 520ST SOFTWARE SUPPORT CENTER

ABACUS
- Paint Pro 36
- Text Pro 36
- Data Trieve 36

ACADEMY
- Typing Tutor/ Word Invaders 23

ACCESS
- Leaderboard Golf 26
- Tournament Disk 15

ACCOLADE
- Mean 18 Golf 29
- Fundog 26

ACTION
- Action Pak 32

ACTIVISION
- Mindshadow 33
- Borrowed Time 33
- Hacker 29
- Music Studio 39
- Paintworks 33
- Little Comp. People 33
- Hacker II 33

ADVENTURE INTL.
- Spiderman 14

ANTIC
- C.O.L.R. Obj. Editor 23
- Maps & Legends 27
- Macro Assembler 60
- Lattice C 114
- Disk Doctor 23
- A-Calc 45
- Data Pascal 75
- CAD-3D 39
- A-Ram 15
- A-Sam 27
- GST C Compiler 60
- GST-ASM 45

ARTWORX
- Expert Opinion 75
- Flash 30
- Star Struck 19
- Red Alert 19
- Murray and Me 15
- Mom and Me 15

ARTWORX
- Bridge 4.0 19
- Compubridge 19
- Mailliist 12
- Strip Poker 25
- Pegasus 12
- Hole in One Golf 19

ATARI
- DB Man 103
- DB Master 34
- Jewel 21
- Star Raiders 21

BATTERIES INCLUDED
- Degas 26
- Degas Elite 49
- Timeliab 33
- Thunder 26
- I/S Talk 49
- I/S Paperclip Elite Call
- Homepak 33

BECKEMEYER
- Micro C-Shell 39
- Micro C-Tools 19
- Micro Make 27
- RTX 53
- Micro MTC Shell 79

BRODERBUND
- Windwheel 29
- Breakers 30

CENTRAL POINT
- Copy II 27

CLASSIC IMAGE
- Disk Library 38
- Diablo 23

COMPUTE
- Super Huey 30

DAC
- Easy Accounting 49

DRAGON GROUP
- 4 in Forth 79
- Forth Accelerator 59

ELECTRONIC ARTS
- Financial Cookbook 36
- Ultima III 39
- Coloring Book Call
- Golden Oldies Call
- Chessmaster 2000 Call
- GOKE Call
- Autoduel Call
- Skyfox Call

EPYX
- Winter Games 26
- Rogue 26
- Temple of Apshai 26
- World Games 26
- Champion. Wrestling 26

FIREBIRD
- The Pawn 30
- Starglider 30

FIRST BYTE
- Kid Talk 33
- Speller Bee 33
- Math Talk 33
- First Shapes 33

HIPPOPOTAMUS
- Hippoword 59
- Hippoconcept 59
- Hippohelp 33
- Hippo Disk Utilities 33
- Hippo Backgammon 27
- Hippo Spell 27
- Hippo Handisk 23
- Hippo Comp. Almanac 23
- Hippo Jokes & Quotes 23
- Hippo Art I 27
- Hippo Pixel 27
- Hippo Fonts I 27
- Hippo Chesser 47
- Hippo Eprom Burner 119
- Hippo Sound Digitz. 109
- Hippo Vision 3 & V 109

LOGICAL DESIGN WORKS
- LDW Basic Compiler 54

MARK OF THE UNICORN
- Final Word 99
- Nex 27
- PC/Intercomm 84

MEGASOFT
- A Copier 27
- X-Rated Library 17

MICHTRON
- Kissed 26
- DOS Shell 26
- DFT 26
- The Animator 26
- Personal Money Mgr. 33
- Utilities 39
- M-Disk 26
- Mudpies 26
- Softspool 26
- Flip Side 26
- Calendar 19
- Hi-Term 23
- Gold Runner 26
- Time Bandits 26
- BBS 33
- Cornerman 33
- Mighty Mail 33
- Lords of Havoc 13
- Cards 26
- Business Tools 33
- Logo 33
- Major Motion 26
- Mission House 26
- Hi-Dope 20
- BBS 2.0 54

MICROLEAGUE
- Silent Service 27

MI-GRAPH
- Easy Draw 59

MIRAGE
- Ikatacus 33

NAVARONE
- Analyze 29
- Timekeeper 37

ONLINE
- Universe II 47

OSS
- Personal Pascal 50

PENGUIN/POLARWARE
- Crimson Crown 19
- OO-Topos 15
- Sword of Kadash 15
- The Coveted Mirror 15
- Transylvania 15

PHILON
- Point Basic-M 99

PROCO
- Pro-Copy 19

PROGRESSIVE COMP. APPL.
- Graphic Artist 139
- Font Editor 54

PRIORITY
- Forbidden Quest 27

QUANTUM
- ST-Talk 14

QUICKVIEW
- Icemacks 54

REGENT
- Regent Spell 34
- Regent Word 34

ROYAL
- RS-Calc 54

SHANNER
- Soundwave SW-1 33
- ST-Key 14
- Macro-Manager 33
- DB Calc II 29

SHELBOURNE
- Pool 24

SIERRA
- Kings Quest II 33
- Ultima II 39
- Winnie the Pooh 19
- Black Cauldron 26
- E/Q Hint Book 6
- B/C Hint Book 6
- Donald Duck 19
- Cash Disbursements 67

SPINNAKER
- Homework Helper/Math 34
- Treasure Island 27

SST
- Chat 15

TDI
- Modula-2 59
- Modula-2 Develp.Kit 109
- UCSD Pascal 59

TELARIUM
- Amazon Call
- Nine Princes/Amber Call
- Farashait 451 Call
- Dragonworld Call

TYNESOFT
- Datamanager 54
- Swiftcalc 54
- Wordwriter 54
- E/P Financial Plan 54

UNICORN
- Fraction Action 27
- Decimal Dungeon 27

UNISON WORLD
- Printmaster 26
- Art Gallery I 19
- Art Gallery II 19

VIP
- VIP Professional 119

X-LENT
- Typesetter 28
- Rubber Stamp 25
- Music Box 32
- Megafont 25

ATARI 520 ST HARDWARE: CALL

Package #1:

Atari 520 ST Computer & SF 354 Disk Drive

Package #2:

Atari 520 Computer, SF 314 Disk Drive and SM 124 Monochrome Monitor

Package #3:

Atari 520 ST Computer, SF 314 Disk Drive and SM 124 Monochrome Monitor

Package #4:

Atari 520 ST Computer, SF 354 Disk Drive and SC 1224 Color Monitor

Package #5:

Atari 520 ST Computer, SF 314 Disk Drive and SC 1224 Color Monitor

HARDWARE OPTIONS:

SF 314 DS/DD Disk Drive 209
SHD 204 20 MG Hard Disk Call

ATARI HARDWARE

Atari SF 354 SS/DD Drive 149
Atari SF 314 DS/DD Drive 249
Atari SM 124 Mono Monitor 149
Atari SC 1224 Color Monitr 329
Atari SH 204 20MB Hard Dr. 679

PRINTERS

STAR MICRONICS
- LV-1210 189
- NX-10 259

PANASONIC
- KX-P 10801 199
- KX-P 10911 259
- KX-P 3131 259
- KX-P 1592 429

MODEMS
- Supra 300 ST 59
- Supra 1200 ST 149

To order call TOLL FREE
1-800-824-7506
ORDER LINE ONLY

COMPUTER CREATIONS, Inc.
P.O. BOX 493 - DAYTON, OHIO 45459
For information, order inquires, or for Ohio orders (513) 435-6868

Order lines Open 9:00 a.m. to 8:00 p.m. Mon.-Fri.; 10 a.m. to 4:00 p.m. Sat. (Eastern Standard Time). Minimum $15 per order. C.O.D. (add $3.00). Please specify computer system. Call toll free number to verify prices and availability. Prices and availability are subject to change without notice. We ship C.O.D. to Continental U.S. addresses only! Please include 4% shipping on all Hardware orders (min. $4.00). Software and accessories add $3.00 shipping and handling in continental U.S. Actual freight will be charged outside U.S. to include Canada, Alaska, Hawaii, Puerto Rico and APO addresses. Ohio residents add 6½% sales tax. Canadian orders add 5% shipping, (min. $5.00). All other foreign orders, please purchase orders welcome. Due to our low prices, all sales are final. NO CREDITS. All defective returns must have a return authorization number. Please call (513) 435-6868 to obtain an RA# or your return will not be accepted for replacement or repair. FOR YOUR PROTECTION WE CHECK FOR CREDIT CARD FRAUD. We do not bill until we ship.

Figure 3: This custom cursor is patterned after Atari's corporate logo.

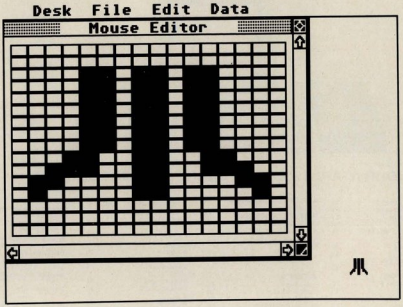
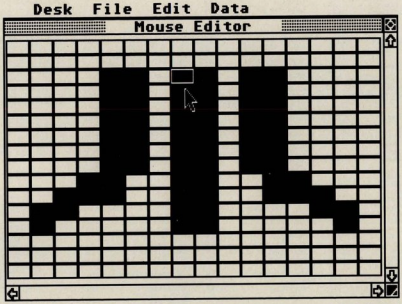


Figure 4: Repositioning a cursor's hot spot.



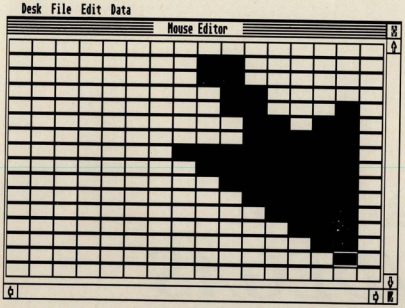
If you want to turn off the custom cursor and restore the normal cursor, choose Set Arrow from the Edit menu. This brings back the default pointer.

The Data menu offers three options: Hot Spot, Mask, and Data. The first option plots a box on the sketchpad to identify the pixel in the mouse cursor that returns the screen coordinates to a program—the cursor's hot spot. In other words, this is the actual pointer spot within the cursor—the part of the cursor that must be on a dialog button or menu item, for instance, when you press the mouse button. By selecting Hot Spot, you can move this indicator box anywhere on the grid to set the custom cursor's hot spot. (See Figure 4.)

The Mask option lets you make a pixel white instead of black. If you look very closely at the default cursor, you'll notice that the black pointer is surrounded by a thin, white mask that helps to separate it from the screen background. With the Mask option, you can draw a similar mask around your custom cursor. If you click on a white square while using Mask, the square changes to the background color.

Finally, the Data selection lets you cancel the

Figure 5: Matching the hot spot to an upside-down pointer.



Mask or Hot Spot options and continue setting black pixels.

Free Samples

To experiment with the two sample cursors included on the magazine disk, simply run Mouse Editor, pick Load Mouse from the File menu, and pick either ARROW.MSE or FUJI.MSE from the item selector. ARROW.MSE resembles the ST's default cursor, and FUJI.MSE is patterned after the Atari corporate logo.

To see how the location of the hot spot affects the cursor, load ARROW.MSE and pick Flip Image from the Edit menu. The arrow image on the sketchpad should now be upside down. Next, pick Test Mouse from the Edit menu. Then try setting some pixels on the sketchpad. Notice how the upper left corner of the cursor still determines where the cursor is pointing, even though the arrow itself points downward.

To match the hot spot with the cursor's new direction, pick Hot Spot from the Data menu and place the box somewhere near the tip of the pointer. (See Figure 5.) Then select Test Mouse again. This time the cursor should work as expected.

The File Format

When you save a custom cursor shape on disk with the Save Mouse option, the resulting file adheres to a certain format.

The first two two-byte integers in the file define the horizontal and vertical (*x* and *y*) locations of the hot spot.

Next, there are two sets of 16 two-byte integer values. The first set defines the mask pattern and the second set defines the pointer pattern.

If you want to learn how these files are saved and loaded, examine the source-code file for Mouse Editor, MOUSE.PAS. There's also an example in the Mouse Control section of the *Personal Pascal* manual. **ST**

Mouse Editor was written using *Personal Pascal* from Optimized Systems Software. Portions of this program (the linked libraries) are copyright 1986 by OSS and CCD. Used by permission of OSS.

STplus tm
P.O. 1197, Berkeley, CA, 94702
Save money from an authorized 1040 ST dealer!
We are totally committed to the new Atari line and carry all related products and WE SHIP QUICKLY !!
GOOD PRICES & EXCELLENT SUPPORT!
1040 ST COLOR = $959, MONO = $799
520 ST COLOR = 779 , MONO = $639
Super 520 with 1 meg and 800k drive$849m/$999c
Atari or Supra20 mb hard disk $639, 60 mb $1725
Epson DX-10 = $249, Epson LX-80 = $239
XMAS SPECIAL: AVATEX,FLASH,CABLE $126

Mark Williams 'C' $125	M	Megamax	$160
Publishing Partner$105	O	Fortran 77	$104.95
Starglider $31.50	R	Psion Chess	$42.00
Flight Simulator $35.00	E	Thai Boxing	$14.00
Dungeonmaster $27.00	&	Time Bandit	$27.00
Video DIGITIZER $114	M	Wordwriter	$56.00
Microsoft WRITE $90.00	O	Thunder	$27.95
Make it Move $35.00	R	DEGAS ELITE	$56
Ansigraph VT102 $55.95	E	Paperclip ELITE call	
GRAPHIC ARTIST $140	I	MAGIC SAC + $120	
Nat'l(800)433-6222	I	Calif(800)874-4789	

S.F. Bay area(415) 849-8717 AmexVisaMC
*** CALL FOR MS-DOS EMULATION***

Snapshot *NEO/DEGAS*

Philip I. Nelson, Assistant Editor

This convenient desk accessory is available whenever you want to capture a screen image for later use with NEOchrome *or* DEGAS. *You can even use it to convert* NEOchrome *and* DEGAS *pictures from one format to the other. It adjusts automatically to any screen resolution and works on any ST, color or monochrome.*

NEOchrome and *DEGAS* are both excellent drawing programs for the Atari ST. But let's face it—not all of us are artists. Rather than always starting with a blank screen and creating something from scratch, sometimes it's easier to simply capture an existing screen image and load it into your favorite drawing program for modifications.

A number of so-called "snapshot" utilities are available both commercially and in the public domain for this purpose. But after trying several of them, we found that none had all of the features we wanted. Some work only in certain screen modes; some can save a screen in *DEGAS* format but not *NEOchrome* format, or vice versa; some don't let you specify a filename or pathname when saving the screen on disk; some require *two* programs to function—one to capture a screen and another to save it; and so on.

As a result, we wrote our own utility: "Snapshot *NEO/DEGAS*." Like other snapshot programs, it lets you capture any screen image instantly and save it on disk for later use. But as the name implies, Snapshot *NEO/DEGAS* lets you save the screen in either *NEOchrome* or *DEGAS* format. It also works on any ST in any screen mode: low-resolution color, medium-resolution color, and high-resolution monochrome. It lets you specify any pathname and filename you want when saving the file on disk. It's available at any time with a simple keypress. And since it's a desk accessory, Snapshot *NEO/DEGAS* installs itself in memory automatically whenever you turn on the computer.

You can use Snapshot *NEO/DEGAS* to capture graphics screens, GEM screens, high-score game screens, or just about anything. As a bonus, it also lets you convert *NEOchrome* pictures to *DEGAS* format, or vice versa.

Installing Snapshot

You'll find Snapshot *NEO/DEGAS* on the magazine disk under the filename SNAPSHOT.AC. It cannot be run from the disk menu program or the GEM desktop; it must be installed as a desk accessory. (A *desk accessory* is a program that automatically loads into memory when you first switch on your computer, and then idly waits there until called from the Desk menu at the far left of the menu title bar. The Control Panel which comes with every ST is an example of a desk accessory.)

To use Snapshot *NEO/DEGAS*, you must first install it as a desk accessory on your startup disk (the disk you insert in drive A when switching on

THE ARTISTRY OF IT. THE ARTISTRY OF IT. THE ARTISTRY OF IT.

Entertainment

FOR THE ATARI ST. FOR THE ATARI ST. FOR THE ATARI ST.

NEW!

Eight Ball — by Stanley Crane

Eight Ball simulates the classic game of pool. This new arcade game so real that each match will put you in the limelight, or behind the eight-ball.

- The rules, the physics and even the graphics are accurate and complete.
- Direct the aim and power of your shot visually and dynamically.
- Five different options let *you* define a "scratch."
- Practice alone, or challenge a friend.

