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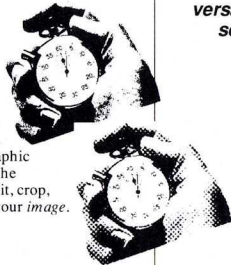
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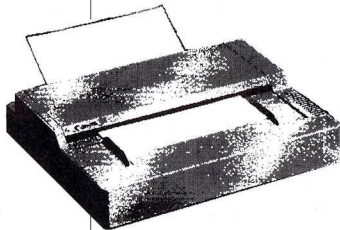
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POSTMASTER:

Send address corrections to Atari Explorer, CN961, Netcong, NJ 07857-0691.

A Pirate Repents

Dear Editor:

I was really shocked by your article on how piracy is affecting the Atari ST market.

I purchased my Atari 800XL in May of 1984, and I received my first box of pirated disks nine months before I even had a disk drive! Since then I have been a major contributor, even cracking some 8-bit titles. In my prime I had amassed over 300 disks jammed with everything my "Happy equipped" drive could copy.

When software started to dry up here in this country, I started to trade in Europe and had connections with some of the biggest pirates in the world. I then sold my 800 to get an ST, and in just under a year I have collected over 200 disks of illegal software.

The day I read the article, I realized just how much damage a single person could do and I stopped, cold. That night I erased every pirated disk I had.

Don't misunderstand: I did purchase some software, like *PC-Ditto*, *Barbarian*, and quite a few others. I thought that my little collection of "bought" software was enough, but I was wrong. I used every excuse in the book to justify piracy to myself and my friends, but none of them changed the fact that it was just plain wrong.

I have a friend who recently purchased a Macintosh SE, and he does not expect to buy any software at all. When I explained why it is so important that he buy software instead of pirating it, his reply was, "so what?" His attitude is not entirely his fault; it is mainly mine. He saw all the new games I got for free and just followed my example. I am trying to undo that.

No matter how hard I try, I can't force you to stop. Not until you realize that what one person does really matters will you be ready to stop. And if this letter has made at least one reader of *Atari Explorer* see that, I will feel that I have begun to make amends.

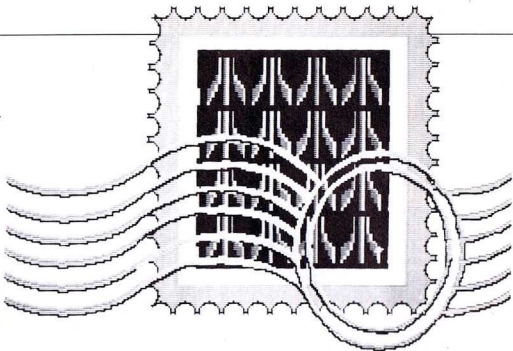
An Ex-pirate,
Bob Paradis
5 Erynwood Ave,
Marlton, NJ 08053

You have gotten the point and reinforced it to our readers better than we ever could. Thanks for your candor.

Legal Backups

Dear Editor:

I am a 19-year-old computer programmer who has been using computers



Letters To The Editor

since he is five years old. I admit that I used to copy software because I wanted to increase my library and could not afford to buy as much as I wanted. I didn't think it mattered, because I thought there would be thousands of buyers to compensate for the programs I stole, and I didn't think that one person quitting would make a difference.

As I got older and more experienced and began my programming career, I realized that every person counts. I have changed my ways and have not pirated software in a long time.

I do, however, try to crack the code of every package I buy—just to see if I can do it. I think it is fun, challenging, and legal to make backups in this way.

I think it is a good ideal to keep publishing articles about piracy to try to get others to give up piracy, so keep up the good work.

On another note: I think it is a shame that the ST is not recognized as the great business machine it is. I know, because I have used and programmed the IBM PC, XT, AT, and System 36.

Michael R. Kirgan

WordPerfect To Abandon Atari?

Dear Editor:

By now you have probably heard rumors about WordPerfect Corporation's alleged intent to pull *WordPerfect* from the Atari market because of excessive piracy. Before the rumor stretches any further, we want to set the record straight.

First of all, we have not announced that we are withdrawing from the Atari market, and we have no current plans to

do so. We *do* have some concerns, but they are not limited to the Atari market; recent events in the Atari market have simply focused our attention on these concerns.

We have had a number of problems with our release for the ST. It was released too early, and there were a lot of bugs. As soon as we realized what we had done, we immediately took what steps we could alleviate the situation. Our programmers focused all of their attention on the bugs and worked nights and weekends to find and fix the problems.

We promised free updates to all registered users and did not exclude those who failed to register, if they could provide proof of purchase. We provide toll-free support to help our customers through any difficulties they might encounter. We feel that this is indicative of our commitment to the Atari market.

As for piracy, our legal people pursue pirates at every possible opportunity. The fact is, however, that we simply can't go after each and every case, so we need the help of people like *Atari Explorer* readers. For the most part, I like what I've heard from the people in the Atari community, and I'm not convinced that Atari users are any worse pirates than any other kind of users.

However, we simply can't let the issue drop. I feel it is mostly a matter of education; many people do not understand the problem. When educated, they generally choose to do the right thing.

To reiterate, we have no current plans to pull out of the Atari market. If, at some future date, we were to make that decision, it would not be based solely on the fact that we found our software on

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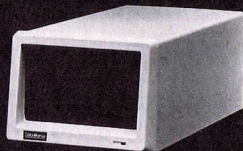
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Letters To The Editor

three BBS systems. Our main consideration would be "can we do our style of business in this market and be profitable?"

Dan Lunt
Vice President of Marketing
WordPerfect Corporation
288 West Center St.
Orem, UT 84057

Since our May/June 1988 cover story on WordPerfect went to press, we have received two updated versions. As we said in our introduction to that article, we have no doubt that WordPerfect Corporation will continue to refine the product until it is as reliable as the versions that have become best-sellers for other computers.

We, too, regret that the program was released too early, but we applaud the company's responsible approach to correcting the problem, and we are happy to learn that rumors of Atari abandonment are false.

Non-Music MIDI Applications

Dear Editor:

A thought has occurred to me, and I am sure it has occurred to many others, although I do not recall any discussions

of the notion in the *Explorer*: the MIDI programming capability of the Atari ST should be able to be configured to control more than musical instruments.

With some newly developed interface equipment, the movement of display mannequins in department stores, including Santa and his reindeer at Christmas; large outdoor signs; displays of colored lights, either with or separate from multiple banks of water fountains, are all subject to a timed sequence of events like the performance of music by a synthesizer. The possibilities are, it seems to me, endless.

The computer as a controller may (I haven't done a cost comparison) be cost-effective, particularly since it has such enormous flexibility. My point is that MIDI programming may open business area applications—such as animated displays and other time-sequence controlled applications—outside of synthesizer control that have not yet been thoroughly developed. Or has the notion of expanding the use of MIDI beyond its present music applications been thoroughly "explored" and found wanting?

Jules Sarzin
2416 Johnson Dr.
Lynn Haven, FL 32444

Stefan Daystrom of Hybrid Arts (a firm that develops MIDI products) was kind enough to provide a personal reply to Mr. Sarzin's letter:

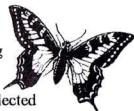
Indeed, MIDI has had non-musical uses, such as driving lighting controllers and laser displays. I would guess that a major factor in keeping MIDI out of such fields is unfamiliarity. The specifications for MIDI are well-defined, but only in musical terms such as Note On, Note Off, and Control Change.

It is possible to redefine a "note" to mean a "switch," and a "control" to mean a "variable," but an awareness of how MIDI normally works (i.e., in a musical environment) would be needed to create a time-sequence control system that would work well with existing MIDI products such as sequencers.

Given that learning this (perhaps irrelevant) application (music) is important to making good use of MIDI even in non-musical situations, it may require less effort to use a custom non-MIDI interface. MIDI could certainly be put to more uses than it has been, but each case needs to be evaluated separately.



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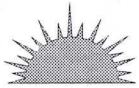
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Migraph proudly introduces Easy-Tools™, a new GEM desk accessory that works with Easy-Draw®.

If you use Easy-Draw to create technical illustrations, mechanical or architectural plans, flyers, charts or forms, then you need Easy-Tools! Easy-Tools lets you:

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* Easy-Tools requires 1 Mb RAM & Easy-Draw version 2.26 or higher. Contact Migraph for Easy-Draw upgrade information.

The reviews are in . . .

"A Best Buy' I'm impressed"

David H. Ahl, Atari Explorer, Nov-Dec 1987

"If you've got an Atari, you probably need this program."

Jerry Pournell, Byte Magazine, October 1987

"pc-ditto is a winner."

Charlie Young, ST World, July 1987

"This is the product we have been looking for."

Donna Wesolowski, ST Informer, August 1987

"This truly incredible software emulator really works."