Color and monochrome $29.95

NEW!

Pro Football Wizard — by William Tan

This football program predicts the outcome of NFL games. Win friendly speculations, and law permitting--money! Replace your hunches with scientific analyses.

- Explains handicapping, betting, money management!
- Keeps track of scores and statistics for 28 teams.
- Minimal data entry! All that's required is a newspaper with box scores and an hour each week.
- Screen and printer reports for better insight.
- Considers physical *and* psychological factors!
- Accuracy for the last 3 years: almost 80% of straight-up predictions, and over 60% with the point spread!

Color and Monochrome $39.95

NEW!

Pinball Factory — by Kary McFadden

Pinball springs to life with fresh new angles that only the computer can offer. This great arcade game also lets you design, build, edit, and play your own custom screens!

- Comes complete with sample games.
- Place bumpers, tabs, and other devices to get the action just right.
- Built-in graphic editor lets you draw the solid barriers as well as illustrations on the playing area.
- Alter gravity, bounce, scoring, and other rules.
- Up to four players with different speeds and settings!
- Multi-ball action gives you up to three balls at once!
- "Tilt" controls even let you "bump" the machine!

Color only $39.95

NEW!

Super Conductor — MacKenzie & Sorenson

This advanced program is for amateur and professional musicians. With or without a MIDI synthesizer, you can record, edit, and play music. Functions include:

- Complete control of external synthesizer.
- Editing of recorded material.
- Quantizing: corrects and aligns notes.
- Holds 10 songs in memory for editing or performing.
- Handles synthesizer "system exclusive" data.
- Song structuring lets you repeat parts of songs, and duplicate even measure-length pieces.
- Play music through the Atari internal speaker!

Color and monochrome $69.95

More Favorites!

The Animator - Animate Neo or Degas pictures. Great for business presentations or just for fun!
Color only $39.95

Cards - Five classic card games: Solitaire, Klondike, Poker Squares, Cribbage, and multi-player Black Jack!
Color and Monochrome $39.95

Flip Side - Play Reversi against friends or the computer. Six computer skill levels, option for timed games, and even in-play help and suggestions!
Color and Monochrome $39.95

Best Seller!

Major Motion - In this arcade, driving game, enemy cars try to smash you off the road. You can play rough too, and there are always your machine guns... Race along highways, curves, and even a waterway!
Color Only $39.95

Best Seller!

Time Bandit - The top ST game! Battle evil across 16 unique arcade lands, 3 adventures, and *thousands of screens!* Spectacular graphics and animation. The adventure awaits!
Color Only $39.95

All reasonably priced, with more coming every day. Ask for our latest catalog!

Dealer inquiries welcome • Visa and Mastercard accepted • Add $3.00 shipping and handling to each order.

MichTron

576 S. Telegraph, Pontiac, MI 48053
Orders and Information (313) 334-5700

the computer) by renaming it SNAPSHOT .ACC. If you aren't sure how to do this, follow these steps:

1. Copy the file SNAPSHOT.AC from the magazine disk to your startup disk.

2. Display a directory window for your startup disk.

3. Select the file SNAPSHOT.AC by clicking once on its icon or filename to highlight it.

4. Drop down the File menu and select the Show Info option.

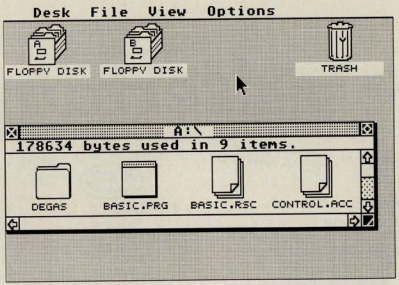
5. When the Show Info dialog box appears, a cursor should appear on the filename line. Change the name of the file to SNAPSHOT.ACC.

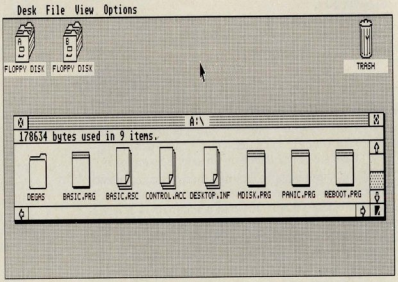
6. Exit the Show Info box by pressing Return or clicking the mouse on the OK button. The directory window for your startup disk should confirm that the file is now named SNAPSHOT.ACC.

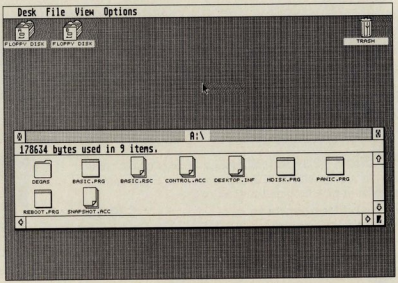
Snapshot *NEO/DEGAS* is now ready to be installed. Turn off your computer and wait about 15 seconds. Then insert your startup disk with SNAPSHOT .ACC into drive A and switch the computer on again. (This *cold start* procedure is recommended because merely pressing the reset button for a warm start does not reliably install a new desk accessory.) When the GEM desktop appears, drop down the Desk menu. You should see a new selection entitled SNAPSHOT NEO/DEGAS.

Snapping Pictures

As a desk accessory, Snapshot *NEO/DEGAS* hides in memory until you need it, even when you're using applications such as ST BASIC or *1ST Word*. To snap a picture of the current screen, just press Alt-Help (hold down the Alt key, then tap the Help key). Snapshot *NEO/DEGAS* briefly inverts the screen colors to signal that it has stored a complete image of the screen, including the resolution, color palette, and current position and appearance of the mouse pointer.







As these three figures show, "Snapshot *NEO/DEGAS*" can capture almost any ST screen in any resolution.

ABBY'S DISCOUNT SOFTWARE

— INTRODUCING —

WORLDS OF WONDER LAZER TAG

LAZER TAG GAME KIT — Includes Star Lyte (Hand Unit), Star Belt & Star Sensor $45.00

ACCESSORIES

Lazer Tag Star Vest $18.00
Lazer Tag Star Sensor $20.00
Lazer Tag Star Band ..... $ 9.00
Lazer Tag Star Helmet $36.00
Lazer Tag Star Cap $20.00

ANIMATED TALKING TOYS

Teddy Ruxpin $65.00
Grubby $49.00
Mother Goose $65.00
Snoopy $75.00
Charlie Brown $49.00
Woodstock ..... CALL
Poseable Miniatures ..... as low as $ 2.50

ACCESSORIES

Hand Puppets ..... as low as $12.00
Books & Tapes ..... as low as $ 9.75
Clothing (for talking toys) ..... as low as $10.50

NINTENDO ENTERTAINMENT SYSTEM

DELUXE SET — Includes Control Deck, 2 Controllers, R.O.B. (Video Robot), Zapper (Light Gun), 2 Game Paks - Gyromite & Duck Hunt $139.00

ACCESSORIES

R.O.B. (Video Robot) $42.00
Zapper (Light Gun) $24.00

GAME PAKS

Robot Series ..... ea. $32.00
Light Gun Series ..... ea. $28.00
Programmable Series ..... ea. $28.00
Sports Series ..... ea. $24.00
Action Series ..... ea. $24.00
Education Series ..... ea. $19.00
Arcade Classics ..... ea. $19.00

ATARI ST HARDWARE

1040 ST CPU, Mouse & Software
520 ST CPU w/RF Modulator Mouse, & Software
SF 354 3½" SS/DD Disk Drive
SF 314 3½" DS/DD Disk Drive
SM 124 12" Monochrom Monitor
SC 1224 12" RGB Color Monitor
SH 204 20MB Hard Drive

CALL FOR PRICES

INDIVIDUAL ITEMS OR PACKAGES

CALL ON THESE AND OTHER PRODUCTS
WE CARRY A COMPLETE LINE OF SOFTWARE AND HARDWARE INCLUDING PRINTERS

TOP HITS

PC Board Designer $279
Paint Pro ..... $ 39
Typing Tutor/ Word Invaders ..... $ 27
Leader Board Golf ..... $ 29
Mean 18 ..... $ 39
Borrowed Time ..... $ 39
Little Computer People ..... $ 27
Hacker ..... $ 34
Hole In One Golf ..... $ 24
Mindshadow ..... $ 39
Music Studio ..... $ 39
Paintworks ..... $ 54
Star Raiders ..... $ 18
Joust ..... $ 18
D B Master ..... $ 40
Chessmaster 2000 ..... $ 35
Ogre ..... $ 32
Sky Fox ..... $ 35
Financial Cookbook ..... $ 39
Temple of Apshai Trilogy ..... $ 27
Winter Games ..... $ 29
World Games ..... $ 29
Pawn ..... $ 34
Starglider ..... $ 34
Silent Service ..... $ 29
Easy Draw $129
Bratacus ..... $ 39
Universe II ..... $ 54
Personal Pascal ..... $ 59
Flight Simulator II ..... $ 39

Ultima II ..... $ 48
Phantasie ..... $ 32
Data Manager ST ..... $ 69
Swift Calc ST ..... $ 69
Word Writer ST ..... $ 69
Printmaster Art Gallery I & II ..... ea. $ 24
Music Box ..... $ 39
Rubber Stamp ..... $ 32
Typesetter ..... $ 32
Sundog: Frozen Legacy ..... $ 32
Copy II ..... $ 32
Thunder ..... $ 29
Homework Helper Math ..... $ 35
Computer Baseball ..... $ 29
Hitchhiker's Guide To The Galaxy ..... $ 29
A Mind Forever Voyaging ..... $ 35
Trinity ..... $ 32
ST-Talk ..... $ 15
Time Bandits ..... $ 32
Mi-Term ..... $ 39
Major Motion ..... $ 32
Ultima III ..... $ 42
Ultima III Club Book ..... $ 10
Perry Mason ..... $ 39
Final Word $116
Decimal Dungeon ..... $ 32
Fraction Action ..... $ 32
Mastertype ..... $ 32
Hex ..... $ 32

Oo-Topos ..... $ 16
Swords of Kadash ..... $ 27
dB Man $109
Space Station ..... $ 25
Deep Space ..... $ 34
Megamax "C" $169
LDW Basic ..... $ 49
Degas Elite ..... $ 59
Mark Williams "C" $149
Leather Godessses of Phobos ..... $ 39
Pinball Factory ..... $ 32
Karate ..... $ 25
Hippo Video Digitizer $129
Hippo Sound Digitizer $129
Casio CZ230S $279
Others Available - Please Call)

MEMOREX DISKS

MD-1 - Work System $18.95
(20 5¼" Disks & 50 File Box)
MD-2 - Word System $21.95
(20 5¼" Disks & 50 File Box)

MEMOREX PAPER

100 Sheets 20 Lb. Ivory ..... $ 2.45
100 Sheets 20 Lb. White ..... $ 2.45
250 Sheets 15 Lb. White ..... $ 3.95
1000 Sheets 20 Lb. White $10.95

BOOKS

ST Internals ..... $ 18.00
GEM Programmer's Reference ..... $ 18.00
ST Tricks & Tips ..... $ 18.00
ST Peeks & Pokes ..... $ 15.00
Basic Training Guide ..... $ 15.00
ST 3D Graphics ..... $ 19.95
Presenting the ST ..... $ 15.00
ST Basic to C ..... $ 18.00
ST Logo Guide ..... $ 18.00

DUST COVERS

1040 ST Computer ..... $ 9.00
520 ST Computer ..... $ 9.00
SF 314 Disk Drive ..... $ 7.00
SF 354 Disk Drive ..... $ 7.00
SC 1224 Color Monitor ..... $ 10.50
Mouse House ..... $ 5.50
Mouse Mat ..... $ 7.50

PRINTERS

OTHERS AVAILABLE – PLEASE CALL
Star Micronics LV-1210 ..... $179.00
Star Micronics NX-10 ..... $239.00
Star Micronics SG-15 ..... $369.00
Panasonic 1091-I ..... CALL
Okimate 20 ..... $239.00

BULK DISKS

Gold Star 3½" DS/DD ..... ea. $1.79
Sony 3½" DS/DD ..... ea. $2.05

ALL TITLES ON DISK UNLESS MARKED (R) FOR ROM CARTRIDGE & (C) FOR CASSETTE TAPE

Order Line
1-800-282-0333
ORDERS ONLY! Sales Personnel Do Not Have Information on Previous Orders or Product Specs.

WE CHECK FOR STOLEN VISA & MASTERCARD
M-F 10 a.m.-8 p.m.; Sat. 10-3 ET
37 S. Broad Street, Fairborn, OH 45324

Customer Service & Ohio Residents
1-513-879-9699
AD #CPST-107

VISA

SOFTWARE ONLY — Prepaid orders over $50 receive free shipping via UPS in continental U.S. Please add $2 orders under $50. HARDWARE and all orders requiring shipment via U.S. Post Office are subject to additional freight charges. Add $5 for COD orders. VISA/MasterCard orders add $2 service charge. Ohio residents add 5.5% sales tax. Personal checks require a three-week waiting period. No waiting when paid by credit card, certified check or money order. All items subject to availability and price change. PLEASE CITE AD NUMBER WHEN ORDERING. ALL RETURNS MUST BE ACCOMPANIED BY AN AUTHORIZATION NUMBER.

MasterCard

At this point, the screen is captured in memory but is not yet saved on disk. If you press Alt-Help again, the captured image will be replaced by a new screen. Unlike most cameras, Snapshot *NEO/DEGAS* can take only one picture on its "film." If you need to capture more than one screen, you must save each image on disk before pressing Alt-Help again.

To save a captured screen on disk, start by dropping down the Desk menu. (Some application programs, such as *1ST Word*, title the Desk menu with the Atari logo symbol, but it still works the same.) Then select SNAPSHOT NEO/DEGAS to activate the desk accessory. A dialog box appears and prompts you to choose the desired format: *NEO* or *DEGAS*. If you decide not to save the screen, you can click on CANCEL. (If you select SNAPSHOT NEO/DEGAS without a captured screen in memory, the accessory informs you with an alert box.)

Since the current version of *NEOchrome* loads only low-resolution files, Snapshot *NEO/DEGAS* warns you if you choose the *NEOchrome* file option when in medium or high resolution. To cancel the save, simply select the CANCEL box. However, Snapshot *NEO/DEGAS* is designed for upward compatibility, so it allows you to save a *NEOchrome*-format image in medium or high resolution in case *NEOchrome* is ever updated to handle those screen formats as well.

After you've selected the file type, Snapshot *NEO/DEGAS* opens a standard GEM file selector box which allows you to choose a filename for the stored screen image. Choose the drivepath and filename you wish to use, just as you would from BASIC or any other ST application. Again, if you choose CANCEL, or if you select OK without entering a filename, Snapshot *NEO/DEGAS* aborts the operation without saving anything to disk. If you select a filename that already exists, Snapshot *NEO/DEGAS* gives you the option to replace the existing file or cancel.

The program also checks to make sure the disk contains enough free space to hold the new file; if there's not enough room, Snapshot *NEO/DEGAS* displays an alert box and aborts without altering the disk. (Keep in mind that a picture file in any resolution in either format requires about 32K.)

Naming Picture Files

When saving pictures, you are responsible for entering a filename with the correct three-character extension for the desired picture format. Every *NEOchrome* filename must end with the .NEO extension. *DEGAS* filenames end with the extension .PI followed by a 1, 2, or 3 to indicate the screen resolution: Use .PI1 for low resolution, .PI2 for medium resolution, and .PI3 for high resolution.

If you're not sure about the extension, look at the path specification in the upper portion of the file selector box. As a convenience, Snapshot *NEO/DEGAS* supplies the correct extension for the format and resolution which you select. The filename extension does not affect the contents of the file; if you accidentally save a picture with the wrong extension, simply rename it with Show Info from the desktop.

Once you've selected a filename, Snapshot *NEO/DEGAS* saves the complete screen image on disk in the desired format, including the screen resolution and color palette which were in effect when you captured the screen. The resulting file can be loaded into *NEOchrome* or *DEGAS* and manipulated like any other picture file.

As a desk accessory, Snapshot *NEO/DEGAS* is normally available from within any GEM application. However, it's possible for an application to change what's available in the Desk menu. Some programs replace existing menus with menus of their own (or make all accessories unavailable, as in the case of *NEOchrome*), but restore them when you exit the application. If you have previously installed Snapshot *NEO/DEGAS*, it should work even when you're using such a program. Press Alt-Help to store a screen image while the application is running; the screen should blink as usual to signal that the image is captured. After you've exited the application, Snapshot *NEO/DEGAS* should reappear in the Desk menu. At this point, you can save the captured image to disk. The process of returning to the desktop does not disturb the captured image.

If Snapshot *NEO/DEGAS* does not reappear in the Desk menu when you return to the desktop, it has been forcibly removed by the application and cannot be used. It's considered bad GEM etiquette for an application to remove a desk accessory without replacing it, but you should be aware of the possibility.

Additional Notes

Snapshot *NEO/DEGAS* works correctly under circumstances where a program temporarily changes the screen resolution. For instance, *NEOchrome* always runs in low resolution, even if the computer is set for medium resolution before you run *NEOchrome*. If you capture a screen in *NEOchrome*, then exit to a medium-resolution desktop, Snapshot *NEO/DEGAS* remembers the correct resolution and saves the picture in lo-res format.

This does not apply, however, to a resolution change which does not occur under program control. If you switch resolutions from the desktop with the Set Preferences option, the ST reinitializes all desk accessories, effectively erasing any screen that Snapshot *NEO/DEGAS* has captured in memory.

Like most ST programs, Snapshot *NEO/DEGAS* opens the GEM file selector to let you choose a filename and pathname. Sometimes, calling the file selector from a desk accessory can have unexpected consequences. If the file selector box overlays an

open disk directory window on the desktop, mouse events may occasionally "leak through" the file selector and affect the underlying window. In such cases it's possible for GEM to become confused about which activity—the file selector or the disk directory window—has priority in receiving mouse input. To avoid surprises, you can close any directory windows that are likely to lie under the file selector box when it appears on the desktop.

Although Snapshot *NEO/DEGAS* itself is less than 4000 bytes in length, it needs to reserve another 32,000-odd bytes of memory to store the screen image, color palette, and other data. That shouldn't create problems unless you're running a highly memory-intensive application on a 512K machine, or are using several other desk accessories which are very large.

Normally on the ST, pressing Alt-Help activates a graphics screen dump to your printer. Snapshot *NEO/DEGAS* diverts this hardcopy vector in order to capture the screen instead. If you run another program that also tries to divert the hardcopy vector for some other reason, Snapshot *NEO/DEGAS* probably won't work correctly. To avoid conflicts, do not use any other program or utility that relies on Alt-Help while Snapshot *NEO/DEGAS* is installed. If you wish to print a hardcopy image of a screen—either from the desktop or a program like *DEGAS*—turn the computer off and reboot with a startup disk that doesn't contain SNAPSHOT.ACC. Or temporarily rename the program to SNAPSHOT.AC and reboot. (A desk accessory must have the extension .ACC to be recognized by the system.)

Snapshot *NEO/DEGAS* may not work correctly on early 520STs which require you to load TOS (the operating system) from disk. Later 520STs and all 1040STs have TOS in ROM (read only memory). There are many differences between the RAM-based and ROM-based versions of TOS. You can have an early 520ST upgraded with TOS in ROM chips at an authorized Atari service center.

Suggested Applications

Snapshot *NEO/DEGAS* is useful in many situations. You may want to create geometric figures in BASIC or Logo (or any other language, for that matter), save the picture, and then touch it up with *NEOchrome* or *DEGAS*. Many such figures can be created more easily with a program than with *NEOchrome* or *DEGAS*. Students can plot mathematical functions; dabblers in the stock market can track the progress of selected securities; artists can draw crystalline lattices.

Game players may also appreciate the ability to save screens. When you struggle to reach the all-time high score, it's nice to have a permanent record of your achievement. It also proves that you really did make a certain score, especially if you have friends who may doubt your boasts.

Another idea is to snap screens to accompany newsletter articles. The screens can be printed out with *NEOchrome* or *DEGAS*. All of the sample screens appearing in *COMPUTE!'s Atari ST Disk & Magazine* which aren't photographs are captured with Snapshot *NEO/DEGAS*, then uploaded using special software to a minicomputer/typesetter. Even some of the actual screen photographs are of captured images; some programs with animation can't be paused long enough for the long exposures required. Snapshot *NEO/DEGAS* captures a frozen image instantly.

Another useful feature of Snapshot *NEO/DEGAS* is its ability to convert a picture from *NEOchrome* to *DEGAS* format or vice versa. To convert a *NEOchrome* picture to *DEGAS* format, simply run *NEOchrome* and load the picture, select the Full Screen display, and then capture the picture by pressing Alt-Help. Exit *NEOchrome* and save the picture from the desktop with a *DEGAS* filename (use the extension .PI1 to indicate low resolution). The picture can then be loaded into *DEGAS*.

To convert from *DEGAS* to *NEOchrome* format, simply reverse the process: Capture the screen from within *DEGAS*, return to the desktop, and save it with a *NEOchrome* filename (use the extension .NEO). Since screen data is structured differently for different resolutions, this conversion works only for low-resolution pictures. You cannot convert between lo-res *NEOchrome* pictures and medium- or hi-res *DEGAS* pictures.

Incidentally, Snapshot *NEO/DEGAS* can capture a *NEOchrome* screen only when you have selected the Full Screen display. If you try to capture a screen that contains the *NEOchrome* tools at the bottom of the screen, the image will be incomplete. This is because *NEOchrome* uses special split-screen techniques to display more than the usual 16 colors in the palette box.

How It Works

The Snapshot *NEO/DEGAS* accessory is written partly in machine language and partly in C. The C portion calls the machine language module as a C function when it initializes the accessory.

The machine language module performs two functions. During initialization, it diverts the ST's hardcopy vector (Alt-Help) to point to itself instead of the screen-printing routine contained in the computer's operating system. After the entire program has initialized, the main part of the machine language portion saves a complete screen image, including the current resolution and color palette, whenever you press Alt-Help. When this occurs, the machine language module also sets a flag to inform the C module that a screen image is available to be saved.

The main portion of the program, written in C,

takes care of displaying the various dialog boxes that appear when you select the accessory. It lets you choose the file format, select a filename, and save the complete image as a disk file.

Since disk operations always involve a certain element of risk, and people have been known to change their minds, the program gives several opportunities to abort the process. If a disk error occurs (for instance, if the disk contains a bad sector or you do something foolish like removing the disk from the drive while it's busy), Snapshot *NEO/DEGAS* aborts the save and informs you that a fatal error has occurred. If you wish to try again, you must start over by pressing Alt-Help and selecting Snapshot *NEO/DEGAS* from the Desk menu.

Studying The Source Code

If you're interested in C or machine language programming, the Snapshot *NEO/DEGAS* source code offers good examples of how to manipulate disk files from C and how to combine a separate machine language module with a main C program. The C source code is on the magazine disk under the filename SNAPSHOT.C; the machine language module is named SNAP.S.

If the machine language portion is to be called as a C function, it must be given a global name that begins with an underscore character (_). For instance, the C portion of Snapshot *NEO/DEGAS* calls the machine language portion as the function *snap()*;. Accordingly, the machine language module begins by declaring _snap as a .globl name and putting the label _snap: before the first instruction in that module.

Likewise, any variables or arrays shared by the C and machine language modules must be declared globally, so that both modules can find and manipulate their contents. This particular application uses four such global objects: the array _scrbuff, which stores the captured screen image; the array _palbuff, which stores the current color palette; the variable _rez, which records the current resolution; and the variable _picflag, which serves as a simple yes/no flag to indicate whether or not a screen image is in storage.

Snapshot *NEO/DEGAS* was written with the Atari ST developer's system, also known as *Alcyon C*. With this system, the two program modules were developed separately and joined together only at the final stage, during linking. Other systems may favor a different procedure. For example, some C compilers offer an ASM macro which permits you to include machine language modules as part of your inline C source code. **ST**

520ST RAM $189 NO SOLDERING

STAGE 1 ☞ Simply open your computer case and install the ***easie*ST RAM** board into 2 existing sockets of the mother board for **1MegabyteTotal.**

STAGE 2 ☞ Upgrade to **2.5 Megabytes** by installing 16 additional soon-to-be available 1 Megabit RAM chips. Additional sockets (already provided for) will also be required on the ***easie*ST** board.
Add $20 if you want us to install the extra RAM sockets at this time.

STAGE 3 ☞ Upgrade all the way to **4 Megabytes** by removing the original 256K RAMS from the ***easie*ST** board and installing 16 more 1 Megabit parts. This stage will require some soldering on the ***easie*ST** board.

No soldering or trace cutting is ever required on the Atari board.
1 year warranty // UPS ground free // VISA & M/C 5% // C.O.D. $3

AERCO
Texas residents + 6.125%

Fine micro peripherals since 1979
Box 18093 Austin, TX 78760
(512) 451 5874

Extended Formatter

Richard Smereka

With this useful utility, you can format blank disks with an option to increase the storage capacity of either a single- or double-sided disk. It works on any ST in any screen mode, either as an "ST-Shell" command or as a stand-alone application from the GEM desktop.

As you know, a formatting command is already built into the Atari ST's GEM desktop. You insert the disk to be formatted into a drive, click the mouse on the corresponding drive icon, drop down the File menu, and select Format. A dialog box pops open to let you choose single- or double-sided formatting. It's all very quick and easy.

Why, then, is a separate utility to format a disk a useful addition to your software library? For one thing, the integral format command is available only from the GEM desktop. If you're using an alternative such as "ST-Shell"—a command-driven disk operating system which was published in the December 1986 issue of *COMPUTE!'s Atari ST Disk & Magazine*—there may be no format command available. In addition, GEM's Format option currently doesn't offer some special features that are possible in a custom formatting utility.

"Extended Formatter" fills both of these voids. First, it provides a handy format command for the ST-Shell command-line interface. (For a full description of ST-Shell, see the December issue; the ST-Shell program can be found on the December disk.) And second, as its name implies, Extended Formatter provides a special formatting option not currently supported by GEM: You can format a single-sided disk to store 404K of data instead of the standard 349K, or a double-sided disk to store 808K instead of the usual 698K. Best of all, disks formatted with this option can be read from or written to without using any special software. They're fully interchangeable with regular disks.

Extended Formatter works on any ST in any screen mode, and works with both single- and double-sided floppy disk drives.

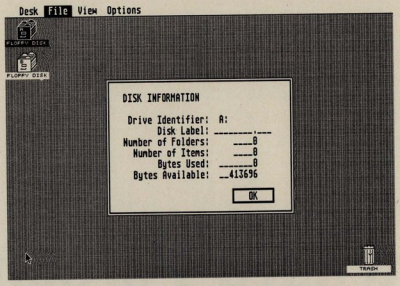
Installing On The Desktop

There are two different ways to install Extended Formatter, depending on whether you plan to use it from the GEM desktop or from a command-driven DOS such as ST-Shell.

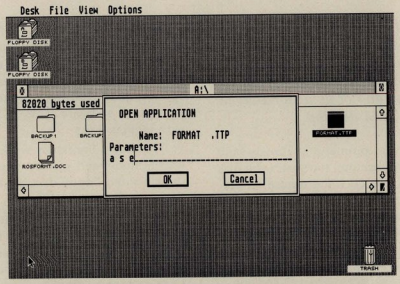
To use it from the desktop, copy the file FORMAT.XXX from the magazine disk to your own disk and rename it FORMAT.TTP. The .TTP filename extension is important. It stands for *TOS Takes Parameters*, which signals to the ST that Extended Formatter is a Tramiel Operating System program that requires certain parameters before it can function. When you run a TTP application by double-clicking on its icon, a dialog box pops open on the screen so you can enter these parameters. (We've named the program FORMAT.XXX on the magazine disk to guard against accidentally formatting the disk.)

Here are the parameters expected by Extended Formatter:

D S **[E]**



As seen in this disk information box, "Extended Formatter" boosts the capacity of both single- and double-sided disks.



When you're running "Extended Formatter" from the GEM desktop, a dialog box opens up so you can enter the proper parameters.

The first two parameters are required. *D* is the drive identifier; substitute A (for drive A) or B (for drive B). *S* indicates the number of sides to be formatted; use S for single-sided or D for double-sided. (You must have a double-sided drive to use D, of course.) The third parameter is optional; if E is entered (do not type the brackets), the extended formatting option is selected. The parameters must be separated from each other by at least one space.

Here are some examples of what you might type into the dialog box when you run Extended Formatter:

A S

This formats the disk in drive A for single-sided use.

B D

This formats the disk in drive B for double-sided use.

THE LOWEST PRICES | THE BEST SERVICE

ELECTRONIC ONE*

PHONE LINES OPEN | 10-6 E.S.T. M-F

CALL (614) 864-9994 • P.O. Box 13428 • COLUMBUS, OHIO 43213

ATARI ST COMPUTERS

520 ST UTILITIES

HIPPO SIMPLE	34.99
HIPPO SPELL	29.99
HIPPO VISION	119.99
HIPPO WORD	59.99
HOME ACCOUNTANT	46.99
HOMEPAK	34.99
HOME PLANETARIUM	19.99
INTRO TO ST LOGO	34.99
INVENTORY MASTER	69.99
IS TALK	34.99
ISO PASCAL	69.99
ISGUR PORTFOLIO SYSTEM	129.99
M-COPY	54.99
M-DISK	29.99
M-DUPE	22.99
MACRO ASSEMBLER	59.95
MACRO DESK	29.99
MACRO MANAGER	49.99
MARC WILLIAMS C	119.99
MAILROOM	49.99
MASTERTYPE	29.99
MCC PASCAL	99.99
MEGAFONT	29.99
MICHTRON BBS	34.99
MICHTRON ANIMATOR	29.99
MICHTRON UTILITIES	39.99
MIGHTY MAIL	34.99
MI-TERM	37.99
MODEL	49.99
MUSIC STUDIO	39.99
NEOCHROME	29.99
N-VISION	29.99
PAINTWORKS	45.99
PAPERCLIP ELITE	64.99
PAYROLL	69.99
PERSONAL PASCAL	49.99
PERSONAL PROLOG	59.99
PERSONAL MONEY MANAGEMENT	34.99
PHILON/FAST BASIC	99.99
PRINTMASTER	29.99
PRINTMASTER ART GALLERY I,II	19.99
PRINTMASTER ART GALLERY III	26.99
PROFESS. BUSINESS LETTERS	34.99
REGENT BASE	69.99
REGENT PAK	32.99
REGENT WORD I	34.99
REGENT WORD II (GEM VRSN)	69.99
RIGHT 90	22.99
RUBBER STAMP	29.99
SERIES BUNDLE (CD AP. GL)	132.99

520 ST ENTERTAINMENT

3-D HELICOPTER SIMULATOR	34.99
A MIND FOREVER VOYAGING	29.99
ALTERNATE REALITY	34.99
ARENA	24.99
AMAZON	34.99
AUTO DUEL	34.99
BAKER ST. DETECTIVE	12.99
BALLYHOO	29.99
BLACK CAULDRON	29.99
BORROWED TIME	34.99
BRATACCAS	34.99
BREACH	29.99
BREAKERS	34.99
BRIDGE 4.0	19.99
BRIMSTONE	29.99
CARDS (MICHTRON)	26.99
CHAMPIONSHIP WRESTLING	27.99
CHESS	42.99
CHESTMASTER	29.99
COMPUTER BASEBALL	29.99
COMPUBRIDGE	19.99
COVETED MIRROR	15.99
CRIMSON CROWN	15.99
CUT THROATS	29.99
DEADLINE	34.99
DEEP SPACE	32.99
DELTA PATROL	19.99
DIABLO	19.99
DONALD DUCKS PLAYGROUND	22.99
DRAGON WORLD	34.99
DUNGEON MASTER	29.99
EIGHT BALL	29.99
ENCHANTER	29.99
ESSEX	29.99
F-15 STRIKE EAGLE	29.99
FAHRENHEIT 451	34.99
FANTICIDE	34.99
FANTASTIC FOUR	14.99
FINAL WORD	109.99
FLIGHT SIMULATOR	36.99
FLIPSIDE	29.99
FORBIDDEN QUEST	29.99
FRANK & ERNEST	15.99
GATEWAY	36.99
GATO	34.99
GHOST TOWN	15.99
GOLDEN OLDIES	24.99
GOLDEN PATH	32.99
GOLDEN RUNNER	29.99

ATARI

520 ST ENTERTAINMENT

INFIDEL	29.99
JET	36.99
JOUST	17.99
KEMPELEN	29.99
KINGS QUEST II	32.99
KINGS QUEST III	34.99
LANDS OF HAVOC	14.99
LEADER BOARD	29.99
LEADER BOARD TOURNAMENT DISK	14.99
HIPPO BACKGAMMON	29.99
HOLE IN ONE GOLF	19.99
HULK	14.99
GOLDEN VOYAGE	14.99
GUILD OF THIEVES	32.99
GUNSHIP	29.99
HACKER	29.99
HACKER II	34.99
HEX	29.99
HITCH HIKERS GUIDE	29.99
SOUNDWAVE	36.99
SOUNDWAVE 8	119.99
ST ACCOUNTS	159.99
ST FILE	29.99
ST KEY	14.99
ST MUSIC BOX	36.99
ST TALK	13.99
HIPPO ART I	29.99
HIPPO-C	46.99