Mike Gibbons, Current Notes, September 1987

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Lotus 1-2-3	Flight Simulator	Framework	Symphony
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Sidekick	Superkey	Norton Utilities	dBase II,III,III+
Crosstalk IV	Carbon Copy	Chart-Master	Print Shop
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GW Basic	Managing Your Money	Silvia Porter's	pfs:Professional File

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pc-ditto is a software-only utility which expands the power of your Atari ST to imitate an IBM PC XT. No extra hardware is required (an optional 5.25-inch drive may be required for 5.25-inch disks). All your IBM disks will work "out-of-the-box".

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- o access to hard disk, if hard disk used
- o optionally boots DOS from hard disk
- o parallel and serial ports fully supported
- o supports 3.5-inch 720K format and 360K single-sided formats
- o supports optional 5.25-inch 40-track drives

System requirements:

- o IBM PC-DOS or Compaq MS-DOS version 3.2 or above recommended
- o optional 5.25-inch drive is required to use 5.25-inch disks
- o 3.5-inch 720K DOS disks require a double-sided drive (Atari SF314 or equivalent)

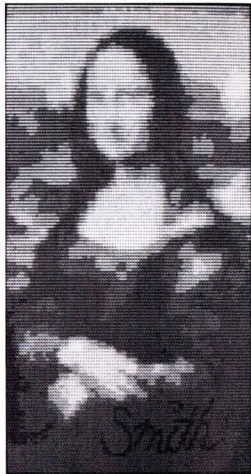
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Editorial

When Associate Editor Linz-mayer decided to reprint the program Attack of the Killer Bobs in the May/June '88 edition of User Friendly, he contacted the Mobile Alabama Atari User's Newsletter to obtain permission.

The editor of the newsletter referred him to the "author," who said he thought he had found the program in a book published by Sybex. The author of the book, he recalled, cited "the programmers at Atari."

When we could find no one at Atari who would admit to ever having made Bob's acquaintance, we called Sybex, whose representative was, likewise, unable to find any mention of Bob in their book.

Having failed to find the source, we decided to give credit to the only publication in which anyone would admit to having seen the program—the Mobile newsletter.

Several weeks later, after the May/June issue had gone to press, we received a letter from Christine Mockel, permissions editor for Sybex, who had found Bob on page 84 of *Understanding Atari ST Basic Programming* by Tim Knight. We hereby acknowledge Sybex's copyright on that material.

Although this path to proper credit was somewhat more convoluted than most, it illustrates what seems to be a very cavalier attitude on the part of

By **BETSY STAPLES**

Credit where it's due

computerists and amateur journalists when it comes to reprinting programs and other material.

For the most part, we are not talking about legalities here. Most people who write articles for local newsletters are more than happy to have their work distributed via the Atari user group network. But imagine how that pleasure is diminished when they discover that their article—or a reasonable facsimile thereof—has appeared in another publication under someone else's name.

And this phenomenon is not limited to helpful hints from newsletters. Publisher David Ahl was recently surprised to see in another Atari magazine a program for generating Sierpinski curves that he wrote in 1984. The program was reprinted from a British magazine to which it had been submitted by an individual, who presumably implied that it was original work. How many steps there were between that person's submission and the original publication of the program in *Creative Computing* in 1984 we will probably never know.

In the case of the Sierpinski program, Dave's copyright was violated at least twice, but that is not really our point here. In general, the people and publishers who care enough to copyright their works can afford to protect those copyrights, and that fact alone ought to be enough to discourage carelessness

among would-be reprinters.

We are more concerned with the respect we think one individual ought to have for another's ideas and efforts. If you find an uncopyrighted article, program, or letter that you think is profound, humorous, or even slightly useful, by all means share it with your friends and fellow Atarians. But have the decency to give credit to the original author.

If you submit it to your user group newsletter, tell the editor exactly where you found it and request that he or she give proper credit if the piece is published. If you want to claim your share of the glory for recognizing the value of the item, ask the editor to print something like: "Submitted by Wilbur C. Parkway; reprinted from the June 1988 Batsto Atari Group Newsletter, P.O. Box 742, Pine Barrens, NJ 08000, \$1.25 per issue." Be sure that your notice includes all the information an interested reader would need to obtain a copy of the original article, if he should so desire. The original author's name should appear in the byline.

A further courtesy is to write to the author, requesting permission to reprint the item.

If you care enough about the quality of your favorite newsletters and magazines to submit good editorial material to them, care enough about your own integrity to apply every last shred of credit where it is due. ■

Extended Promotional offer *

ST VIDEO DIGITIZER

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.....
 NEW PRODUCTS

PRODUCTIVITY SOFTWARE

Migraph announces the release of *Easy-Tools*, a new drawing accessory for *Easy-Draw*. Installed as an accessory, the new product appears as a desktop icon in *Easy-Draw* and allows you to rotate an object by any degree, rotate an object about an arbitrary point, create/rotate multiple copies about any point at varying sizes and distances, specify/inquire about numeric data for size and location of an object, convert objects to polylines for further editing, create polyline text labels that can be rotated by any degree, and make grids easily and precisely. \$49.95.

Migraph, 720 S. 333rd St., Ste. 201, Federal Way, WA 98003, (800) 223-3729, (206) 838-4677.

Springboard Software has released an Atari 8-bit version of *The Newsroom*, a desktop publishing program that allows the user to produce a two-column newsletter with graphics. Features include a built-in word processor, which allows entry of text in any of five fonts; page layout functions, which automatically format text to wrap around illustrations; and drawing tools, which allow the user to create his own art or select from more than 600 pieces of clip art included in the program.

Also available are three clip art collections. Volume 1 offers 600 pieces of all-occasion art; Volume 2 offers 800 pieces of business art; and Volume 3 offers 600 pieces of sports and recreation art for use with *The Newsroom*. \$49.95.

Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435, (612) 944-3915.

Neconcept has announced *WordUp*, a full-featured GEM/GDOS word processor that allows the user to add graphics to text. The WYSIWYG program also offers the ability to print text out in columns. \$79.95.

Neconcept, 908 Camino dos Rios, Thousand Oaks, CA 91360-2302, (800) 666-8766, (805) 498-3840.

ST Composite Cable

E. Arthur Brown Co. has released a composite cable that allows any Atari ST computer to use composite video devices. The cable connects to the standard ST monitor port and converts the RGB signal to gray scaled low- and medium-resolution composite output.

The monitor end of the cable offers both audio and video RCA-type connectors. The device carries a suggested retail price of \$24.95.

E. Arthur Brown Co., 3404 Pawnee Dr., Alexandria, MN 56308, (612) 763-6393.

New hardware and software

*for Atari 8-bit
and ST computers*

**New
Products**

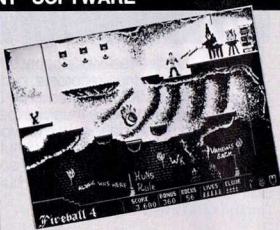
ENTERTAINMENT SOFTWARE

Cheat from **Alpha Systems** is a new program that alters games so users can play with an unlimited number of lives. It works with more than 100 8-bit Atari game programs. After mastering the game, the player can change the program back to limited lives with the Uncheat utility. \$24.95.

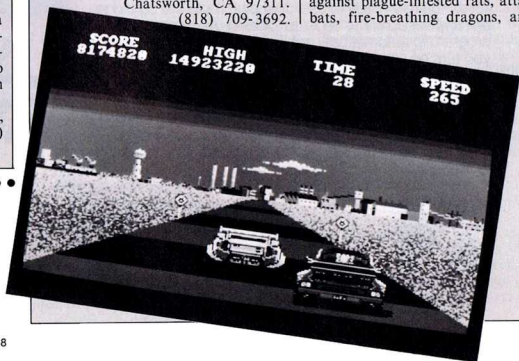
Alpha Systems, 1012 Skyland Dr., Macedonia, OH 44056, (216) 467-5665.

Titus Software announces *Crazy Cars* for the ST, a racing game that lets players test their driving skill in a Mercedes 560 SEC, Porsche 911 Turbo, Lamborghini Countach, and Ferrari GRO. The game offers six races and 72 skill levels. \$39.95.

Titus Software, 20432 Corisco St., Chatsworth, CA 97311, (818) 709-3692.



Dark Castle is now available for the Atari ST from **Three-Sixty**. Set in medieval times, the game features a hero who must fight his way through 14 different rooms of increasing difficulty against plague-infested rats, attacking bats, fire-breathing dragons, and as-



NEW PRODUCTS



Print Sharer

The Black Box Expandable Print Sharer and its companion four-port serial or parallel expansion units allow up to 16 serial or parallel computers to share one parallel printer. As many as three expansion units can be used with one Print Sharer, which itself has four

active ports.

The device automatically locks onto the requesting channel and directs its data to the printer. If the printer is busy, the Print Sharer will hold data in a "print busy" condition until the printer is free. The Expandable Print Sharer sells for \$279, and the four-port model for \$259.

Black Box Corp. P.O. Box 12800, Pittsburgh, PA 15241, (412) 746-5500.