520 ST COLOR	768.00
520 ST B/W	598.00
ATARI 20 MEG HARD DRIVE	648.00
DBL SIDED DRIVE	218.00
COLOR MONITOR	318.00
B/W MONITOR	168.00
10 FT. DISK DRIVE CABLE	18.00

HIPPO CONCEPT	59.99
HIPPO DISK UTILITIES	32.99
HIPPO EPROM BURNER	119.99
HIPPO LEDGER	56.99
TASS TIMES	34.99
TEMPLE OF APSHAI	29.99
TENTH FRAME	29.99
TIME BANDITS	29.99
THE PAWN	29.99
TRANSYLVANIA	15.99
TRINITY	29.99
ULTIMA II	39.99
ULTIMA III	42.99
VIDEO VEGAS	19.99
WINNIE THE POOH	16.99
WINTER GAMES	29.99
WISH BRINGER	29.99
WITNESS	29.99
WORLD GAMES	29.99
XMEN	14.99
ZORK I,II,&III	29.99

520 ST ENTERTAINMENT

INFIDEL	29.99
JET	36.99
JOUST	17.99
KARATE	25.99
KEMPELEN	29.99
KINGS QUEST II	32.99
KINGS QUEST III	34.99
LANDS OF HAVOC	14.99
LEADER BOARD	29.99
LEADER BOARD TOURNAMENT DISK	14.99
LEATHER GODDESS	29.99
LITTLE COMPUTER PEOPLE	34.99
MAJOR MOTION	29.99
MEAN 18	32.99
MERCENARY	26.99
MINDWHEEL	29.99
MIND SHADOW	34.99
MICROLEAGUE BASEBALL	39.99
MICROLEAGUE WRESTLING	39.99
MISSION MOUSE	29.99
MOON MIST	29.99
MONKEY BUSINESS	18.99
MUD PIES	19.99
NINE PRINCES OF AMBER	34.99
OGRE	27.99
OO-TOPOS	9.99
PEGAMMON	12.99
PINBALL FACTORY	29.99
PHANTISIE	29.99
PLANETFALL	29.99
PRO FOOTBALL	29.99
PROTECTOR	22.99
PYRAMID OF DOOM	14.99
QUEST	15.99
QUIZAM	24.99
ROGUE	29.99
RVP	29.99
SAVAGE ISLAND	14.99
SAVAGE ISLAND II	14.99
SEA STALKER	29.99

520 ST ENTERTAINMENT

TASS TIMES	34.99
TEMPLE OF APSHAI	29.99
TENTH FRAME	29.99
TIME BANDITS	29.99
THE PAWN	29.99
TRANSYLVANIA	15.99
TRINITY	29.99
ULTIMA II	39.99
ULTIMA III	42.99
VIDEO VEGAS	19.99
WINNIE THE POOH	16.99
WINTER GAMES	29.99
WISHBRINGER	29.99
WITNESS	29.99
WORLD GAMES	29.99
XMEN	14.99
ZORK I,II,&III	29.99
STAR RAIDERS	18.99
STRIP POKER	26.99
SUNDOG	29.99
SUPER HUEY	29.99
SUSPECT	29.99
SUSPENDED	32.99
SWORD OF KADASH	15.99
SHANGHAI	32.99
SILENT SERVICE	29.99
SKY FOX	32.99
SORCERER	29.99
SPACE STATION	25.99
SPACEQUEST	36.99
SPELLBREAKER	32.99
SPIDERMAN	14.99
ST KARATE	29.99
STAR CROSS	32.99
STAR FLEET I	36.99
STAR LEGAL	32.99
SUSPECT	29.99
SUSPENDED	32.99

ATARI ST COMPUTERS

HOW TO ORDER: CASHIER CHECK, MONEY ORDER, MASTERCARD* OR VISA* (ADD 4% FOR CHARGE CARDS) . . . NO PERSONAL CHECKS . . . NO C.O.D.'S . . . SHIPPED U.P.S. . . . ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
SHIPPING: ADD $3.00 ON ALL ORDERS UNDER $100.00 . . . ADD $5.00 ON ALL ORDERS OVER $100.00. ACTUAL FREIGHT CHARGED ON MULTIPLE ORDERS.
INTERNATIONAL: ACTUAL FREIGHT CHARGED ON ALL ORDERS OUTSIDE THE CONTINENTAL UNITED STATES INCLUDING A.P.O.
POLICIES: NO RETURNS WITHOUT A RETURN AUTHORIZATION . . . NO RETURNS UNLESS DEFECTIVE. ALL DEFECTIVES WILL BE EXCHANGED . . . NO EXCEPTIONS. PLEASE SPECIFY

CALL OR WRITE FOR FREE CATALOG

CALL ELECTRONIC ONE (614) 864-9994 P.O. BOX 13428 COLUMBUS, OHIO 43213

A S E

This formats the disk in drive A for single-sided use and also selects the extended-formatting option (404K).

A D E

This formats the disk in drive A for double-sided use with the extended formatting option (808K).

After you've entered the parameters and clicked on the OK button or pressed Return, Extended Formatter loads into memory and then waits for you to press a key. This gives you a chance to swap disks if necessary. (On a single-drive system, naturally, you wouldn't want to format the disk from which you loaded Extended Formatter.)

That's all there is to it. Just remember that formatting erases any previous information that may have been stored on the disk. GEM's Format command warns you about this with an alert box, but Extended Formatter does not. This shouldn't be a problem, however, since the TTP dialog box should be warning enough and it also provides a Cancel button to abort the program.

Formatting From ST-Shell

A somewhat different procedure is required when you're running Extended Formatter from a command-line interface like ST-Shell instead of from the GEM desktop.

First, install Extended Formatter by copying FORMAT.XXX from the magazine disk and renaming it FORMAT.PRG. Note that you *do not* name the program FORMAT.TTP in this case.

To run Extended Formatter, type the following command line:

FORMAT *D S* [E]

The parameters are the same as those used when Extended Formatter is being run from the desktop. *D* is the drive identifier, either A or B; *S* is the number of sides to format, either S for single-sided or D for double-sided; and E is the optional parameter for extended formatting (again, omit the brackets). The parameters must be separated from each other and from the FORMAT command by at least one space. Here are some examples:

FORMAT A S

This formats the disk in drive A for single-sided use.

FORMAT B D

This formats the disk in drive B for double-sided use.

FORMAT A S E

This formats the disk in drive A for single-sided use and also selects the extended-formatting option.

FORMAT A D E

This formats the disk in drive A for double-sided use with extended formatting.

After you've entered the parameters and pressed Return, Extended Formatter loads and then waits for you to press a key. This gives you a chance to swap disks if necessary.

Additional Tips

Extended Formatter works only with microfloppy disks in drives A or B. Attempting to format a disk in any other drive causes an *invalid drive specification* error. Also, do not attempt to format a RAM disk or hard disk with this utility.

When you run Extended Formatter, there must be at least 20,000 bytes of memory available in the computer for the track buffer. If there's not enough memory, an error results.

Normally a single-sided ST disk has 349K of disk space available and a double-sided disk has 698K. The extended-format option boosts these capacities to 404K and 808K, respectively, by increasing the number of tracks on the disk as well as the number of sectors per track. There should be no problem reading from or writing to these disks with drives that are properly aligned. To avoid trouble, however, we recommend filling an extended disk with files that can be replaced and testing it awhile before entrusting it with your irreplaceable data.

When using the extended format option, you may have to change the way you copy disks. The Atari ST's disk copy routine—which is called when you drag a disk icon atop another disk icon or use the copy command from ST Shell—will not copy a normally formatted disk onto an extended format disk, or vice versa. That's because the operating system first checks to be sure the disks used in a copy operation are compatible. That is, both disks must have the same total storage space available. If not, the computer informs you that the disks are incompatible. You may have encountered this message when trying to copy a floppy disk to a RAM disk or vice versa.

To copy a normally formatted disk onto an extended format disk, copy the individual files and folders from disk to disk. The easiest way to do this is to select a number of files simultaneously by looping them with the mouse or clicking on them while holding down a Shift key. See your ST manual for more information on extended-selection copying.

It is possible, however, to copy extended format disks onto each other by dragging the disk icon or by using the copy command from ST Shell.

To minimize its size, Extended Formatter was written in machine language instead of a high-level compiled language. Programmers who wish to study how the program works can examine the file FORMAT.S on the magazine disk. **ST**

ATARI®

STation

The one STop shop

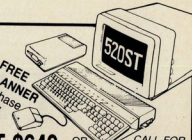
TO ORDER
CALL TOLL FREE

1-800-225-5878

IN MICHIGAN
313-595-0788

520ST $299 OR LESS!
When Purchased with Drive & Monitor

BONUS! FREE SHANNER PLANNER With ST Purchase $40 VALUE



1040 ST $649 OR LESS! *CALL FOR LATEST PRICE*

SUPRA 20 MEG
HARD DRIVE FOR ST

$645 OR LESS

THOMPSON RGB
COLOR MONITOR FOR ST

$299 OR LESS

FREE SHIPPING! IF WE DON'T SHIP YOUR MERCHANDISE WITHIN 48 HOURS OF ORDERING. HARDWARE AND A/O EXCLUDED.

BULK 3½ DISKS .99 QTY 100
SS/DD

PANASONIC 1080I

- ★ 120 CPS
- ★ EPSON/IBM
- ★ NLQ MODE
- ★ FRICTION/TRACTOR

$199

1200 BAUD MODEM KIT

- ★ AVATEX 1200 HC
- ★ ST TALK SOFTWARE
- ★ COMPUSERVE STARTER KIT
- ★ RS-232 CABLE M-F

COMPLETE KIT *JUST* **$149**

HARDWARE

ATARI 520 ST	$339
ATARI 1040ST	$649
ATARI SF314 DRIVE	$199
ATARI SF354 DRIVE	$149
ATARI SM124 MONO MONITOR	$149
ATARI SM1224 COLOR MONITOR	$329
AVATEX 1200 MODEM	$89
AVATEX 1200 H.C. MODEM	$129
CASIO CZ-101 SYNTHESIZER	$299
CASIO CZ-230S SYNTHESIZER	$349
OKIMATE 20 W/PL-N-PR	$198
PANASONIC 1080-I (120 CPS)	$199
PANASONIC 1091-I (180 CPS)	$269
PANASONIC 1592	$429
SHANNER SD2000 DUAL DS/DD 1.6 MEG DRIVE	$339
STAR LV-1210 (NLQ)	$179
STAR NX-10	$229
SUPRA 20 MEG HARD DRIVE	$645
SUPRA 30 MEG HARD DRIVE	$679
THOMPSON COLOR RGB MON	$299
UPGRADE- ME:G-A-RAM	$129
UPGRADE- EZ-RAM	$159

Diskettes

BULK 5 1/4" W/SLVS & LBLS	$.39
BULK 3 1/2"	$.99
BULK 3 1/2" DS/DD	$1.60
MAXELL 3 1/2" SS/DD (BOX)	$14.95
MAXELL 3 1/2" DS/DD (BOX)	$19.95
SONY 3 1/2" DS/DD (BOX)	$19.95
SONY 3 1/2" SS/DD (BOX)	$13.95
3 1/2" DRIVE CLEANER	$11.95

★ STORAGE ★

DISK FILE 40 - 3 1/2	$6.99
DISK FILE 60 - 5 1/4	$6.99
DISK DIRECTORY (3 1/2)	$22.99
LIBRARY CASE-3 (5 1/4)	$.99
LIBRARY CASE-5 (3 1/2)	$.99
LIBRARY CASE-10 (3 1/2)	$1.99
POCKET PAK (3 1/2)	$14.99

DUST COVERS

1040 ST	$6.95
520ST	$6.95
520ST SYSTEM	$24.95
GEMINI 10	$6.92
PANASONIC 1080/90/91	$6.95
SF 314	$2.95
SF 354	$2.95
SM 1224	$11.95
SM 124	$11.95

CABLES, INTERFACES, ETC.

AB SWITCH BOX PARALLEL	$39.95
AB SWITCH BOX RS-232	$39.95
AB-X CROSSOVER BOX PAR	$49.95
GRAPHIX AT 8-BIT-232	$299.95
MICROPRINT	$34.95
MICROSTUFFER	$59.95
P.R. CONNECTION	$29.95
RS-232 F/F 6'	$9.95
RS-232 M/F 10'	$12.95
RS-232 M/F 6'	$9.92
RS-232 M/M 6'	$9.95
ST DRIVE CABLE 6'	$14.95
ST PRINTER CABLE 10'	$9.95
ST PRINTER CABLE 6'	$6.95
XE SERIAL 6'	$9.95

CONTROLLERS

ATARI ECOMONY	$4.95
EPYX 500XJ	$14.95
REPLACEMENT MOUSE	$49.95
TAC 2	$8.95
WICO 3-WAY	$23.95
WICO BOSS	$12.95

MISC ACCESSORIES

14" TWIST-N-TILT	$14.95
5 1/4 DISK NOTCHER	$7.95
AMARAY PRINTER STAND	$14.95
MOUSE HOUSE	$4.95
MOUSE MAT	$7.95
PRINTER STAND, 2-PIECE	$12.95
SIX OUTLET SURGE STRIP	$14.95

Color Paper Labels Cards

CONT PAPER - 20LB LAZER BLUE, YELLOW, GREEN PINK, WHITE, SALMON, GOLD	
500 SHEETS (ANY COLOR)	$6.95
RAINBOW PACK #1 (P-Y-B)	$6.95
RAINBOW PACK #2 (GR-S-GO)	$6.95
• CONTINUOUS LABELS • PINK, BLUE, YELLOW, WHITE	
AUDIO CASSETTE, WHITE	$9.99
DISK (2 3/4 X 2) 250 WHITE	$4.99
FILE FOLDER (3 1/2 X 5/8) 750	$9.99
MAIL (3 1/2 X 15/16) 1000	$6.99
NAME BADGE (3 3/8 X 2 3/8) 250	$9.99
• CONTINUOUS CARD STOCK (250) • RED, GREEN, BLUE, ORANGE, WHITE	
3 X 5	$4.99
4 X 6	$7.99
5 X 7	$9.99

Ribbons
BLACK, RED, GREEN, BLUE

EPSON FX/MX/RX-80	$5.99
PANASONIC KXP/90/91/I	$9.99
STAR/OKIDATA	$2.99
XMM 801/LEGEND/BMC	$7.99
XMM 804	$7.99
ALL OTHERS	CALL

SOFTWARE

CALL FOR COMPLETE LIST OF OVER 400 TITLES

ARENA	$26.95
AUTO DUEL (A/O)	$33.95
BLACK CAULDRON	$31.95
BRATACCUS	$25.95
BREACH (A/O)	$31.95
BREAKERS	$33.95
BRIDGE 4.0	$19.95
CHAMPIONSHIP WRESTLING	$26.95
CHESS (VERY GOOD)	$47.95
CHESSMASTER (A/O)	$31.95
COMPUTER BASEBALL (A/O)	$31.95
COPY II ST	$31.95
D.B. MAN	$99.95
DAC EASY	$46.95
DATA MANAGER ST	$53.95
DEEP SPACE	$34.95
DEGAS ELITE	$51.95
DEGAS	$26.95
DIABLO	$19.95
DOLLARS AND SENSE	$66.95
FLIGHT SIMULATOR II	$34.95
DUNGEONMASTER	$26.95
EZ TRACK	$43.95
F-1 STRIKE EAGLE (A/O)	$31.95
FANTACIDE (A/O)	$33.95
I.S. TALK	$32.95
INFOCOM SOFTWARE	CALL
ISGUR PORTFOLIO SYSTEM	$133.95
KINGS QUEST	$33.95
KINGS QUEST II	$33.95
KINGS QUEST III	$33.95
LCM 200 CLOCK	$37.95
LDW BASIC COMPILER	$47.95
LEADER BOARD-EXECUTIVE	$13.95
MAJOR MOTION	$31.95
MARK WILLIAMS "C"	$119.95
MICHTRON BBS 2.0	$52.95
PRINT MASTER ART GALLERY II	$19.95
PRINT MASTER	$26.95
PUBLISHING PARTNER	$119.95
REGENT BASE	$66.95
SHANGHAI	$30.95
SKYFOX (A/O)	$31.95
ST KARATE	$26.95
STAR FLEET I	$36.95
STAR RAIDERS I	$19.95
STARGLIDER I	$26.95
WINNIE THE POOH	$16.95
WINTER GAMES	$26.95
WORD WRITER ST	$53.95
WORLD GAMES	$26.95
ZOOMRACKS II	$99.95

No surcharge for MasterCard or Visa

Ordering Information: Credit Card - Have name, card number, expiration date, shipping address and phone number (DAY) reay with order. **Personal and company checks:** Call order in - you will receive an order number, send order number and check to the P.O. Box listed. Allow 14 Business days for check to clear. **Money Orders:** Call order in - you will receive an ordernumber, send $10.00. No C.O.D.'s over $100.00, add an additional $3.00 to shipping charges for C.O.D. All areas not serviced by U.P.S. will be shipped first class insured mail. All shipping charges in excess of the above terms will be added. All goods are new and include factory warranty. (All defectives must have a return authorization number.) Please call (313)595-0788 to obtain an R.A. # or return will not be accepted. Prices and availability subject to change without notice. All correspondance should be sent to P.O. BOX 75 - Wayne, MI 48184

Picture Puzzler

Douglas N. Wheeler

Looking for an interesting diversion? This program scrambles a NEOchrome- *or* DEGAS-*format picture into a 10 × 10 jigsaw puzzle for you to reassemble on the screen. It also times how long it takes you to solve the puzzle and works in any screen resolution, color or monochrome.*

Nearly every Atari ST user accumulates at least one diskful of pictures created with *NEOchrome*, *DEGAS*, and other drawing programs. Besides the "Atari Art" feature published in each issue of *COMPUTE!'s Atari ST Disk & Magazine*, numerous screens are available from user groups and bulletin board systems. With the popular slide-show programs that are also widely available, it's easy to view these pictures in rapid succession without actually loading them into *NEOchrome* or *DEGAS*.