EDUCATIONAL SOFTWARE

Artworx announces *Spanish Verb Tutor*, a program designed to help both beginning students and fluent speakers in the use of Spanish verbs. It provides instruction and practice in all moods, persons, and tenses of 12,000 regular and irregular verbs. Lessons review increasingly complex verb forms and each is followed by a practice quiz, which is graded and recorded for future reference. \$39.95.

Artworx Software, 1844 Penfield Rd., Penfield, NY 14526, (800) 828-6573, (716) 385-6120.

sorted other perils. The program offers seven levels of play. \$44.95.

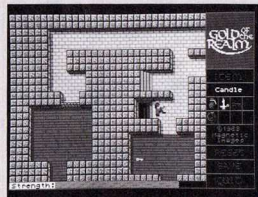
Three-Sixty, 2105 S. Bascom Ave., Ste. 290, Campbell, CA 95008, (408) 879-9144.

Logical Design Works has released *Club Backgammon*, a game that allows the player to play against the computer on any of three different skill levels or take on a human opponent. Features include an automatic scorekeeper, a doubling cube, and comprehensive game log.

Logical Design Works, 780 Montague Expy., Ste. 403, San Jose, CA 95131, (408) 435-1445.

Magnetic Images announces *Gold of the Realm* a graphic adventure for the ST. The game features 300 screens, sound effects, three levels of difficulty, and thousands of game variations. It requires a color monitor and joystick. \$39.95.

Magnetic Images, P.O. Box 17422, Phoenix, AZ 85011, (602) 265-7849.



UTILITIES

Trio Engineering announces *Unispec*, an enhancement for *Spectrum 512*, which also provides a flexible link to all other ST graphics programs. The user can run *Unispec* and almost any other ST program simultaneously, switching between them with a single mouse click. Pictures or parts of pictures can be switched from one program to another, as well. The program works with both GEM and non-GEM packages. *Unispec* also allows the user to rotate images, cut and past smooth curved pieces of images, create transparent overlays, do layout work using snap and digital position readouts, and more.

Trio Engineering, P.O. Box 332, Swampscott, MA 01907, (617) 964-1673.

Neoccept has released *Fontz*, a font editor and conversion utility that allows users to convert Macintosh, Amiga, Hippo, and *Degas* fonts to the GEM format for use with the company's new *WordUp* word processor. It is also possible to create custom fonts. \$34.95.

Neoccept, 908 Camino dos Rios, Thousand Oaks, CA 91360-2302, (800) 666-8766, (805) 498-3840.

Migraph has released 150 and 300 dpi GDOS printer drivers for the new Hewlett-Packard Deskjet printer.

which can be used with an Atari 520 or 1040 ST with 1Mb of memory. The drivers are bundled and include the screen and printer fonts in the *Easy-Draw* Swiss typeface. Owners of *Supercharged Easy-Draw* have access to the Dutch and Courier typefaces as well. \$49.95.

Migraph, 720 S. 333rd St., Ste. 201, Federal Way, WA 98003, (800) 223-3729, (206) 838-4677.

Softrek has introduced *Turbo ST*, a high-speed enhancement for the ST that works by intercepting calls to GEMDOS text drawing routines and replacing them with optimized assembly language equivalents. The new routines can display text up to five times faster than those they replace. \$49.95.

Softrek, P.O. Box 5257, Winter Park, FL 32793, (305) 657-4611.

DiskIO from Omega Soft is a sector editor for Atari 8-bit computers. Features include the ability to reconstruct a damaged directory, trace any file on a disk, identify and save binary file parameters, and display sectors in hex, ATASCII screen characters, or character mode. The program supports most standard DOS commands. \$32.95.

Omega Soft, P.O. Box 140, Harrells, NC 28444, (919) 532-2359.

New and Improved

Need to know the latest version of a software package? Find it here.

8-Bit Programs

•Action, ICD/OSS	3.6
Bank Street Writer, Broderbund	1.0
B/Graph, Electronic Arts	1.1.1
Blazing Paddles, Baudville	04412
•Celebrity Cookbook, Merrill Ward	1.2.65
•Chipmunk, Microdapt	3.0.3
•ComputerEyes, Digital Vision	1.3
Desktop Performance Studio, Virtuosonic	1.1
Draper Pascal, Draper	2.0
•Elite Personal Accountant, Clearstar Softechnologies	1.3
•Enhancements To Basic II, Hathaway Electronics	5.0
•First Xlent Word Processor, Xlent	2.1
•FlashBack, ICD/OSS	1.4
Guitar Wizard, Baudville	11602
Kyan Pascal, Kyan	2.0.2
•Lightspeed C, Clearstar Softechnologies	2.32
•MagniPrint II+, Alpha Systems	4.0
MYDOS, Supra	4.3
PaperClip with Spellpak, Electronic Arts	2.0
•Parrot II, Alpha Systems	2.8
Print Shop, Broderbund	1.0
Print Shop Companion, Broderbund	1.0
•QuickCode, Stardust	1.1
•Scanalyzer, Alpha Systems	3.6
•SpartaDOS Construction Set, ICD/OSS	3.2D
Super Archiver, Computer Software Services	3.0.2
•Top-DOS, Eclipse	1.5a
•Top-DOS Plus, Eclipse	1a
•Top-DOS Professional, Eclipse	1c
TypeSetter 130XE, Xlent	1.4
TypeSetter 48K, Xlent	1.3

ST Programs

Aegis Animator, Aegis Development	2.10
Alice Pascal, Looking Glass	1.5
APL-68000, Spencer Organization	6.05C
Athena II, Iliad	1.8
•Award Maker Plus, Baudville	23706
•Backup, MichTron	1.8
BB Express ST, ICD/OSS	1.3
BB/ST, QMI	1.12
CAD 3D, Antic	2.0.2
The Chameleon, Future Software Systems	1.0
•Church Manager, Hi-Tech Advisers	1.50
•Celebrity Cookbook, Merrill Ward	1.2.65
•ComputerEyes Color, Digital Vision	1.0
•ComputerEyes Mono, Digital Vision	1.0
Copy II ST, Central Point	2.5
•Cross-16, Memocom Development Tools	2.2
Cyber Paint, Antic	2.0
Dac-Easy Accounting, Dac	1.0
Dac-Easy Payroll, Dac	1.0
Data Manager ST, Timeworks	1.1
•DataTrieve, Altabac	2.04
•dBMan, Atari	4.0
Degas Elite, Electronic Arts	1.1
DeskCart, QMI	1.0.2
•DigiSound, Alpha Systems	1.6.2
•Disk Library, Classic Image	1.2
Dollar & Sense, Monogram	1.2
•EasyDraw, Migraph	2.3
•Edit-8000, Savant Audio	1.1
EZ Calc, Royal	1.33
•First CADD, Generic	2.0
1st Word, Atari	1.06
1st Word Plus, Prospero	2.0.2
Flash, Antic	1.6
Fleet Street Publisher, Spectrum Holobyte	1.1
Fontz, Neocent	1.00
•Fortran for GEM, Propero	2.13
GFA Basic, MichTron	2.0.2.7
Hard Disk Accelerator, Beckemeyer Development	1.13
Hard Disk Toolkit, Beckemeyer Development	1.03
Inform, Regent	1.04
•Interlink ST, Intersect	1.8
Inventory Manager, Regent	1.2
Inventory Master, Royal	1.2
•Inventory-Pro, Hi-Tech Advisers	2.01
IS Talk, Electronic Arts	2.0.3
LabelMaster Elite, Migraph	1.0
L/DW Basic Compiler, Logical Design Works	2.0
•Magic Sac, Data Pacific	5.9
•Mail-Pro, Hi-Tech Advisers	2.0.2

Software packages are constantly being enhanced by their publishers to add features, fix bugs, and incorporate the latest technological advances. To derive the maximum benefit from your software investment, it is important to know what updates have been made to the packages you use. If you are not using the most current version of a package, contact the manufacturer to find out what enhancements have been made and what you must do to obtain the new version.

Working from information provided by the publishers themselves, we have compiled a list of the most current version numbers of many popular 8-bit and ST software packages and software/hardware products. Program version numbers are often found printed in the documentation, on the title screen, in a README text file on disk, or in an About... item in the left-most menu on the GEM desktop.

While every attempt has been made to make this list as comprehensive as possible, we realize that a few fine products may have been omitted. If you would like to see a specific program added to this list, please send your suggestion to New and Improved, Atari Explorer, 7 Hilltop Rd., Mendham, NJ 07945.

Note: we have not included entertainment and educational programs in this list because, as a general rule, these packages are not updated frequently.

•Bullets indicate a new listing or program update.

The Manager, BMB Computerscience	1.0
Mark Williams C, Mark Williams	2.1.7
MasterPlan, ISD Marketing	1.0
•Master Tracks Pro, Passport Designs	2.0
•Micro C-Shell, Beckemeyer Development	2.70
•Micro RTX Developer Kit, Beckemeyer Development	2.70
Modula 2, Jefferson	1.1
•Modula-2, TDI	3.01A
MT C-Shell, Beckemeyer Development	1.10
Multi-Manager, New World	1.0+
Music Studio, Activation	1.0
The Navigator, Antic	2.0
•Partner ST, Timeworks	1.0
•Pascal for GEM, Prospero	2.13
•Payroll Master, Royal	2.1
PC-Ditto, Avant-Garde Systems	3.0
•Personal OS-9/ST, Microware	2.2
•Personal Pascal, ICD/OSS	2.0.2
Phasar, Antic	3.0
Phion Fast/Basic-M, Phion	1.35
P.M. Interface, Xlent	1.1
•Power Print, Alpha Systems	2.4
Print Master Plus, Union World	1.61
ProCopy, Proco Products	1.50
Professional C Development System, Megamax	2.0
Professional OS-9/ST, Microware	2.2
•Publishing Partner, SoftLogic	1.0.3
•Real Basic, Computer Crossware Labs	1.3
Regent Base, Regent	1.1
Regent Word II, Regent	870403
•Sales-Pro Plus, Hi-Tech Advisers	2.15
STAccounts, ISD Marketing	2.0
ST Hard Drive Utility Disk, Supra	3.01
•ST-Reply, MichTron	3.0
ST Sprite Factory, Future Software Systems	1.1
ST-Talk Professional, QMI	2.0
•SuperBase, Progressive Peripherals	1.0.2.7
•Super Directory, MichTron	1.2
SwiftCalc ST, Timeworks	1.1
Thunder, Electronic Arts	1.31
•True Basic & Run-time, True Basic	2.0
•TuneUp, MichTron	1.25
•Turbo ST, Softkrac	1.0
•Universal Item Selector, Application & Design	1.01
•Video-Pro, Hi-Tech Advisers	2.00
VIP Professional, ISD Marketing	1.2
WordPerfect 4.1, WordPerfect	01/31/88
WordUp, Neocent	1.00
•Word Writer ST, Timeworks	2.0.1
Write 90°, Xlent	1.3
Zoomracks II, Quickview Systems	1.0

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C070263	Ribbon for the SMM804 Dot Matrix Printer	\$ 12.95
C026224	Blank Disks, 3.5" Double Sided (box of 5)	\$ 16.95
C0266313	International ST Software Catalog	\$ 12.95
C026220	ST BASIC Source Book and Tutorial (new version)	\$ 12.95
LPS004	Toner Kit for SLM804 Laser Printer	\$ 59.95
LPS005	Drum Kit for SLM804 Laser Printer	\$199.95

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DS5061	Algebra II, Vol 1	\$19.95
DS5062	Algebra II, Vol 2	\$19.95
DS5063	Algebra III	\$19.95
DS5065	Geometry, Vol 2	\$19.95
DS5067	Trigonometry	\$19.95
DS5068	Biology, Vol 1	\$19.95
DS5069	Biology, Vol 2	\$19.95
DS5070	Biology, Vol 3	\$19.95
DS5071	Biology, Vol 4	\$19.95
DS5072	Chemistry, Vol 1	\$19.95
DS5073	Chemistry, Vol 2	\$19.95
DS5074	Physics, Vol 1	\$19.95
DS5075	Physics, Vol 2	\$19.95
DS6066	Statistics	\$19.95

General

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TP7602	Fraction Action	\$39.95
TP7603	Decimal Dungeon	\$39.95
TP7604	Read & Rhyme	\$39.95
TP7605	Kinderama	\$39.95
TP7606	Animal Kingdom	\$39.95
TP7607	Read-A-Rama	\$39.95
TP7608	Aesop's Fables	\$49.95

DRAWING

DS5027	Neochrome	\$39.95
TP6025	GFA Draft	\$99.95
TP6026	Make-It-Move	\$69.95
TP6701	Easy Draw	\$99.95
TP6705	Personal Draw Art #1 (requires Easy Draw)	\$29.95
TP6706	Technical Draw Art #1 (requires Easy Draw)	\$29.95

ENTERTAINMENT

DS5007	Home Planetarium	\$ 39.95
DS5018	Missile Command	\$ 29.95
DS5019	Star Raiders (color monitor required)	\$ 29.95
DS5020	BattleZone	\$ 39.95
DS5080	Crack'ed	\$ 29.95
TP6011	Major Motion	\$ 39.95
TP6012	Time Bandit	\$ 39.95
TP6013	Cards	\$ 39.95
TP6024	8-Ball	\$ 29.95
TP6027	Match Point	\$ 39.95
TP6037	Gold Runner	\$ 39.95
TP6041	Airball	\$ 39.95

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TP6303	Business Starter Kit	\$ 19.95
TP6304	Home Starter Kit	\$ 19.95
TP6305	Accounting Starter Kit	\$ 49.95
TP7101	EZ-Calc	\$ 69.95

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TP7301	MIDI Play	\$ 49.95
TP7302	Beatles, Vol 1	\$ 19.95
TP7303	Classics, Vol 1	\$ 19.95
TP7304	Hits '86	\$ 19.95

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TP6019	GFA Basic	\$ 79.95
TP6020	GFA Basic Compiler	\$ 79.95
TP6402	Fortran 77	\$ 99.95
TP7801	Mark Williams "C"	\$179.95

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TP6029	Mictron Utilities	\$ 59.95
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 VISA or MasterCard

Exp. _____ / _____

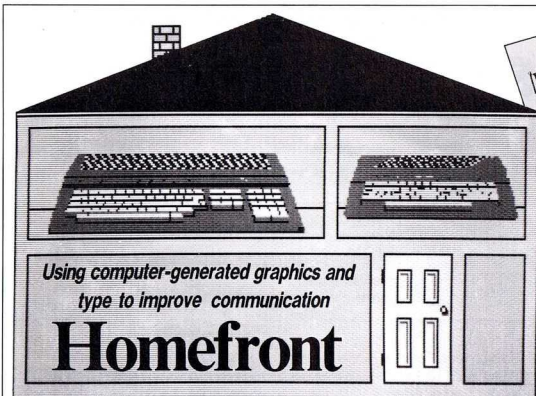
SUB
TOTAL

CALIF. RESIDENTS
 ADD 7%
 SALES TAX
 Shipping and handling
 (under \$50, add \$3.50
 over \$50, add \$5.00;
 over \$100, add \$7.00)

TOTAL \$

No COD's, please

Signature _____



Using computer-generated graphics and
type to improve communication

Homefront

By ROXANE FARMANFARMAIAN

Every week or so, my local dry cleaner hangs a new sign in his window announcing a special deal he's offering for the next few days. The sign, obviously printed by a computer, always has his logo in the upper left-hand corner and a small picture repeated several times along the bottom, below the message.

Just down the block, the bulletin board next to the cash machine at my bank is filled with notices—many of them computer printed on bright pink or green or yellow paper—advertising maid services, yard sales, continuing education classes at a nearby college, community baseball tryouts, and discount coupons for the lingerie shop across the street. Next to the handwritten signs and small typeset notices, these computer-generated announcements really stand out.

Computer graphics are everywhere—from the church bulletin to the local luncheonette. Where once the impact of a computer-generated notice was due primarily to its novelty, it now seems that the amusing graphics and tidy typefaces our Atari spew forth are the norm in amateur advertising.

Few of us bought our machines with the intention of becoming a computer Picasso or Warhol. The dry cleaner certainly didn't; he uses his computer primarily to record and price customer orders and to keep track of his expenses. But somewhere along the line he realized that his computer could also turn out ads and announcements to enhance his business.

You, too, can find hidden graphics potential in your Atari. Even if you have never drawn a straight line in your

life—let alone portraits or architectural elevations—your computer can add graphic impact to your career, community activities, schoolwork, or hobby.

For the average home user, computer graphics fall into three categories: charts and graphs to explain numbers; pictures and words for promotional or personal use; desktop publishing for newsletters. It takes a little time to get the hang of working with line and design in all three areas, though it is work that can seem like play if you begin by just noodling around—experimenting, doodling, putting the software through its paces.

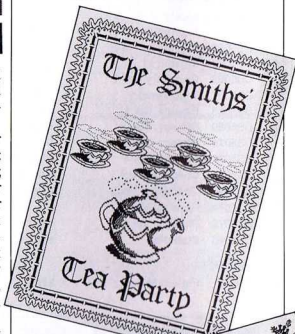
Once you settle down to do something for real, however, restraint becomes the operative word. The novice at the computer palette, suddenly realizing the enormous number of options at his disposal, has a tendency to go crazy. Drawing a perfect circle or box, filling it with a swathe of patterned shading, adding curlicues and arabesques, using four or five typefaces—are all as simple as touching a button and sliding the mouse around on the pad.

The result: a false sense that more is better, which leads inevitably to visual pandemonium. The sign or newsletter becomes all but impossible to read—the message lost among graphic elements that compete for attention. The moral is: don't get carried away by the discovery that you have a true space-age watercolor set at your fingertips.