Now there's something new you can do with your computer art collection. "Picture Puzzler" lets you turn any *NEOchrome*- or *DEGAS*-format picture into a fascinating jigsaw puzzle that you reassemble on the screen. It even keeps track of how long it takes you to put the puzzle back together.

Picture Puzzler supports the mouse and works in any screen resolution: low-resolution color, medium-resolution color, and high-resolution monochrome. And because it's written in compiled C, it responds to your commands very quickly.

Scrambling A Screen

Two files associated with Picture Puzzler are on the magazine disk: PUZZLER.PRG, the executable program file, and PUZZLER.C, the C source code (mainly of interest to programmers). To get started, simply run PUZZLER.PRG from the disk menu or the GEM desktop in the screen resolution of your choice.

After you've clicked on the OK button to acknowledge the copyright message, a standard GEM file selector appears. This works like any other file selector; click on the filename of the picture you want to load, and then click on OK. (As a shortcut, you can double-click on the filename.) If the picture you want to load is on another disk, insert that disk in drive A and click within the file window to display the new directory. You can also change the pathname at the top of the selector window to load pictures from other drives.

Picture Puzzler automatically recognizes a *DEGAS*- or *NEOchrome*-format picture by its filename extension. *DEGAS* pictures should end in .PI1 for low resolution, .PI2 for medium resolution, and .PI3 for high resolution. *NEOchrome* pictures should always end in .NEO.

After Picture Puzzler loads the picture, it asks you to pick a difficulty level: easy, medium, or hard. (See Figure 1.) We recommend starting with easy. On this level, the program divides the picture into a 10 × 10 grid and randomly scrambles the resulting 100 pieces. The medium and hard levels scramble the picture into 100 pieces, too, but they also add a twist—literally. On the medium level, about 25 percent of the pieces are flipped upside-down. On the hard level, about 50 percent of the pieces are flipped. When you pick your level, Picture Puzzler rapidly scrambles the picture before your eyes. The result can be seen in Figure 2.

The Hard Part

So much for the easy stuff. Now it's time to reassemble the picture. To do this, you drag pieces around the screen with the mouse just as you drag files around on the GEM desktop. To pick up a piece, point to it; then click and hold the left mouse button. Drag the piece where you want it; then release the mouse button. Instantly, it's swapped with the piece that formerly occupied that spot. (See Figure 3.)

If you chose the medium or hard level, you may need to flip some pieces over. To do this, hold down either the Shift, Control, or Alternate key when you press the mouse button to drag a piece; when you release the button, the piece is dropped into place and flipped.

Reassembling a picture is not as easy as it looks. To give you some help, Picture Puzzler lets you look at the unscrambled picture when you press and hold the *right* mouse button. You can look at the picture as long as you hold down the button. But be careful: You get only three such peeks during each puzzle.

If you get frustrated and want to give up, you

ProCopy ST BACKUP UTILITY

You can't backup your software because copy protection locks you out. **ProCopy** is the key!

- Protects against the accidental loss of expensive software
- Works with all Atari STs
- Copies both S/S & D/S disks
- Use with 1 or 2 disk drives
- Not copy protected
- **FREE** shipping and handling
- **TOLL-FREE** telephone number
- Updates are only $12 with return
- Orders shipped same day
- Disk analyze function included

Dealer Inquiries Welcome

VISA MasterCard and C.O.D. orders

$34.95

Call (800) 843-1223

Send check for $34.95 (overseas add $2.00 for air mail) to:

PROCO PRODUCTS

P.O. BOX 665, CHEPACHET, RHODE ISLAND 02814 USA
(401) 568-8459

Available Internationally in Europe and Australasia

THE MOVING FINGER CO.
Building 2
Shamrock Quay
Southampton, SO1-1QL
England
Tel. 0703-227274

TECH-SOFT
COMPUTER WHOLESALE
324 Stirling Highway
Claremont
Western Australia 6010
Tel. 09-385-1885

METACOMCO

The quality source for Atari ST software
Announces

CAMBRIDGE LISP

THE SYMBOLIC LANGUAGE FOR ATARI ST and AMIGA

An interpreter/compiler providing a complete LISP development environment for $199.95

also available

Lattice 'C' - The well known Lattice 'C' compiler	$149.95
MCC Pascal - Fast ISO/ANSI standard compiler	$ 99.95
Macro Assembler - Professional quality development system	$ 79.95
BCPL - NEW! Full standard BCPL compiler	$149.95
Make - NEW! UNIX-like Make utility	$ 69.95
Menu + - Best selling ST menu generator	$ 29.95

All ST languages include Menu+ and provide full interface to GEM VDI/AES functions.

Contact your local dealer or call:
TEL: (US) 800-AKA-META (CAL) 800-GET-META
Add 6½% tax if CA resident

Metacomco
5353 #E Scotts Valley Dr., Scotts Valley, CA 95066

Registered trademarks: Lattice - Lattice, Inc.; Atari ST - Atari, Inc.; UNIX - Bell Labs.

"function_aid"

Patent Pending

- Stop fumbling for your manuals
- Put your Macros in front of you
- Rests on top of your *ST
- Adjust window to suit your light
- When finished, remove & cover keys
- 4 Blank inserts included (2" x 12")
- Designed & made only for the *ST

$24.95

*ST is a trademark of Atari Corporation

★ **Indispensible for business programs (word processors, telecommunications and data bases) etc.**

★ **Just about any program you use needs function_aid**

★ **If you own an Atari *ST you definitely need this!**

★ **Unconditional 5 year Guarantee**

If you break **function_aid**, return it and we will replace it at no charge to you.

Compuserve PPN 76410,35

STATIC ENGINEERING, INC.

P.O. Box 570, Bristol, CT 06010

(203) 879-4671

Please send _____ **function_aid(s)** at $24.95 each .... _____
Add a shipping charge of 1.87 each ..... _____
(CT residents add sales tax of 1.50 each) ..... _____
Overseas add $7.00 shipping charge ..... _____
TOTAL _____

Name _____
Address _____
City _____ State _____ Zip _____

☐ MASTER CARD ☐ VISA ☐ MONEY ORDER

Card No. _____ Exp. Date _____

Distributors of "function_aid"

Figure 1: This picture is about to be scrambled.

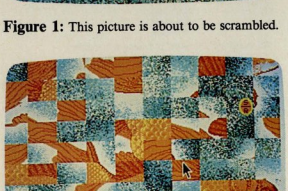


Figure 2: In seconds, "Picture Puzzler" turns the screen into a jumbled mess.

can return to the desktop by pressing both mouse buttons simultaneously. A dialog box asks you to confirm this action.

If you persevere and complete the puzzle successfully, Picture Puzzler instantly lets you know and displays a dialog box showing how long it took you to finish. At this point, you can either try another picture or exit the program.

Helpful Hints

Some of the same techniques that apply to assembling real jigsaw puzzles also work with Picture Puzzler. For example, if the screen has a border, this is always a good place to start when assembling a complex picture. If the picture contains any text, this is also a good place to begin.

You may be wondering what happens when a picture contains large areas of solid color or repeating patterns. It would seem to be nearly impossible to reassemble such a picture, because many of the pieces are visually identical. However, Picture Puzzler takes this problem into consideration. If two or more pieces really are identical, their positions are interchangeable. But if even one pixel is different, Picture Puzzler treats them as separate pieces that must be placed in their original locations.

Figure 3: An outline box appears as you drag a piece to a new location.

Despite this feature, occasionally you may assemble a picture which looks correct, but in fact is not. The problem is that more than one palette color may be assigned the same red, green, and blue values, making them indistinguishable on the screen. Picture Puzzler knows the difference and won't let you finish until you get it right. This problem can be seen in the picture entitled "Mr. X" that comes on the *DEGAS* disk. There's a border on the lower right side of the screen, though you can't see it.

Fortunately, there is a solution. When you drag a piece over one of these areas, the border of the dragged box changes colors. At any rate, keep this problem in mind if you're creating your own pictures for puzzles.

Another problem is encountered when trying to piece together sections of a picture that were spray painted. For instance, the picture of the comet on the *DEGAS* disk is just about impossible to complete because there is almost no pattern to the stars. If you want to try it, be my guest—but be sure not to waste your three peeks at the correct picture.

About The Program

As you may have noticed, this program makes use of many of the ST's special features. The source code is well documented if you want to experiment with the program. It was compiled with *Megamax C*, so some changes may be necessary to make it compatible with other versions of C.

Here's a brief look at a few generic functions which may be of use in your own programs:

- rnd(*n*)—returns a random integer between 0 and $n-1$.
- copy(*orig, new, words*)—copies a portion of memory of length *words* from *orig* to *new*, where *orig* and *new* are memory locations.
- compare(*orig, new, words*)—compares two areas of memory as defined by *orig, new,* and *words*. Returns a zero if they match, or a one if they do not.
- exchange(*orig, new, words*)—exchanges two areas of memory as defined by *orig, new,* and *words*. **ST**

PUBLIC NOTICE

GEMINI WILL MATCH ANY ADVERTISED PRICE & GIVE FREE SHIPPING

ORDERS SHIPPED WITHIN 24 HOURS
FULL EXCHANGE ON DEFECTIVES

Gemini Enterprises, one of Atari's largest dealers, will match any advertised price and ship FREE in continental U.S. Send certified check or money order, stating publication & page number of item you want price matching on, to —

GEMINI ENTERPRISES

692 Milford Road
East Stroudsburg, PA 18301

(717) 424-2248

$5.00 HANDLING CHARGE FOR APO & FPO ADDRESS.

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
- Resource Construction Set • Make

Benchmark	Compile Time	Execute Time	Size
Sieve	70	2.28	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

100% ERROR FREE
DISKETTES

GUARANTEED FOREVER
100% ERROR FREE

With Hub Rings
Write Protect Tabs
Tyvec Envelopes

36¢ Each

In Factory-Sealed
Poly Packs
Sold in Lots of 100

QUALITY PRINTER RIBBONS

Apple Imagewriter	$3.95 ea
Okidata 80/82/83	$1.49 ea
Epson LX 80/90	$2.95 ea

Sold 6/Box (Minimum)

Min. Order $25.00. S&H Continental USA: $4.00/100 or fewer disks; discount at 300. Ribbons $.25 each. Foreign orders APO/FPO, please call. MI residents add 4% tax. Prices subject to change without notice. Hours 8:30 AM - 7:00 PM.

Precision Data Products™
P.O. Box 8367, Grand Rapids, MI 49518
(616) 452-3457 • Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028

THE ATARI TEN COMMANDMENTS

IV

"We shall create a computer that lets consumers choose what's right for them."

Jack Tramiel

Some of our competitors insist that you do things their way. IBM®, for example, forces you to use command keys. And Apple®, forces you to use a mouse.

The revolutionary 1040ST™ Computer gives you both.

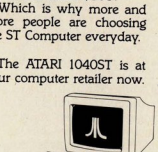
If you feel more in command with command keys and a professional keyboard, the ST™ has them. If you feel more comfortable with the immediate response of a mouse, the ST Computer has that also.

The 1040ST takes 16-bit, 68000 technology to its limit. It is two to four times more powerful than the Macintosh™ or the PC AT™ And far faster as well.

And you get all the power and performance of the ST for an incredible $999.

Which is why more and more people are choosing the ST Computer everyday.

The ATARI 1040ST is at your computer retailer now.



ATARI

© 1986 Atari Corp. ATARI, ST, & 1040ST are TM's or reg. TM's of Atari Corp. Apple is a reg. TM of Apple Computer, Inc. IBM & AT are TM's or reg. TM's of International Business Machines Corporation. Macintosh is a TM licensed to Apple Computer, Inc.

AC/FORTRAN™

Mainframe quality, full feature **ANSI FORTRAN 77** compiler includes: **Debugger,** Linker, Library Manager, Runtime Library, **IEEE** math, and **C** interface. Supports **Complex** numbers, **Virtual** arrays, **Overlays** and Dynamic Linking generates directly executable object code for MC68000. Not copy protected.

AC/BASIC™ - Coming Soon

From the authors of **Microsoft BASIC** compiler for Macintosh, comes AC/BASIC for the Atari ST. Fully compatible with the **Microsoft 68000** interpreter: plus programs written in MS BASIC can easily be ported from other machines. Includes **Debugger, BLOCK IF, CASE** statement, and **STATIC** keyword extensions; executes up **50x** faster than interpreted BASIC. AC/BASIC is the new reference standard for MC68000 based personal computers. Not copy protected.

Telephone orders welcome

absoft

MasterCard VISA American Express Card

Scientific/Engineering Software
4268 N. Woodward, Royal Oak, MI 48072/(313) 549-7111

Atari and ST, trademarks of Atari Corp. Microsoft and MS trademark of Microsoft Corp.

NEW! for the ST

SoftWerx presents MaxPak™
a comprehensive productivity package for the ST

MAXPAK™

Nine powerful programs combine in MaxPak™ to help you get the most out of your ST

High -Speed Print Spooler
No more waiting for printing. Immediately returns you to your program. Abort, reprint, or redirect the spooler to a disk file. Page jammed? No problem! Reprint any or all pages as many times as you like.

Printer Magic
Access the enhanced print features of any printer from any ST word processor, spreadsheet, or program. Turn printer features on and off via a GEM menu or by imbedding printer commands in your document.

Math Magic
Calculate algebraic expressions from any GEM or non-GEM program. Just type in the expression and the result pops into your program.

File Lister
Print out documents, program listings, and text files. Options are headings, page numbers, line numbers, tab expansion & more.

Screen Clock
Flickerless digital clock, unobtrusively ticks away the seconds in the corner of the screen. Sets time on power up.

Macro Keys
Record frequently used phrases, passwords, or keystroke sequences and assign them to any key on the keyboard. MaxPak™ will instantly play them back to your program with a single keystroke.

Ram Disk
An ultra-fast, variable size, memory based disk drive. Automatically copies files to the ramdisk when you power up.

Screen Saver
Prevents damage to CRT phosphors. Automatically turns off the ST's screen if you haven't touched the keyboard or mouse for a while. Just nudge the mouse or press a key and the screen instantly returns.

ST Character Set
Access the full ST extended character set from any GEM program. Click on the character and it pops in.

All MaxPak functions work in all three ST screen resolutions with GEM and non-GEM programs. MaxPak gives your ST a boost in capability and performance that no ST user will want to be without. Maximize your ST system with MaxPak!

Available at ST dealers nationwide. To order by credit card call (801) 272-5623 $49.95

SOFTWERX
P.O. Box 71118 Murray, UT 84107

Also by SoftWerx, watch for:
StakPak™ a whole Stack of powerful accessories for your ST.
ThinkPak™ an outline processor that lets you organize your thoughts into useful outlines.

Atari ST is a trademark of Atari Corporation. MaxPak™ is a trademark of SoftWerx.

THE ATARI TEN COMMANDMENTS

#V

"We shall create a computer that gives consumers Power Without the Price."