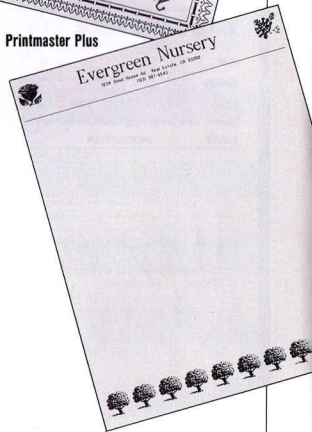
Stick with one or two fonts in any given graphic piece. Don't clutter the design with pictures thrown helter-skelter about the page. And until you graduate to pro status (and maybe even after), get some feedback from your



The News Station



Printmaster Plus



The Larson Family Times

July 8, 1988



Cheerleader
Coach Larson wants all family members to get in shape.

Coach Larson will be pleased to welcome you to his office at 1234 N. Main Street. You may be getting a new office building soon.

Coach Larson has decided to play the stock market.

Coach Larson has decided to play the stock market. He has a new office building soon.

Coach Larson has decided to play the stock market.

The New House

After years of living in the old house, the Larson family has decided to move to a new house.

We're moving!

1234 N. Main Street

July 8, 1988

Coach Larson will be pleased to welcome you to his office at 1234 N. Main Street. You may be getting a new office building soon.

Coach Larson has decided to play the stock market.

Coach Larson has decided to play the stock market.

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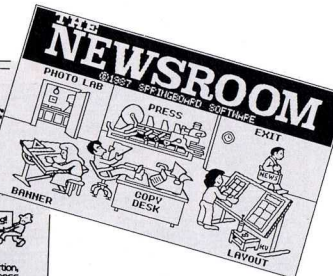
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Coach Larson has decided to play the stock market.



Pictures and Words

When Broderbund first introduced *The Print Shop* four or five years ago, banners and greeting cards poured off printers in record numbers, and the same smiling computer icons and flowery fonts could be seen from Anchorage to Miami. Since then, more clip-art libraries than you can count have become available—through user groups, in the public domain, and from such commercial sources as No Frills Software—and the flexibility of the programs in the category (including the original *Print Shop*, available for 8-bit Ataris) has improved markedly.

Printmaster Plus from Unison World for the ST, for example, features stationary and calendar (both weekly and monthly) options in addition to the familiar greeting card, banner, and poster formats. This means you can develop a single schedule format for family household chores or for the kids' newspaper route. Then, you can turn

convoy. If you wish to show how many votes your candidate has compared to others in the field, a pie chart might be best, as it can immediately show what part each candidate has of the total. If, on the other hand, you are dealing with the increase in revenue from PTA bake sales and auctions over the last five years, a line graph may be better, as it can clearly indicate change over time. Bar graphs, by contrast, are ideal for comparing two or more factors simulta-

The Newsroom

family or friends before you print out the final copy to send to everyone in the PTA or your hottest prospective clients.

Charts and Graphs

To add a new twist to an old saw: a picture is worth a thousand numbers. Summarizing the sales figures for your business, comparing this year's taxes with last year's, and assessing the impact of a local candidate's campaign on the community are examples of numerical exercises that can be effectively translated into graphs.

Software designed to help create good charts for printout has made great strides in recent years. It is now quite easy to combine text with graphics and to make the final result look polished and professional. For example, both Atari's *NeoChrome* and *Degas Elite* by Electronic Arts offer a snap feature that aligns all text and graphics to an invisible grid, ensuring that your columns stack up neatly and that your design is tight and clean. *The News Station*, by Reeve Software for both 8-bit and ST computers, lets you divide your page into eight separate "plates" so that your graph can be self-contained with its own typeface for the headline and explanatory text.

Numbers can be displayed in pie charts, line graphs, or bar graphs. Each form has advantages, depending on the kind of information you are trying to

Even if you have never drawn a straight line in your life, your computer can add graphic impact to your career, community activities, schoolwork, or hobby.

neously—the income from two different investments over the past few years, for example.

Try interpreting your numbers in each of these chart types to see which makes the most sense. When you have found the best for the purpose at hand, add a title and a caption explaining in just a few words what the graph shows.

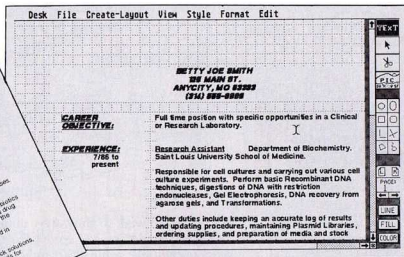
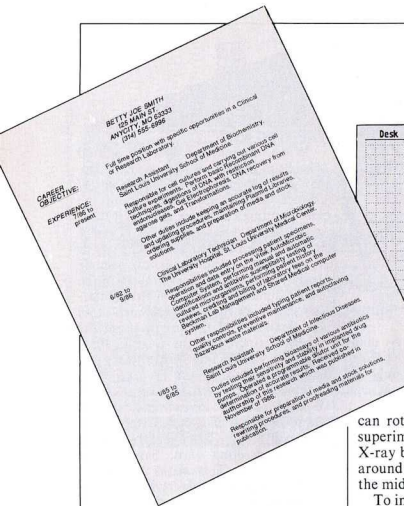
By incorporating graphs into your work (proposals at the office, business plans, applications for a mortgage, school reports, etc.) you will be able to enhance the impact of the material you present. People's eyes have a tendency to glaze over when faced with a page of numbers. Not so with a clear, easy-to-understand graph. And, as with any computer activity, you can start and stop the creative process whenever you wish; you are not constrained by the hours and workload of a typesetter or the whims of a freelance artist. You can do your drawing late at night or early in the morning—whenever it is most convenient for you. Your Atari is always ready.

them out at the press of a key whenever you need a new one—and fill it in either using the computer or by hand.

The ten fonts and 110 clip-art images that come on the master disk guarantee that your work will look unique (a disk of 20 more fonts and borders, plus additional "gallery" disks, offer more clip art).

Originality is perhaps most important when you are designing stationery—a personal or business letterhead. The advantages of doing it on your Atari are that you save typesetting costs and you can change it easily (when you move to a new home or office, for example, or add a new member to your staff).

You can even develop a different letterhead for each of the hats you wear—personal, school board, consulting, whatever. Remember, when designing your stationery, that it projects an image of you when your message reaches the hands of the recipient. Make it expressive, but keep it simple; you will be filling most of the page with text.



Publishing Partner

can rotate them left or right by 45°, superimpose text over a drawing (called X-ray background), and wrap a design around the edges of the paper, leaving the middle blank for the message.

To increase the number of options at your disposal, load in the *Paint Pro* Li-

Don't be satisfied with another run-of-the-mill computer-generated poster; go for the gold and do something unusual and eye-catching.

Desktop Publishing

The ability to combine text and

If you are using *Printmaster Plus*, you will notice that the stationery option does not have border capabilities. Don't despair. If you want a border, switch to the poster option, use text in a small size and any graphic elements to your wish, but place them only at the top or bottom of the page. When you print out the "poster," you will have a letterhead with a border.

If, like the dry cleaner, you want to create posters or flyers to promote your business or spread the word about a yard sale or school function, a program like *Degas Elite* will allow you to get quite sophisticated. Not only does it enable you to stretch and compress your drawings (so you can add a realistic looking shadow underneath a jogger or a pile of furniture, for example), but you

can rotate them left or right by 45°, superimpose text over a drawing (called X-ray background), and wrap a design around the edges of the paper, leaving the middle blank for the message.

graphics into a tight, readable grid is one of the greatest services offered by personal computers. Desktop publishing, as this ability is called, is most often used for newsletters, but it can work just as effectively for resumes, flyers, and stock sales memos.

Because it is so cheap to create them

can rotate them left or right by 45°, superimpose text over a drawing (called X-ray background), and wrap a design around the edges of the paper, leaving the middle blank for the message.

Sources of Software

Abacus Software
2201 Kalamazoo, SE
Grand Rapids, MI 49510
(616) 241-5510

Broderbund Software
17 Paul Dr.
San Rafael, CA 94903
(415) 492-3500

Electronic Arts
2755 Campus Dr.
San Mateo, CA 94403
(800) 448-8822

Migraph
720 S. 333, Suite 201
Federal Way, WA 98003
(206) 838-4677

No Frills Software
800 E. 23rd St.
Kearney, NE 68847
(308) 234-6250

Reeve Software
29W150 Old Farm Lane
Wrenville, IL 60555
(312) 933-2317

SoftLogik
4129 Old Baumgartner
St. Louis, MO 63129
(314) 894-8608

Spectrum Holobyte
2061 Challenger Dr.
Alameda, CA 94501
(415) 522-3584

Springboard Software
7808 Creekridge Cir.
Minneapolis, MN 55435
(612) 944-3915

Unison World
2150 Shattuck Ave.
Suite 902
Berkeley, CA 94704
(415) 848-6666

XLent Software
P.O. Box 5228
Springfield, VA 22158
(703) 644-8881

(no typesetting or printing costs, no layout artist's fees—nothing but you, the software, and your Atari), newsletters are proliferating. Customers are being kept informed about special prices and new products available at local malls; communities are being kept up-to-date on events at the public library, senior citizens' center, etc.; and club members are being kept abreast of group activities.

Some desktop publishing programs, including *Typesetter Elite*, by XLent Software for the ST, and *The News Station* for both 8-bit and ST computers, allow you to feed in text (or ASCII/ATASCII) files from a word processing or drawing program. This is a key feature to look for in desktop publishing software if you want to include text and figures generated by other programs. Programs that emphasize imported material generally offer only basic word processing and graphics features; they allow you to take what you have created

NEW PRODUCTS

EASY-TOOLS™
The Accessory You've Been Waiting For!

It's here! The program you've been waiting for... **EASY-TOOLS™** is the most powerful desktop publishing program ever designed for the Atari 8-bit and ST computers. It's the only program that lets you create professional-quality newsletters, flyers, brochures, and more... **EASY-TOOLS™** is the only program that lets you create professional-quality newsletters, flyers, brochures, and more... **EASY-TOOLS™** is the only program that lets you create professional-quality newsletters, flyers, brochures, and more...

USER SURVEY

Please answer the questions below and return the form to us. The information will be used to determine product and/or price changes and to help you improve our work. Thank you!

Do you own a 520 ST... 100... Mega...
 What do you use Easy-Draw for?
 Newsletter Publishing
 Business Stationery
 Personal Stationery
 Forms, Check, Invoices
 Labels (Indicate how many sheets)

What software do you use?
 What software would you like to see added which is not currently available?
 If you own a Commodore 64, what software would you like to see added?

Do you have an e-mail? If so, please give us your e-mail address.



Easy-Draw

across the top in headline format. The various company names of the places you have worked become the subheads. Fill in text as needed. In this way, you can change your resume easily and keep it up to date. Yet, it has a lot more flair than a normal word-processed document, and if you can arrange to have it printed out on a laser printer, you will have a really eye-catching piece with which to promote yourself.

Don't be surprised if, after you become a skillful desktop publisher with one of the entry-level programs, you begin to long for the even greater power of one of the more expensive professional programs and the elegant output of a laser printer. ST owners can choose *Supercharged Easy-Draw* by Migraph, *Fleet Street Publisher* by Spectrum Holobyte, or *Publishing Partner* by SoftLogic.

Your Atari is a multi-purpose art machine that can release all sorts of hidden artistic capabilities in you. So power up, both of you, and start getting your message across in graphics that demand attention.

Desktop publishing is most often used for newsletters, but it can work just as effectively for resumes, flyers, and stock sales memos.

with other software and arrange the separate elements so they work together.

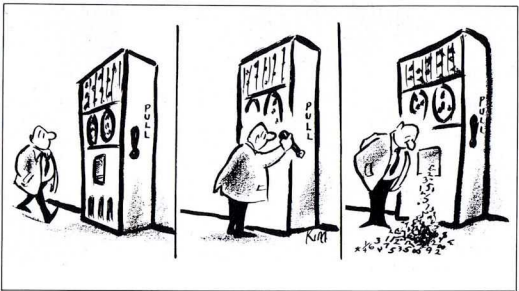
Other programs, such as *The Newsroom*, by Springboard for the 8-bit series, offer relatively sophisticated word processing capabilities on the assumption that you will want to create and manipulate your material as you go along.

To design a good newsletter, you need to divide your screen into columns or boxes, and decide where you want to place large headlines and graphics. The layout should be flexible, so that within a three-column format, for example, you can change the placement of the charts or bold type so they fit with whatever text you want to include at any given time.

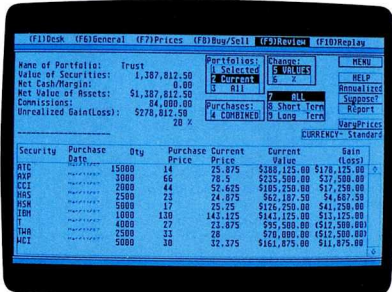
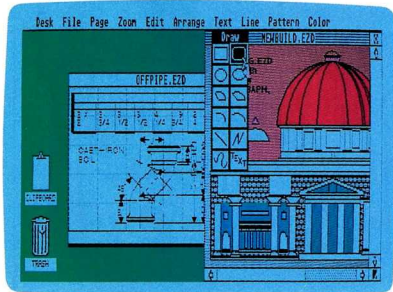
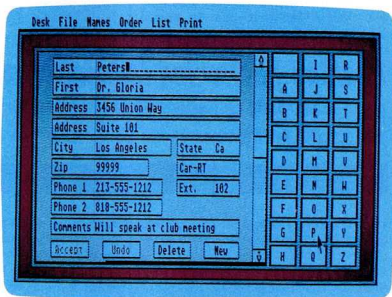
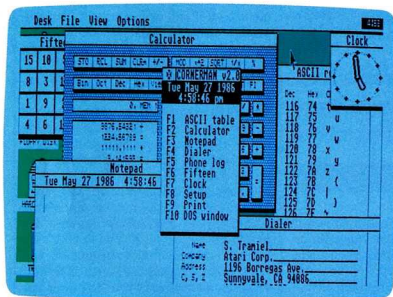
Expect the first session with your desktop publishing program to take some time, because, in essence, you will be creating the template that you will use for future issues. Once you have created and saved the template, however, you're set. All you need to do for

subsequent issues is to feed in new text (and art) files and write new headlines. Turning out a newsletter turns out to be a cinch.

For resumes, the same principles apply. Design a layout with the dates of your employment down the left column, for example. Put your name and address



At almost half the price of a Macintosh, it looks even better.



This could be love at first sight. And who would blame you?

After all, you're looking at the business end of the new business machines from Atari®

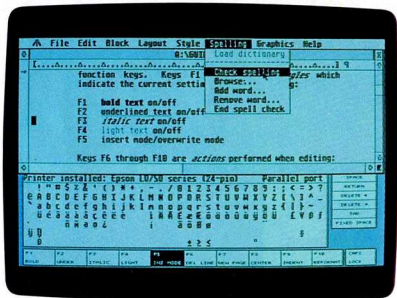
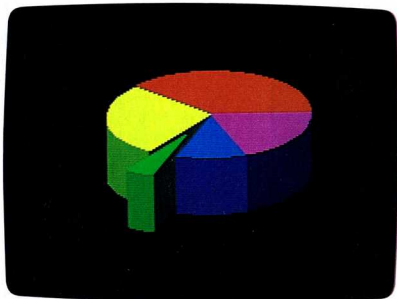
The Mega2™ and Mega4™

The two most powerful, full-featured personal computers you can buy for not very much money.

And just look at everything you get.

The Mega™ computers come with 2 or 4 megabytes of memory, standard. Enough for the largest personal computer applications.

There's a graphics accelerator, our exclusive BLITTER™ chip, for faster, smoother scrolling, graphics and



even animation.

And since our resolution is one of the highest of any standard personal computer monitor, you'll like what you see.



In color, of course.

There's no shortage of programs to put on that screen, either.

From word processing to data bases to spreadsheets to powerful CAD and desktop publishing solutions.

And they're as reasonably priced as our computers.

Which brings us back to the reason the new Atari Mega looks so good in the first place.

Simply put, it's a faster, more feature-rich computer than a Mac SE.

For just about half the price.

Now, for the name of your nearest Atari Mega dealer, call us at (408) 745-2015.

Because knowing what you know now, can you really look us in the face and say you wouldn't like to see a little more?

ATARI
Power without the price.™

Mega, Mega2, Mega4 and BLITTER are trademarks and Atari is a registered trademark of Atari Corporation. Other brand or product names are trademarks or registered trademarks of their respective holders. © 1987 Atari Corporation.

Atari ST software offers a range
of entertaining ways to learn touch typing

Atari Classroom

By JOYCE WORLEY

Typing has become one of the most important manual skills a person can acquire in this complicated high-tech world. These days, there is hardly a child or adult whose life can't be improved by keyboard virtuosity. Crisp, neatly prepared assignments raise grade point averages of students; carefully typed reports and communications enhance professionalism in the business world.

Carpenter or computerist, composer or artist, writer or restaurateur, doctor, lawyer, Indian chief—everyone has to communicate ideas to others, and the personal computer has made this com-

munication easier than ever before. It has also made it necessary for more people than ever before to know how to type.

The good news is that the computer is also the best typing teacher in the world; no human instructor can equal it. Computer tutorials have endless patience, customize the learning experience to suit individual learners, and even offer entertaining game formats to make the lessons fun.