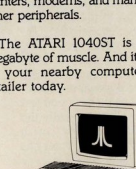
Jack Tramiel

Our amazing 1040ST™ Computer is the world's first PC to cost less than $1. per kilobyte.

How does that stack up against the competition? You'll pay over $2. per kilobyte for the Macintosh™ Plus. More than $7. per kilobyte for the Amiga™. And the PC AT™ kilobyte weighs in at a whopping $18. That's why the 1040ST brings new meaning to the word "value."

For a revolutionary $999., the ST™ Computer gives you a megabyte of memory. It's a complete package, with CPU, drive, monitor, and mouse. Its keyboard is packed with function keys and a numeric keypad. Expandability is a built-in bonus. There are industry-standard ports for printers, modems, and many other peripherals.

The ATARI 1040ST is a megabyte of muscle. And it's at your nearby computer retailer today.



© 1985, Atari Corp.
ATARI, ST, & 1040ST are TM's or reg. TM's of Atari Corp. Amiga is a TM of Commodore-Amiga, Inc.
PC AT is a TM of International Business Machines Corporation. Macintosh is a TM licensed to Apple Computer, Inc.
Prices are manufacturers' suggested prices, August 1985. Actual retail prices may vary.

DUST COVERS

★ CUSTOM MADE TO FIT
★ HEAVY 32-oz. VINYL ANTI-STATIC
★ EXTENDS EQUIPMENT LIFE
★ Choice of Colors Light Tan or Brown

COMPUTERS	
C-64, Plus 4	8.00
C-128	13.00
Datassette (C2N)	5.00
Amiga 1000	13.00
IW/Amiga Mon. Stacked	20.00
Keyboard only	7.00
Atari 800XL, 130XE	11.00
Atari 520 ST	14.00
IBM PC, XT	28.00
IBM 5051 Keyboard	8.00
(Dimensions Required for IBM Clones)	

DISK DRIVES	
C-1541, C-1571	8.00
Amiga 3½" D Drv	8.00
Amiga 5¼" D Drv	9.00
Indust GT, MSD SD-1	8.00
MSD SD-2	10.00
Enhancer 2000	8.00
FSD-1	8.00
Atari 1050	8.00

VIDEO RECORDERS (State Make & Model Include Dimensions)	13.00

PRINTERS	
C-1525/MPS 801	10.00
C-1526/MPS 802	13.00

PRINTERS	
C-MPS 803, C-1520	8.00
Panasonic 1090/91	13.00
Gemini 10 & Star 10's	13.00
Gemini 15 & Star 15's	16.00
Okidata 92	13.00
Okidata 120/192	13.00
Okimate 10/20	8.00
Epson MX/FX/RX80	13.00
Epson LX80/C-1000	13.00
Seikosha SP-1000	13.00
Comrex 220	13.00
C Itoh 7500	13.00
Citizen MSP 10	13.00
Atari 1027	13.00
C DPS 1101	16.00

MONITORS	
Atari SC 1224 RGB	19.00
C-1702, BMC Color	16.00
C-1902 Amiga	19.00
Amdek 300-700	19.00
Teknika MJ 10/22	19.00
CM-141 (C-1802)	19.00
Gold Star 13" Color	19.00
Thompson CM 365-66	19.00
C-1902A Magnvx 40	19.00
Magnavox 80	19.00
NEC 1225	19.00
Taxan 220	19.00
Sakata SC-100	19.00
Zenith 122/123	19.00
Zenith 131/133	23.00

Order by stating MAKE, MODEL and COLOR CHOICE TAN or BROWN with check or money order plus $1.50 per item ($4.50 max.) shipping and handling (Foreign air extra). Calif. Res. Include 6.5% State Tax.

SPECIAL COVERS WILL BE MADE TO YOUR DIMENSIONS. SEND YOUR REQUIREMENTS FOR OUR LOW PRICE QUOTES.

Crown Custom Covers
24621 PAIGE CIRCLE, DEPT. A
LAGUNA HILLS, CA 92653
(714) 472-6362

Choosing A Compiler

So far, we've discussed why it's a good idea to learn to program in C, and a little of what the C language is like. Those of you who think you'd like to try C are now faced with the problem of choosing a C compiler. You have several versions of C to choose from on the ST.

The process of comparing compilers, however, is complicated by the fact that the compiler itself does not make up a complete C programming environment. In order to effectively program in C on the ST, you need not only a C compiler, but also a text editor, linker, command processor shell, resource file construction program, and documentation of the GEM (Graphics Environment Manager) and TOS (Tramiel Operating System) functions. You might also want an assembler, disassembler, debugger, program librarian, and make utility. Each of the C compilers currently being sold contains some, but not all, of these features.

C compilers for the ST are available from Alcyon, Megamax, MetaComCo, and GST. Another package, *Haba Hippo C*, has been discontinued, though copies are probably still available from existing stock. Still another, *Mark Williams C*—a package popular on the IBM PC—has recently become available, but at this writing we have not yet obtained a copy for review.

Of the compilers we've seen, we'll pass by the two lowest-priced entries, *Haba Hippo C* and *GST C*. *Hippo C* was the first C compiler available for the ST other than Atari's own development system (*Alcyon C*). *Hippo C* was lacking in such areas as floating-point math and GEM support, and had so many other problems that it was ultimately withdrawn from the market.

GST C is not nearly as problem-ridden as *Hippo C*, and in fact has many positive features. For a very low price it offers not only the compiler and linker, but also an assembler, text editor, and menu-driven command shell. It also offers complete GEM support (though it doesn't include GEM documentation). The major problem with *GST C* is that it's not really a complete implementation of the C language. It lacks such major features as floating-point math, casts, and structures. This is not to say that you can't develop significant programs with *GST C*; GST reportedly used it in-house to develop *1ST Word*, the word processor included with every ST. But if you're just learning to program on the ST, you're confronted with adapting to both a new language and a complex operating system, and it's extremely difficult to work around the eccentricities of a nonstandard compiler at the same time.

Alcyon C: Wheat And Chaff

The first C compiler to appear for the ST was *Alcyon C*, which is included in the kit which Atari sells to software developers. The $300 developer's kit is a package deal, however, so you can't buy *Alcyon C* without also paying for everything else in the kit—mostly documentation. This makes *Alcyon C* the most expensive C package and probably the most extensive as well.

Atari's GEM and ST documentation represents both the best and the worst available. It's the best because it contains the most ST information you can get in one place, and it's the worst because precious little of it was written specifically for the ST.

Take, for example, the GEM documentation. Basically it consists of poor photocopies of Digital Research's preliminary GEM manuals for the IBM PC, complete with 8088 machine language examples that have nothing to do with the 68000-based Atari ST. Atari didn't add any material on how GEM differs on the ST, nor did it try to eliminate the large quantity of irrelevant material that relates only to the PC. It's up to the reader to separate the wheat from the chaff. So while the documentation starts out as a stack of about 2000 loose sheets of paper, by the time you get rid of the IBM GEM installation manual, material on CP/M–68K, and more information than you'll ever want to know about the Kermit communications transfer protocol, you're left with a much smaller pile.

The good stuff consists mainly of the *Hitchhiker's Guide to the BIOS*, the *Line A Document*, a GEMDOS manual, some hardware specifications, and miscellaneous loose ends. This material is very helpful but is incomplete, not entirely free from errors, and poorly organized (some of it exists only as disk files that you must print yourself). There have been some indications that Atari is in the process

Sheldon Leemon

COMPUTE!'s Atari ST DISK & MAGAZINE

SAVE $17.00*

Say "YES" now to COMPUTE!'s Atari ST Disk & Magazine.

If you're one of the tens of thousands who've recently purchased an Atari ST, *here's great news!*

Introducing COMPUTE!'s Atari ST Disk & Magazine—an exciting new publication devoted exclusively to the special needs and interests of Atari ST users like you. And this special introductory offer is a great way to get acquainted.

Every other month, COMPUTE!'s Atari ST Disk & Magazine brings you exciting new action-packed programs already on disk! Each is ready to run. Just load the disk and you're ready to go.

You can depend on getting at least five new programs in each issue—high-quality educational, home finance, utility, and game programs you and the entire family will use, enjoy, and profit from all year long.

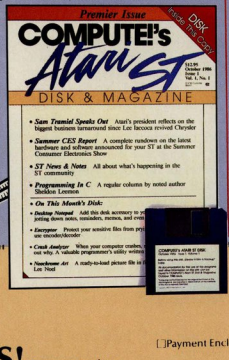
*Off the cover price

Fact is, the fantastic programs alone are worth much, much more than the low COMPUTE!'s Atari ST Disk & Magazine subscription price. But exciting new programs are just the very beginning of what you'll get as a COMPUTE!'s Atari ST Disk & Magazine subscriber.

Has a hot new piece of software suddenly hit the market? Turn to the magazine section and find out fast—and first. Our up-to-the-minute software reviews are timely and complete. And you can depend on each issue to deliver the latest inside word on everything from interfaces to languages...programming to disk drives. If it has anything to do with your Atari ST, you'll find out right here in the pages of COMPUTE!'s Atari ST Disk & Magazine...the definitive guide to your new Atari ST computer.

So subscribe today and take advantage of our special introductory offer. Sign up now and get a full year's subscription—6 big issues—for just $59.95. You save $17 off the regular subscription price.

But hurry. A deal this special can't last forever. So return the attached reply card now!



NEW!

Mail coupon today or call toll-free

1-800-247-5470

In Iowa

1-800-532-1272

COMPUTE!'s Atari ST Disk & Magazine

A **COMPUTE!** Publication

Mail today to:
COMPUTE!'s Atari ST Disk & Magazine
P.O. Box 10775
Des Moines, IA 50340

[ ]Payment Enclosed [ ]Bill My Visa/MasterCard/American Express**

Credit Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

**For American Express call toll free 1-800-247-5470, in Iowa, 1-800-532-1272

Outside U.S.A., please add $10 (U.S. Funds) or $20 (Air Mail) per year for postage.

CHARTER SUBSCRIPTION OPPORTUNITY

☐**YES!** Sign me up for a year's subscription to COMPUTE!'s Atari ST Disk & Magazine at the special introductory rate of just $59.95. Send me 6 big issues of the disk and magazine—at a savings of $17 off the newsstand price.

of writing a set of polished, professional manuals.

Probably just as helpful as the printed documentation, or more so, is the support that Atari provides in the Atari Developers' Forum on the CompuServe Information Service. To reach this area, log on and type GO ATARIDEV. Atari representatives are available online to answer programming questions, and they also provide programming examples and timely updates to the manuals. Although this service goes a long way toward filling in the gaps left by the written documentation, it's not free.

The *Alcyon C* Compiler

Alcyon C consists of a three-pass compiler that generates machine language source code, plus an assembler. After you've run those four programs, you still have to put your object code through the linker and Relmod utility to convert it into a form that can be loaded by GEMDOS (GEM Disk Operating System). To make running these six programs a little more bearable, Atari includes a minimal batch utility program that lets you set up text scripts which describe a sequence of programs to be run with one command.

Although the batch utility makes compiling and linking more convenient, it doesn't do much to speed up the process. *Alcyon C* produces good results, but having to load and run so many programs makes it slower for development than any other C compiler. It's theoretically possible to run this compiler with just one single-sided drive, but it's not something I'd recommend if your time is worth more to you than 30 cents an hour. A hard disk drive—or better still, a very large RAM disk—is the only way to go with this package.

The compiler itself is solid and professional. It offers several compile-time options that can be invoked with flags in the command line, including one which specifies a search path for include files. It has good support for floating-point math, and the library of standard functions is quite adequate.

As usual with this package, however, the compiler documentation is not really specific to the ST version of *Alcyon C*. Instead, you get photocopies of the Digital Research CP/M–68K C documentation, along with Alcyon's generic Motorola development system manual. It's up to you to figure out what applies to the system you're working with. Nevertheless, all of the material is there, somewhere.

Valuable Extras

The *Alcyon C* package includes a large collection of auxiliary software. Digital Research's *Resource Construction Set* (RCS) is almost indispensable for creating GEM program resources such as menus and icons. For creating source code, there is the *Micro-EMACS* editor, a non-GEM command-driven text editor that is also available in many public domain versions. The *AR68 Program Librarian* helps manage system library files. *SID* is a symbolic assembly-level debugger.

There's also a simple, usable-but-buggy command processor shell called COMMAND.TOS that operates something like the MS-DOS interface. (Personally, I prefer the Michtron *DOS Shell* program, which is more complete and reliable.) And to compensate for the disorganized documentation, the program disks include good source code for a sample GEM application and desk accessory.

In summary, the Atari developer's kit contains everything you need to write great GEM software, but finding it can sometimes resemble a high-tech adventure game.

Although Atari doesn't limit the sale of its developer's kit as some manufacturers do (Atari's definition of a developer is somebody who is willing to spend $300), the prospective buyer should exercise discretion. This package is mostly for those who are seriously dedicated to producing commercial applications.

Megamax C: Complete And Concise

The *Megamax C* compiler package provides a development system almost as complete as Atari's, but in a much more attractive and usable format and at a more affordable price ($200). The GEM documentation isn't as extensive as the Digital Research material from Atari, but that's mostly because it doesn't contain any extraneous information.

Instead, each GEM library call is summarized on its own page, complete with an example of the syntax, a full explanation of the function, and its input and output parameters. Brief overview sections provide a little insight into how to put the calls together. Similar concise explanations are offered for BIOS (Basic Input/Output System), XBIOS (extended BIOS), and GEMDOS routines. In addition, there are chapters covering system global variables, keyboard codes, and system error codes.

In short, Megamax has taken all of the most useful ST information and summarized it in a convenient and attractive format, complete with a table of contents and index. The documentation for the compiler itself is also neatly laid out. Its most serious flaw is that there's no list explaining the compiler or linker error messages, which can make it quite difficult to figure out where you've gone wrong.

Megamax's previous 68000 compiler was created for the Macintosh, and for good or ill that experience has shaped the ST version of C. On the positive side, Megamax is obviously used to dealing with a mouse-driven windowing environment, and it shows in the way in which *Megamax C* takes advantage of the user interface.

For example, while it's

convenient to use the GEM desktop icons to run a single program, it isn't so convenient when you have to edit, compile, link, and test an application over and over again. So Megamax provides a shell program from which you can easily edit, compile, link, and run the program you're writing. It even has a built-in make utility that lets you compile and link in one step. Moreover, when a compile fails, you end up back in the text editor with your source code and a list of the compile errors in separate windows.

The 32K Ceiling

But Megamax's Macintosh background also has some drawbacks. Macintosh programs use position-independent code, which limits program code and data segments to a maximum size of 32K. While Mac programmers are used to this by now, it seems to have thrown the ST world for a loop. Whenever I mentioned the Megamax compiler to any of its competitors, they almost always said the same thing: It's a nice, fast compiler for small applications, but it isn't really useful for serious work because it limits you to 32K programs.

Of course, if that were true, there wouldn't be any Macintosh software. The 32K limit on program segments means only that any single function must be less than 32K. To create programs larger than 32K, you simply string the 32K sections together.

Likewise, the 32K data section limit means you can't declare an array with more than 32K of elements. You can, however, work with larger data arrays by using the *malloc* function to allocate the memory, then declaring a pointer to that memory block.

Swift Compilation

The *Megamax C* compiler itself is a fast and simple one-pass compiler. True, this simplicity does limit your options somewhat. For example, since there are no compile-time directives, all header files must either be in the same folder as the source file, or in the HEADERS folder within the MEGAMAX folder. The MEGAMAX folder, in turn, must be on the disk's root directory, which irritates some hard disk users. Also, compiler error messages are directed to a disk file without consulting you for your opinion.

In general, *Megamax C* is very compatible with *Alcyon C* source code. It uses 16-bit integers, which simplify GEM programming. As many published benchmarks have shown, the object code produced by *Megamax C* tends to be smaller and faster than that produced by *Alcyon C*—in some cases, significantly so.

A more important distinction is the time and trouble required to compile a program with each package. Unlike the large and unwieldy collection of programs required for *Alcyon C*, all of the necessary *Megamax C* programs fit neatly on one single-sided disk with room left over for source code. And the Megamax compiler works so quickly that it's actually much faster to compile and link a program using *Megamax C* with a floppy drive than it is to use *Alcyon C* on a hard disk. If you use *Megamax C* with a hard disk or RAM disk, it's almost like working with an interpreter rather than a compiler.

The auxiliary programs in the Megamax package are outstanding. It is the only C package besides Atari's that comes with a resource construction set. Resource files are all but essential to creating GEM applications that use drop-down menus, dialog boxes, and icons, and it is almost prohibitively tedious to create them manually. A resource construction set, therefore, is practically a necessity for serious GEM programmers.