Four educational typing programs are currently available for the Atari ST. Whether the student is 4 or 44, just beginning to learn the alphabet or an

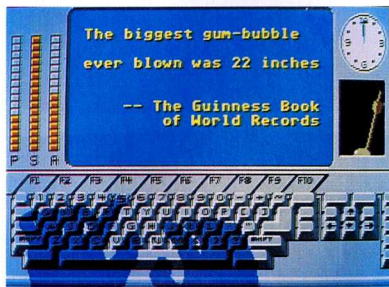
experienced typist honing existing skills, one of these should be exactly right.

Mavis Beacon Teaches Typing

Mavis Beacon Teaches Typing bills itself as "the finest typing program in the world." Don't look for any arguments from me about that. *Mavis* is the quintessential teacher—ever patient, ever charming, and ever more ambitious for her charges to continue improving their typing skills.

Software Toolworks' first big hit was *Chessmaster 2000*. These folks certainly aren't afraid of a challenge—or competition, either. Following that success, they tackled another software category already crowded with outstanding programs. The publisher turned the same careful thought and solid design principles that made *Chessmaster 2000* an award winner to a typing program that should become the standard against which to measure all other programs.

It is not that this tutorial is so different from all its predecessors. As was the case with *Chessmaster 2000*, the new program has been honed to a state of perfection that makes it a delight to use. *Mavis Beacon Teaches Typing* makes use of all the tried and true teaching methods traditionally used to teach the skill, then adds a few new twists, some outstanding graphics, and lots of good-



Mavis Beacon is the quintessential teacher—
ever patient, ever charming, and ever more ambitious for her charges to continue improving their typing skills.

Mavis Beacon Teaches Typing

System: Atari ST
Age range: 10 to adult
Price: \$44.95
Summary: Full-featured typing tutorial
Manufacturer:
Software Toolworks
13557 Ventura Blvd.
Sherman Oaks, CA 91423
(818) 907-6789

ies to enhance the lessons.

It is never easy to master high-tech skills, but *Mavis* holds your interest with guaranteed-to-succeed teaching methods that make it impossible not to learn.

The first time you use *Mavis*, the program prepares a profile, including your name, age, and current typing skill, then tailors the lessons to fit a beginner, intermediate (less than 20 words per minute), or advanced student (someone who knows how to type but wants to improve speed and accuracy). You select the lesson length.

The instructions are given in four separate "learning centers." The study period begins with The Chalkboard. *Mavis* tells you which typing problem this lesson will address, then suggests the method she has chosen to overcome the problem.

The Classroom pictures a keyboard on screen, along with a monitor displaying the text to be copied. Poised above the keyboard is a pair of shadowy hands, which guide you into correct hand placement. They then mimic correct fingering during the lesson.

The Workshop also pictures the keyboard with the guide hands, but adds some helpful features to boost speed. There is a clock for timing lessons, a metronome to help you develop a productive rhythm, and three meters that constantly monitor speed, accuracy, and the percentage of the lesson completed so far. Any or all of these features can be disabled if you find them distracting.

The fourth work area is The Arcade. In this typist's playground, you "race" against a pace car as jet planes skywrite the typing drill on the horizon. A rearview mirror reflects the competition. Type fast enough, and the pace car falls behind. Slow down, and the car creeps up, then passes your racer. This arcade-style contest is a lot of fun, and it really is a speed-builder, too. There is nothing like a little competition to make your fingers fly.

Oodles of other features make the learning process rich. There are 19 graphs to chart progress from day one up to the moment. A variety of helps are always available to describe how the program works, correct fingering techniques, and answer other questions that may arise while using the program.

Mavis can be customized to suit individual tastes and needs. The guide hands can be turned off and on, all the on-screen meters and dials can be elimi-

nated at will, and you can study either the Qwerty or the Dvorak keyboard. The on-screen typewriter can be used either with or without word wrap, and the backspace key can be disabled, making it impossible to go back and correct mistakes.

Extensive script files contained in the program make typing practice more fun. A huge database of words makes it possible for lessons to be made up of words with certain letters. There are also interesting sayings, facts, fiction, riddles, jokes, and phrases. When you create your own lesson, you can choose the type of material you want for practice.

The pleasant personality of the teacher adds a lot to the tutorial. When *Mavis* suggests a lesson plan, you select either of two responses: "Yes, let's do that," or "No, let's do something else." *Mavis* doesn't mind rejection at all; she just offers more options, such as Play A Game, Do A Lesson, Make Another Suggestion, Repeat Last Lesson, Make Your Own Lesson, or even, if you decide she was right after all, Repeat Original Suggestion.

The documentation is of the same high quality as the program itself. Every facet of the tutorial is explained and illuminated. Additionally, there is a complete history of typing, instructions for writing good business letters, and

even a built-in resume writer.

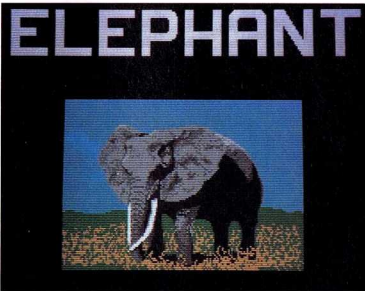
This feature-packed program is the perfect all-purpose typing tutor. It is easy to understand and fun to use, and—best of all—it really works!

A complete typing tutorial, even one as outstanding as *Mavis Beacon Teaching Typing*, isn't appropriate for everyone, however. Fortunately, there are other typing preparedness programs for the ST that can help younger folks, who might find the larger program too daunting.

A B Zoo

A B Zoo is a combination program designed for children from 3 to 6. The youngest computerists can use *A B Zoo* to help them master the alphabet. At its top level, the program requires the child to type words from memory. Although kids can use the program alone, they will need parental guidance to get them started.

Level One works like most alphabet tutorials. The child touches a key, then sees the name and picture of an animal. There is, however, an important difference between *A B Zoo* and other alphabet programs. Pictured on screen is a representation of the Qwerty keyboard. When the child presses a letter, that key is blanked on screen, and the letter is disabled on the keyboard. This continues, letter by letter, until the child has



A B Zoo

System: Atari ST

Age range: 3 to 6

Price: \$29.95

Summary:

Familiarizes children with typing

Manufacturer:

MichTron

576 S. Telegraph

Pontiac, MI 48053

(313) 334-5700

Children learn to spell the names of the depicted animals while painlessly acquiring a working knowledge of the computer/typewriter keyboard.

pressed every letter of the alphabet. With each stroke he reinforces familiarity with the keyboard while learning the names of some nifty, well-drawn animals.

Level Two randomly displays the name and picture of each animal. The illustration disappears, and the child must copy the name. Pressing a wrong key has no result, but each correct letter re-exposes one part of the animal until the name and the picture are completed. Level Three adds a complication; the child must type the animal names from memory to see the pictures again.

The learning process is very easy. Even the top level offers no particular obstacle for young typists. Children learn to spell the names of the depicted animals while painlessly acquiring a working knowledge of the computer/typewriter keyboard.

The graphics are delightful; each of two disks features a separate picture set. One group has straightforward representations of the animals; the second presents amusing cartoons of the animals—funny pictures that are particularly appealing to kids.

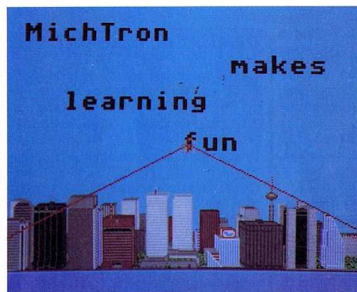
This is not a very complex program, and it doesn't offer very many skill lessons. There is no attempt made to teach children proper typewriter fingering or how to use the number and symbol keys. Neither does it contain any speed training; the learner has unlimited time to accomplish each task. However, proper fingering, number and symbol typing, and speed tests would be inappropriate for the targeted age group.

There is little to complain about in the program, except that some of the word choices seem difficult for this age group. Most children should have no trouble mastering "quail" for the letter q, or "ursus" for u. On the other hand, "xiphosuran" is quite a mouthful even for adults and presents a formidable spelling challenge for young children.

Invasion

Invasion is a double-threat program for students age 5 and over. Children choose to study text (letters) or math (numbers), uppercase or lowercase, and whether the invaders appear in order or randomly. There are three difficulty levels, which set the height on screen from which the invasion starts.

The invasion game itself will be familiar to anyone who has ever examined a typing training program. A word or an arithmetic problem appears at the top of the playscreen, then falls toward the



The current week's spelling or arithmetic problems can easily become the invading force to be blasted out of the sky.

bottom. Typing the word or the correct answer zaps the invader. The object is to stop the descending missile before it reaches the city pictured across the bottom of the screen and destroys one of your buildings.

Invasion, unlike MichTron's instructional program for younger students, is an open-ended program that allows parents and teachers to customize the lessons. This keeps the program fresh and reusable indefinitely.

There are actually only a few words included in the vocabulary file that comes with the disk—barely enough to get the learner started. The real value is in editing files to suit the student. Just follow on-screen prompts, then type in the words or math problems to be studied. The week's spelling or arithmetic problems can easily become the invading force to be blasted out of the sky.