The *Megamax C* linker is intelligent enough to load only the modules necessary to resolve external references in your source code, which reduces the size of executable object files. Also, because it automatically searches the system library, your command line merely has to specify the name of your object module.

Sorry, No Assembler

Along with the linker there's a librarian and a code improver that performs branch optimization. The text editor is nice, but probably too Mac-like for most ST users—it won't let you move the cursor with the cursor keys, and it's limited to 32K files. Of course, you're free to use any other standard ASCII text editor or word processor to create your source code.

There's no assembler in the Megamax package, and some would say that none is necessary since the compiler accepts in-line assembly commands and thus doubles as an assembler. Still, some people like a compiler that generates assembler source code so they can optimize sections of the program. This isn't possible with *Megamax C* unless you use its disassembler to break down your program and then reconstruct it as source code.

Finally, the Megamax package contains even more example programs than Atari's, including the same application and desk accessory program source.

The only other viable C product I've seen that's cheaper is MetaComCo's *Lattice C*. While this is a good, full C compiler with an excellent standard library, it suffers from some serious problems. First, the *int* data type is 32 bits long instead of 16, which causes portability problems with *Alcyon C*. Second, it doesn't include a resource construction set, which puts a damper on GEM programming. And third, it doesn't include any GEM documentation. By the time you finish buying the extra books you need, your investment will equal the cost of *Megamax C*.

But the real clincher is the compiling time. Unless you're trying to finish *War and Peace* while your programs compile and link, you'll find *Megamax C*'s speed to be a lifesaver. **ST**

You smirk. Your opponent winces. You bow. So does he. The *World Karate Championship*™ begins. Slowly, ever so slowly, you approach. He flinches, and you make a combination front punch and kick. You spin, then do a reverse kick. A forward flip. You kick again, only higher. Bang. It connects. Lights out.

This time, you survived in one piece.

You'll have 17 intricate moves to master.

As you progress, you'll fight your way from white to black belt in 8 deadly, international settings. With a final, championship match at the base of Mt. Fuji. See you at the Dojo.

One or two players. Apple II & compatibles, Atari 800/130, C64/128, IBM & compatibles.

Practice long enough and your fingers will be registered as lethal weapons.

SMASH SOMEONE'S FACE IN THE COMFORT OF YOUR OWN HOME.

It's the Sultans of Slam. The Gurus of Gashes. The meanest, nastiest rowdies to ever hit the canvas. Ladies and not-so-Gentlemen, we proudly present the vile, irreputable stars of *Championship Wrestling*™.

These animals use every trick known to man. And a few that aren't.

There are 8 of these creeps in all, each with their own disgusting personalities and revolting habits.

Throw them from the ring. Crush their heads. Slam them to the mat. Pulverize their puny bones. You'll have over 25 moves to pin your man. You'll need over 250 stitches if you don't.

And one day, after your poor battered head resembles an over-cooked cabbage, you'll be good enough to win the title. And the Championship Wrestling Belt will be yours.

EPYX

One to eight players. Apple II & compatibles, Atari ST, C64/128.

Finnish

Steve Rehrauer

Each issue, COMPUTE!'s Atari ST Disk & Magazine *features a screen of computer artwork contributed by an ST artist. The screen is on the magazine disk in* NEOchrome *format under the filename ART.NEO. It can be loaded into any graphics-design program compatible with* NEOchrome *files. If you want to contribute a screen, send the disk to* COMPUTE!'s Atari ST Disk & Magazine, *P.O. Box 5406, Greensboro, NC 27403. All artwork must be completely original and previously unpublished in any form. Screens should be drawn in the low-resolution color mode. Please include a paragraph or two or text describing the artwork and any special techniques employed. We pay $100 plus disk royalties for each screen accepted for publication. Artwork accepted for publication becomes the property of COMPUTE! Publications, Inc.*

Notes From The Artist

I am a software engineer at Prime Computer in Framingham, Massachusetts, working in the area of compiler design. At home I use my 520ST for fun and profit, and hope to soon see more of the latter. I have several projects in the works, but take a break now and then with *DEGAS* and *NEOchrome.* I used both of these programs, plus an advance copy of *DEGAS Elite,* to create "Finnish." I originally had only a monochrome monitor with my ST system, and "Finnish" was one of my first color efforts. In this picture I was trying to capture the metallic sheen and flowing grace of a goldfish. I am slowly learning to use color effectively at the expense of lower resolution.

ST

Software Discounters of America

S.D. of A.

For Orders Only—1-800-225-7638
PA Orders—1-800-223-7784
Customer Service 412-361-5291

- Free shipping on orders over $100 in continental USA
- No surcharge for VISA/MasterCard
- Your card is not charged until we ship

ACTIVISION
HOME COMPUTER SOFTWARE

The graphics editor and paint program for Atari ST computers.

Paintworks
List 69.95
Our Discount Price 44.

ABACUS BOOKS	
ST Basic to C	$33
ST Basic Training Guide	$33
ST Gem Prog. Ref.	$33
ST Graphics & Sound	$33
ST Internals	$33
ST Logo	$33
ST Machine Language	$33
ST Midi Programming	$33
ST Peeks & Pokes	$33
ST 3-D Graphics	$33
ST Tricks & Tips	$33
ABACUS SOFTWARE	
Assem/Pro	$39
Data Trieve	$33
Forth/MT	$33
PC Board Designer	$129
Paint Pro	$33
Text Pro	$33
ACADEMY	
Typing Tutor	$23
ACCESS	
Leader Board Golf	$25
L.B. Tourn. Disk #1	$14
Tenth Frame	$25
ACCOLADE	
Mean 18 Golf	$25
Mean 18 Famous Course Data Disk	$14
ACTION	
Timekeeper Clock Card	Call
ACTIVISION	
Borrowed Time	$33
Hacker II: The Doomsday Papers	$33
Little Computer People Discovery Kit	$33
Mindshadow	$33
Music Studio	$39
Shanghai	$29
Tass Times in Tonetown	$33
ARCADIA	
Ninja	$19
Renegade	$19
ARTWORX	
Bridge 4.0	$19
Compubridge	$19
Hole In One Golf	$19
Mail List	$14
Peggammon	$12
Strip Poker	$25
Thai Boxing	$14
BATTERIES INCLUDED	
D.E.G.A.S.	$23
D.E.G.A.S. Elite	$49
I*S Talk	$33
Isgur Portfolio System	$129
Paperclip Elite	Call
Thunder: The Writers Assistant	$25
Time Link: The Time Management System	$33
CENTRAL POINT	
Copy 2	$25
CDA	
America Cooks Series:	
American	$9.95
Chinese	$9.95
French	$9.95
Italian	$9.95
Mexican	$9.95
DAC	
Dac Easy Accounting	$49
Dac Easy Payroll	$33
**requires double-sided drive & 132 column printer*	
DATASOFT	
Alternate Reality: The City	$25
ELECTRONIC ARTS	
Chessmaster 2000	$29
Financial Cookbook	$33
Skyfox	$29
Star Fleet 1	$33
EPYX	
Champ. Wrestling	$23
Rogue	$23
Super Cycle	$23
Temple Apshai Trilogy	$23
Winter Games	$23
World Games	$23
World Karate Champ.	Call
FIREBIRD	
Starglider	$29
The Pawn	$29
FTL	
Dungeon Master	$25
X-Rated Graphics Library Disk for Printmaster (not for kids)	$16
MICHTRON	
BBS 2.0	$49
Back Up	$25
Business Tools	$33
Calendar	$19
Cornerman	$33
Eight Ball	$19
Major Motion	$25
M-Disk	$25
Mi-Term	$33
Personal Money Mgr.	$33
Pinball Factory	$25
Pro-Football Wizard	$25
Soft Spool	$19
Time Bandit	$25
Utilities	$39
MICROLEAGUE	
WWF Wrestling	Call
MICROPROSE	
Gunship	Call
Silent Service	$25
MI-GRAPH	
Easy Draw 2.0	$49

Smash somebody's face in the comfort of your own home.

Championship Wrestling
List 39.95
Our Discount Price 23.

Join the World Hall of Fame. That is, if you acquire the gold.

World Games List 39.95
Our Discount Price 23.

PCA	
The Graphic Artist	$129
The Font Editor	$49
The Font Pak	$33
PENGUIN/POLARWARE	
Crimson Crown	$14
Oo-Topos	$14
Sword of Kadash	$14
Transylvania	$14
REGENT	
Regent Base	$59
Regent Word 2	$59
SHELBOURNE	
ST Pool	$23
SIERRA	
Black Cauldron	$25
Kings Quest 2	$33
Winnie the Pooh	$16
SPECTRUM HOLOBYTE	
Gato	$25
SSI	
Phantasie	$25
SUBLOGIC	
Flight Simulator 2	$33
Jet	Call
TDI	
Modula 2	$49
Modula 2 (Dev)	Call
TIMEWORKS	
Data Manager	
w/Report Mgr.	$49
Swiftcalc w/Sideways	$49
Word Writer w/85,000 Spell Checker	$49
UNICORN	
Decimal Dungeon	$25
Fraction Action	$25
Math Wizard	$25
Read & Rhyme	$25
UNISON WORLD	
Art Gallery 1	$19
Art Gallery 2	$19
Print Master	$25
XLENT	
Megafont	$25
Rubber Stamp	$25
ST Music Box	$33
Typesetter Elite	$33
Write 90*	$19
ACCESSORIES	
Anchor VM 520 300/1200 Baud Modem w/Software (Hayes Compatible)	$139
Bulk Disks 3½	Call
Compuserve Starter Kit ($25 usage credit)	$19
Disk Case (Holds 40)	$9
Dow Jones Starter Kit (5 hr.)	$14
Epyx 500 XJ Joystick	$14
Kraft Joystick	$9
Magnum Joystick	$12
Supra 20 meg Hard Disk Drive	Call
Wico Black Max	$9
Wico Boss	$12
Wico Bat Handle	$17
Wico Three Way	$21

Super Cycle, the challenge—have you got what it takes to win it all?

Super Cycle
List 39.95
Our Discount Price 23.

R.P.V.	$25
Sundog	$25
GAMESTAR	
Champ. Baseball	$29
Champ. Basketball	$29
HIPPOPATAMUS	
Hippo Vision	Call
INFOCOM	
A Mind Forever	$29
Ballyhoo	$25
Hitchhiker's Guide to the Galaxy	$25
Leather Goddesses of Phobos	$25
Moonmist	$25
Sorcerer	$29
Spellbreaker	$33
Trinity	$25
Wishbringer	$25
Zork 1	$25
Zork 2 or 3	$29
MARK OF THE UNICORN	
Hex	$23
PC Intercomm	$69
MEGASOFT	
ST Copy	$23
FAST	$33
Label Master	$25
MILES COMPUTING	
Harrier Strike Mission	$33
MINDSCAPE	
Balance of Power	$33
Bratacca	$33
MINDSCAPE—CINEMAWARE	
Defender of the Crown	Call
King of Chicago	$33
Sinbad: Throne of the Crown	Call
S.D.I.	$33
MONOGRAM	
Dollars & Sense	$65
OMNITREND	
Breach	$25
Universe 2	$44
ORIGIN	
Autoduel	$33
Ogre	$26
Ultima 3	$39
SSG	
Personal Pascal	$49

A captivating strategy challenge derived from the ancient Chinese game of Mah Jongg.

Shanghai List 44.95
Our Discount Price 29.

P.O. BOX 111327—DEPT. CST—BLAWNOX, PA 15238

**Please Read The Following Ordering Terms & Conditions Carefully Before Placing Your Order:* Orders with cashiers check or money order shipped immediately. Personal & Company checks, allow 3 weeks clearance. No C.O.D.'s! *Shipping: Continental U.S.A.*—Orders under $100 add $3; *free shipping on orders over $100. AK, HI, FPO, APO—add $5 on all orders. Canada & Puerto Rico—add $10 on all orders.* Sorry, no other international orders accepted! *PA residents add 6% sales tax on the total amount of order including shipping charges!* Prices subject to change without notice. *REASONS FOR CALLING CUSTOMER SERVICE—412-361-5291* (1) Status of order or back order (2) If any merchandise purchased within 60 days from S.D. of A. is defective, please call for a return authorization number. Defective merchandise will be replaced with the same merchandise only. NO CREDITS! After 60 days please refer to the manufacturers warranty included with the merchandise & return directly to the manufacturer. *Customer service will not accept collect calls or calls on S.D. OF A.'s 800# order lines! REGULAR HOURS: Mon.-Fri. 9AM-5:30 PM, Sat. 10AM-4PM Eastern Time.* Have you seen our on line catalog of 1000 software titles for Commodore, Atari, Apple, IBM and Amiga? It's on Compuserve Electronic Mail—just type GO SDA and shopping for software will never be the same again!

ST Desktop Publishing

SoftLogik has introduced *Publishing Partner*, a desktop publishing program for the Atari ST. It offers a complete screen representation of the printed page, and is designed for professionals who want to produce high-quality output mixing text and graphics on their dot-matrix and laser printers.

Publishing Partner supports any *PostScript*-compatible printer, including Apple's LaserWriter. Epson- and graphics-compatibles, Star (Gemini), and Okidata dot-matrix printers are also supported, and new printer drivers are already being released for other brands.

In addition to having word processing capabilities, the program permits the user to adjust the character size, character spacing, and line spacing ranging from 1/72 inch up to 2 inches. The Toolbox option lets the user insert lines, boxes, circles, and patterns anywhere on the page.

Publishing Partner is available for $149.95, and will work with 520ST and 1040ST systems using either a color or monochrome monitor (monochrome recommended).

SoftLogik, 4129 Old Baumgartner, St. Louis, MO 63129.

Circle Reader Service Number 220.

MIDI Recording For ST

Midisoft has announced *Metatrak*, a 32-track software recording studio that connects any MIDI (Musical Instrument Device Interface) musical instrument with an ST.

The $99 program offers realtime record, playback, overdub, rewind, and fast-forward functions; 32 polyphonic independently controlled tracks; 30,000 notes per song on the 520ST and 70,000 on the 1040ST; full track editing that lets you combine, move, copy, and erase any combination of the tracks; and many other features. The program also uses all MIDI signals, including pitch bend and keystroke velocity.

Midisoft, P.O. Box 1000, Bellevue, WA 98009.

Circle Reader Service Number 221.

ST Computer Bridge

Bridge Baron, a computer bridge-playing program, is now available for the Atari ST in a recently enhanced version. Winner of the First Computer Bridge Tournament, *Bridge Baron* can generate more than a million random deals, or the user can set preselected deals. In either case, the computer will bid, play the cards, and defend.

The new features of the program include playing with a partner against the computer, receiving hints from the program, optional scoring in rubber bridge fashion, switching sides to replay a previously played hand, choosing an automatic-play mode, and saving deals to disk.

Bridge Baron is available for $49.95 for the Atari ST computers with either monochrome or color monitors.

Great Game Products, 8804 Chalon Drive, Bethesda, MD 20817.

Circle Reader Service Number 222.

ST

THE ATARI TEN COMMANDMENTS

VI

"We shall create a computer that's as powerful in the music studio as it is in the office." Jack Tramiel

Atari was among the first in the personal computer business to do something for music.

With a built-in Musical Instrument Digital Interface (MIDI), you can turn the 1040ST™ into a multitrack recording studio by connecting it directly to keyboards, drum machines, and synthesizers. No other PC has MIDI built in—not IBM®, not Amiga™, not Macintosh™.

The 16-bit ST™ also contains a sound chip with three programmable voices. One more reason why the ST Computer is at the top of the charts.

The ST is one of the finest 68000-based PC's you can own. It also features an array of expansion ports for your synthesizer, printer, and other important peripherals.

The 1040ST gives you all this for $999–which we think will be music to your ears.

Available at fine computer and music dealers.

ATARI®

© 1986, Atari Corp.
ATARI, ST, & 1040ST are TM's or reg. TM's of Atari Corp. Amiga is a TM of Commodore-Amiga, Inc. IBM is a reg. TM of International Business Machines Corporation. Macintosh is a TM licensed to Apple Computer Inc.

The Exciting Atari ST Computers Are Here...

We offer a complete line of Atari ST Systems, Hard Disk Drives and Software. We evaluate and sell only the best products for the ST. Call Toll-Free for best pricing, VISA & MasterCard gladly accepted.

Ask for our **Free ST Buyers Guide & Newsletter** with reviews, news and helpful tips to get the most out of your ST!

SPECIAL!

Micro Time Internal Clock Card. Battery powered & recharges from system. Easy installation, No soldering.

Only $34.95

Authorized Atari Service Center

Toll Free 800-782-7007 (Oregon 479-9516)

SERIOUS SOFTWARE!

837 NE 6th St. Grants Pass, OR 97526

3M Diskettes

FREE!

CEI has an outstanding special on Flip 'n' File™ 15 storage cases. When you purchase a Flip 'n' File 15 storage case from CEI, you'll get 10 3M SSDD Soft Sectored diskettes free. Limited quantities available so order today. Order # **FNF-KA** . . . $9.99 each. Minimum order 10 Flip 'n' File™/15.

Other 3M computer products

5¼" **5DSDD-RH-KA** . . . . . $0.93 each
3½" **3SSMD-KA** . . . . . $1.36 each
8" **8SSSD-KA** . . . . . $1.48 each
8" **8SSDD-KA** . . . . . $1.79 each
5¼" head cleaning kit **H-KA** . . . $4.95 each
DC300XL-KA data cartridge . . . $17.95 ea.
Minimum order 100 diskettes/10 cartridges

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

Dysan Diskettes

Now get wholesale pricing on Dysan diskettes from Communications Electronics Inc. while quantities last. Lifetime warranty and packed 10 to a carton with color coded diskette ID labels, write protect tabs, and heavy duty Tyvek® tear resistant envelopes.

5¼" SSDD **801187-KA** . . . . . $1.69 each
5¼" DSDD **802060-KA** . . . . . $1.99 each
5¼" DSDD 96 TPI **802067-KA** . . . $2.29 ea.
Head cleaning kit **DHCK-KA** . . . $9.99 each

Dysan Diskettes

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

Verbatim Diskettes

Take advantage of this Verbatim Valuelife triple special. As long as quantities last, you'll first get high quality Verbatim diskettes at only 79¢ each. Second, on your order of Verbatim 5¼" single sided double density disks you'll get a FREE plastic storage case that holds 10 diskettes, and third, you'll also get a FREE head cleaning kit. Order Verbatim today.

5¼" SSDD **29633-KA** . . . . . $0.79 each

Verbatim Value!

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

Diskettes 25¢ ea.

CEI now offers a once in a lifetime offer on 100% certified and error-free 5¼" single sided double density diskettes for only 25¢ each in multiples of 500 diskettes. If you want double sided double density diskettes these are only 27¢ each in multiples of 500 disks. Write protect labels included. Available only in multiples of 500 diskettes. Since quantities are limited, stock up now.

5¼" SSDD **MAX1D-KA** . . . . . $0.25 each
5¼" DSDD **MAX2D-KA** . . . . . $0.27 each

BIG SAVINGS!

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

How to order

To get the fastest delivery of your diskettes, phone your order directly to our order desk and charge it to your credit card. Written purchase orders are accepted from approved government agencies and most well rated firms at a 10% surcharge for net 10 billing. For maximum savings, your order should be prepaid. All sales are subject to availability, acceptance and verification. All sales are final. All prices are in U.S. dollars. Prices, terms and specifications are subject to change without notice. No rainchecks on out of stock items. Not responsible for typographical errors. A $5.00 additional handling fee will be charged for all orders with a merchandise total under $50.00. All shipments are F.O.B. CEI warehouse in Ann Arbor, Michigan. No COD's. Non-certified checks require 3 weeks bank clearance. Michigan residents add 4% sales tax or supply your tax ID number and reason for tax exemption.

For **shipping charges** add $6.00 per 100 diskettes and/or any fraction of 100 5¼-inch or 3½-inch diskettes. Add $1.00 per data cartridge or head cleaning kit for U.P.S. ground shipping and handling in the continental U.S. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping is *three* times the continental U.S. rate.

Mail orders to: Communications Electronics Inc. Box 1045, Ann Arbor, Michigan 48106-1045 U.S.A. If you have a Discover, Visa or Master Card, you may call and place a credit card order. Order toll-free in the U.S. Dial 800-USA-DISK. In Canada, order toll-free by calling 800-CA1-DISK. If you are outside the U.S. or in Michigan dial 313-973-8888. Telex anytime 671-0155 (6710155 CE UW). Order your disks from CEI now.

Copyright © 1986 CEI

Ad #052486-KA

BASF Diskettes

CEI has a super special deal from BASF. As long as quantities last, when you order BASF 5¼" Single sided double density disks from CEI, you'll get a special price of only 69¢ each. And if you order promptly, as a further bonus while limited quantities last, you'll also get a free 10 pack plastic library case. Stock up now at this fantastic low price on BASF Qualimetric Diskettes with a BASF lifetime warranty.

5¼" SSDD **54974-KA** . . . . . $0.69 each

BASF SAVINGS!

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

Super Disk Diskettes

Super Disk™ celebrates their anniversary with super special pricing on Super Disk brand 100% certified error-free and drop-out free computer diskettes. Stock up now at these super special prices. Order only in multiples of 100 diskettes.

SAVE ON SUPER DISK DISKETTES Product Description	Part #	Super Disk price per disc ($)
5¼ SSSD Soft Sector w Hub Ring Retail 10 pack	8431-KA	0.44
5¼ Same as above but bulk pack w o envelope	8437-KA	0.29
5¼ SSDD Soft Sector w Hub Ring Retail 10 pack	8481-KA	0.48
5¼ Same as above but bulk pack w o envelope	8487-KA	0.33
5¼ DSDD Soft Sector w Hub Ring Retail 10 pack	8491-KA	0.52
5¼ Same as above but bulk pack w o envelope	8497-KA	0.37
5¼ DSHD for IBM PC/AT - bulk pack	8667-KA	1.29
3½ SSHD (135 TPI) - bulk pack	8317-KA	1.09
3½ DSHD (135 TPI) - bulk pack	8327-KA	1.24
5¼ Tyvek® diskette envelopes - 100 pack	CVS-KA	10.00

SSSD = Single Sided Single Density SSDD = Single Sided Double Density
DSDD = Double Sided Double Density DSQD = Double Sided Quad Density
SSHD = Single Sided High Density, DSHD = Double Sided High Density

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

TDK Diskettes 96 TPI

If you need a 96 tracks per inch diskette, CEI now has an excellent price on boxed TDK product. This product is designed to store up to 780 Kb. for non-AT systems. 300 oersteds. Lifetime warranty and packed 10 to a carton with color coded diskette ID labels, write protect tabs, and heavy duty Tyvek® tear resistant envelopes.

5¼" SSDD 96 TPI **M1DX-S-KA** . . . $0.89 each
5¼" DSDD 96 TPI **M2DX-S-KA** . . . $0.99 each

TDK Best Buy

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

Fuji Diskettes

Fuji diskettes imported from Japan, are now available from CEI at a special price while quanties last. Fuji diskettes are packaged 10 to a carton and come with color coded diskette ID labels, write protect tabs, and heavy duty Tyvek® tear resistant envelope. Order your disks today.

5¼" SSDD **MD1D-KA** . . . $0.74 each
5¼" DSDD **MD2D-KA** . . . $0.84 each

Fantastic Fuji!

Credit card orders call
800-USA-DISK or 800-CA1-DISK in Canada
For information call 313-973-8888

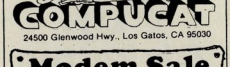
Communications Electronics Inc.
P.O. Box 1045 ☐ Ann Arbor, Michigan 48106-1045

Advertisers Index

Reader Service Number/Advertiser	Page
102 Abacus	BC
103 Abby's Discount Software	41
104 Absoft	54
105 Accolade	1
106 Aerco	44
107 Atari Corp.	53,54
Batteries Included	2
109 Beckemeyer Development Tools	31
110 Communications Electronics Inc.	63
111 Compucat	64
112 ComputAbility	29
113 Computer Creations	35
114 Computer Mail Order	33
115 Computer Software Service	16
116 Computer Solutions	21
Crown Custom Covers	54
117 DAC Software, Inc.	19
118 Electronic One	47
119 EPYX	5
120 EPYX	13
121 EPYX	51
122 Firebird Licensees, Inc.	IBC
123 Gemeni Enterprises	53
124 Megamax, Inc.	53
125 Metacomco	51
126 MichTron	31
127 MichTron	39
128 MicroProse	10
NRI Schools	25
129 Okidata	6
130 Origin Systems	IFC
131 Precision Data Products	53
Proco Products	51
132 Serious Software	62
133 Software Discounters of America	61
134 SoftWerx	54
135 STatic Engineering, Inc.	51
136 STplus	37
137 The ST Station	49

COMPUTE! Books' Atari ST Collection . . . 9

COMPUTE!'s Atari ST Subscription 56
Outstanding, Artistic, Instructive books from COMPUTE! . . . 14



24500 Glenwood Hwy., Los Gatos, CA 95030

Modem Sale

Avatex 1200 $85.86

Avatex 1200hc $125.26

Instant shipping (or as fast as we can). *Mastercard & Visa accepted* (no extra charge). Shipping & handling add 6%. California customers add 6.5% sales tax. Order by *phone* (Mon. - Fri. 10 am - 5 pm PST). Order by *modem* (daily 6 pm-9am) from our online TeleCatalog. Prices subject to change without notice.

(408) 353-1836

How To Use The Disk

Every issue of *COMPUTE!'s Atari ST Disk & Magazine* includes a 3½-inch microfloppy disk as part of the package. If you experience a problem with the disk, please contact us at (919) 275-9809 from 8:30 a.m. to 4:30 p.m. (Eastern Time), Monday through Friday.

To use the disk, simply insert it in a drive and click on the appropriate file-drawer icon to display the directory window. If you wish, you may boot up your ST with this disk by inserting it in drive A and switching on the computer, but normally it contains no active desk accessories.

There are two ways to access programs and files on the disk. You can simply run or examine the files from the GEM desktop. Or you can use the custom menu program on the disk that contains descriptions of each file as well as special instructions. To run the menu program, double-click on the file named DISKMENU.PRG. It works in all screen modes: low- and medium-resolution color, and high-resolution monochrome.

DISKMENU.PRG displays a directory of files on the disk, one screen at a time. Click on the lower buttons labeled *Prev* or *Next* to display the previous or next screens.

At the top of the disk menu are three buttons labeled *Description, QUIT,* and *Run program.*

The *Description* button calls up a screen which describes the program or file. At the bottom of this screen is the filename and two buttons labeled *MENU* and *RUN.* Clicking on the *MENU* button returns you to the disk menu. Clicking on the *RUN* button loads and runs the program. However, if this particular file is not an executable program (for example, a source code or data file), the *RUN* button is dimmed and disabled.

You can also run a program directly from the disk menu by clicking on the *Run program* button at the upper right. However, if this particular file is not an executable program, you'll be alerted to this fact.

Note that many files on the disk require special instructions or explanation; please refer to the corresponding article before attempting to run a program or access a file.

Clicking on the *QUIT* button on the disk menu returns you to the GEM desktop.

There are four files on the disk which are required for the disk menu program: DISKMENU.PRG, DISKMENU.RSC, MONOMENU.RSC, and CONTENTS.FEB. Do not delete these files if you intend to use the disk menu. If you plan to use the disk menu, be sure these files are copied when you back up the disk.

Our disk is not copy-protected. You are encouraged to make a backup of the disk as soon as possible. However, the contents of the disk are copyrighted and may not be used by anyone other than the owner of the magazine. Since the writers and programmers whose work appears on this disk are paid, in part, according to the volume of sales, we ask that you respect the copyright.

Special Notes

In order to conserve magazine space for more program-oriented articles, this issue's reviews are included on disk. The filenames are CORNMAN.TXT, PAINTWRK.TXT, MODULA2.TXT, TEXTPRO.TXT, and LEADER.TXT. These are ASCII text files which can be viewed or printed out in three ways. The simplest method is to double-click on the icon or filename in a GEM desktop directory window; when a dialog box appears, click on SHOW to read the review on the screen, or click on PRINT to make a copy on your printer. Alternatively, you can view or print the reviews by loading them into any text editor or word processor that handles ASCII text files, such as *1ST Word* or *ST Writer.* A third way to view or print the reviews is to use the "File Lister" program included in this issue. Refer to the article for instructions.

Check this issue's "Readers' Feedback" column for updates to two programs published in the October 1986 issue: "Word Count" and "Encryptor."

STARGLIDER

Starglider – is an all action combat simulation featuring fast moving, animated, 3D vector graphics. The animation and speed of the action is superior to anything yet seen on a home micro. The scenario places the user in the role of a pilot of the only surviving ground attack vehicle left to oppose the alien invaders of the planet Novenia. The mission is to destroy the aliens powerful flagship the Starglider. To achieve the final conflict requires flying skill and battle strategy.

The novella accompanying the product incorporates many clues necessary to survive the increasing levels of combat difficulty and sets the mood for the player as the protector of the human race.

DYNAMIC SPACE COMBAT SIMULATION FOR YOUR ATARI 520ST™

RAINBIRD 68000 RANGE

CHARTBUSTERS

firebird

FACTSHEET/ORDER HOTLINE: 201.934.7373
FIREBIRD LICENSEES INC. P.O. BOX 49, RAMSEY, N.J. 07446

ATARI 520ST IS A TRADE MARK OF THE ATARI CORPORATION

STOP

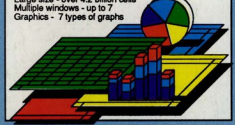
We have the software you've been looking for!

PowerPlan ST

New!

Full-powered Spreadsheet

37 math functions - 14 digit precision
Large size - over 4.2 billion cells
Multiple windows - up to 7
Graphics - 7 types of graphs



A powerful, large capacity (65,000 by 65,000 cells) spreadsheet package that also features a built-in calculator, online notepad and integrated graphics. Displays your data in numerical or graphical format instantly in up to seven different chart types (pie, bar, 3D bar, line, etc.). 14 digit precision with 37 math functions and more. **$79.95**

PaintPro

PaintPro

PaintPro

Multiple windows

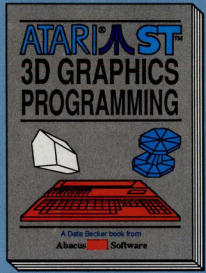
A GEM™ among ST drawing programs. Very friendly, but very powerful design and painting program. A *must* for everyone's artistic or graphics needs. Use up to three windows. Cut & paste between windows. Free-form sketching; lines, circles, ellipses, boxes, text, fill, copy, move, zoom, spray, paint, undo, help. Double-sized picture format. **$49.95**

DataTrieve

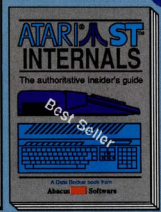
The quick and effecient way of retrieving data on the ST

Data management was never this easy. Help screens; lightning-fast operation; tailorable display; user-definable edit masks; up to 64,000 records. Supports multiple files. Includes RAM-disk programs. Complete search, sort and file subsetting. Interfaces to TextPro. Easy printer control. Includes five common database setups. **$49.95**

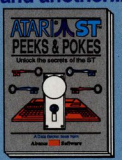
One good book... deserves another... and another... and another... and another...



3D GRAPHICS PROGRAMMING
FANTASTIC! Rotate about any axis, zoom in or out, and shade 3D objects. All programs written in machine language (and commented) for high speed. Learn the mathematics behind 3D graphics. Hidden line removal, shading. With 3D pattern maker and animator. **$24.95**



ST INTERNALS
Essential and valuable information for the professional programmer and ST novice. Detailed descriptions of the sound and graphics chips, internal hardware, I/O ports, using GEM, system variables, interrupt instructions, error codes. Commented BIOS listing. An indispensible reference for your ST library. 450pp **$19.95**



ST PEEKS & POKES
Enhance your programs with the examples found within this book. Explores using different languages BASIC, C, LOGO and machine language, using various interfaces, memory usage, reading and saving from and to disk. 280pp **$16.95**

ST TRICKS & TIPS
Fantastic collection of programs and info for the ST. Complete programs include: super-fast RAM disk; time-saving printer spooler; color print hardcopy; plotter output hardcopy; creating accessories. Money saving tricks and tips. 260pp **$19.95**

GEM Programmer's Ref.
For serious programmers needing detailed information on GEM. Presented in an easy-to-understand format. All examples in C and assembly language. Covers VDI and AES functions. No serious programer should be without. 410pp **$19.95**

Optional diskettes are available for $14.95 each.

Atari and Atari ST are trademarks of Atari Corp.
GEM is a trademark of Digital Research Inc.

Phone (616) 241-5510

Telex 709-101 • Fax (616) 241-5021

you can count on **Abacus**

P.O. Box 7219 Dept. SB Grand Rapids, MI 49510

Other software and books also available. Call or write for your **free catalog** or the name of your nearest dealer. Or order directly using your credit card. Add $4.00 per order for shipping. Foreign orders add $10.00 per item. 30-day money back guarantee on software. Dealers inquires welcome–over 1500 dealers nationwide.