The invasion forces gradually fall faster, forcing the typist to increase speed. A scoring system provides incentive to keep the child blasting away. However, this is not a true typing program. It doesn't offer any real instruction, such as a fingering chart or typing drills. But, it is a fine way to help a kid pick up some keyboard speed in an entertaining format that makes learning more fun.

The *Invasion* graphics are workmanlike, if not outstanding; the views of the city are well-drawn. But graphic splendor is beside the point here. The real strength of *Invasion* is the ability to customize the lessons indefinitely as the child grows. This turns a simple program into a long-term investment for value-conscious parents.

Typing Tutor Word Invaders

Typing Tutor Word Invaders from Academy Software is a classic program that has been dusted off and re-issued for virtually every home computer system. Although it lacks the sparkle of the state-of-the-art *Mavis Beacon*, it is still useful, and the same virtues that made *Typing Tutor Plus Word Invaders* a hit on the Vic-20 in 1982 can help typing students of all ages today.

After booting up, you choose either the Typing Tutor or the Word Invaders module and then select the typing level at which you want to begin study. The first seven levels introduce the keyboard, starting with the home row in the first lesson and gradually adding other keys, including capital letters, punctuation keys, and numbers. The symbols are not covered. The eighth lesson reviews all the material studied and administrators a "final exam."

Each lesson consists of eight typing exercises. These range from groups of random letters to simple words and sentences made up of the letters learned so far. The ninth exercise in each lesson is actually a typing test, and if you can type the material at a speed of at least ten words per minute with fewer than three errors, the program advances to the next level.

Word Invaders makes a game out of each lesson, using the letters learned in that lesson. To play, you choose a level and one of four speed ranges. The top

Invasion

System: Atari ST

Age range: 5 and up

Price: \$29.95

Summary: Game-style practice in typing and math problems

Manufacturer:

MichTron

576 S. Telegraph

Pontiac, MI 48053

(313) 334-5700

Typing Tutor Word Invaders

System: Atari ST

Age range: 8 to adult

Price: \$34.95

Summary: Utilitarian tutor provides keyboard practice with drills and game play

Manufacturer:

Academy Software
P.O. Box 6227
San Rafael, CA 94903
(415) 499-0850

level requires that you attain a rate of 35 wpm to win the competition, but it can keep up with speeds up to 80 wpm.

The game is another variation of the standard typing tutor theme. An alien spaceship types invading words in the sky, and you operate the cannon that blasts the invaders by copying the words correctly.

The graphics in the game are disappointing. They lack the fashionable flair that ST users have come to expect. In fact, there isn't a great deal of difference between playing the game and working through the tutorial. Word Invaders provides a little extra practice and some good feedback with a score and a speed report at the end of each wave of invaders. But it simply isn't exciting enough to offer a lot of motivation.

The program lacks frills throughout. It does not retain your name or typing level in memory; nor does it offer any variations in the lesson plans or customize the lessons to address your weaknesses.

The on-screen teaching material is limited to the typing practice plus one diagram of the proper finger positions. Commentary and explanation—what little there is—can be found only in the skimpy instruction manual.

These shortcomings make *Typing Tutor Word Invaders* inappropriate for the ST user in search of a full-featured typing tutorial to guide him from total ignorance to advanced skill levels and for the very young user who would probably prefer a more entertaining package.

On the positive side, *Typing Tutor Word Invaders* is a solid, if somewhat utilitarian, program that can be used very nicely to supplement classroom instruction or provide practice for self-motivated typing students. ■

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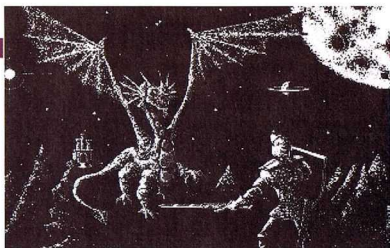
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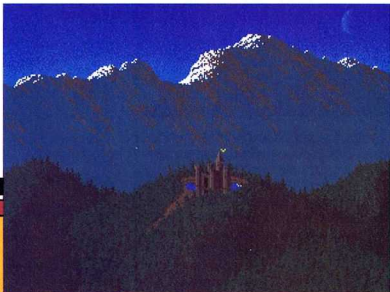
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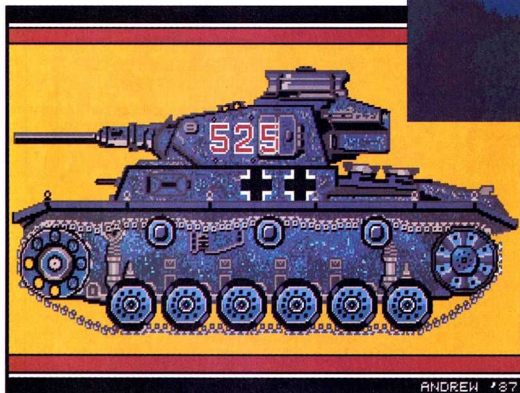
Pyramid (NeoChrome) by Mark Jensen of McClellan AFB, CA.



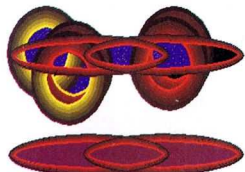
Dragon (Degas) by Thomas Starnes, Jr. of Sacramento, CA.



Dusk in the Valley (Degas) by Jonathan Cassell.



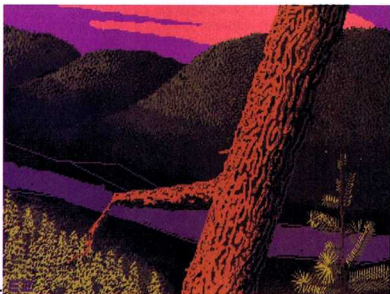
Panzer (Degas) by Andrew Chiou of West Malaysia.



Eyes (Degas) by Art Tarlocky of Berwyn, PA.



Shuttle (NeoChrome) by Vin Newtguay of Los Angeles, CA.



Forest (NeoChrome) by Ed Zator of Toronto, ON.

Graphics Gallery

We are overwhelmed! More than 50 images were submitted to our Graphics Gallery contest in the months of March and April—more than in any two-month period since the start of the contest. Thus, we had a tough time picking the ten winning entries displayed here.

Top prize, a three-year subscription to *Atari Explorer* goes to David Smith of Binghamton, NY, for his abstract image of a suspended head which he calls "Gilbert."

This issue, many of the entries were animated. Mark Jensen's "Pyramid" and Alex Tarlecky's "Eyes," for example, are quite spectacular when seen on the screen. Unfortunately, we can't capture animation very well on the printed page. If you would like images in their original form, they are available for downloading from the *Atari Explorer* category in the ST area on Genie and from section 8 of the Atari vendors' forum on CompuServe.

To enter our ongoing Graphics Gallery contest, submit your image(s) on disk in either *NeoChrome* or *Degas* format. Your disk must be labeled with the format used and your name and address. Also send a self-addressed stamped envelope with 45 cents postage for the return of your disk. We will return your disk with *ten new images* in the format of your choice.

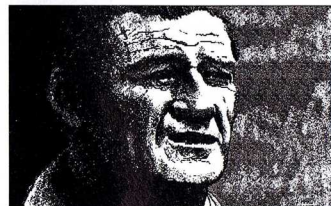
Your entry must include a signed statement as follows: "I certify that the image(s) submitted is (are) my own personal work and that no portion was copied from any image belonging to another person or organization or from copyrighted printed or video material. I give *Atari Explorer* the right to print my image(s) and/or use it (them) in promotional material or computer show displays."

Please allow eight weeks for the return of your disk. If you are a subscriber, please include an address label (or copy) showing all code numbers so that we can extend the correct subscription if you win. ■

By DAVID H. AHL



Fighters (Degas)
by Gerald Rutherford
and Paul Galliano
of Belle Chasse, LA.



John Wayne (Degas) by
Patrick Hardy of La Vorne, CA.



Gilbert (NeoChrome) by David Smith of Binghamton, NY.

If you have ever tried to take photos of the display on your Atari screen, you know that often they do not come out very well. There are several reasons for this. First, the automatic exposure meter in your camera expects the subject to be lit by reflected light, whereas a computer display is essentially the light source itself. In other words, taking a photo of a computer screen is the same as taking a picture of a light bulb or the sun.

The second problem is that most automatic exposure meters "look" at a relatively small spot in the center of the image area with the expectation that your subject is usually centered. (Some newer cameras average the readings—either manually or automatically—from several spots in the image area.) Therefore, unless the spot in the center of the display is composed of colors of medium brightness, your photo will be too dark or too light.

The third problem in taking screen photos is that in the case of composite video output, the display is refreshed from top to bottom every $1/30$ of a second. Your eye doesn't see the black band between images, but your camera does. Thus, if your exposure time is shorter than $1/30$, you will get a black bar across your image.

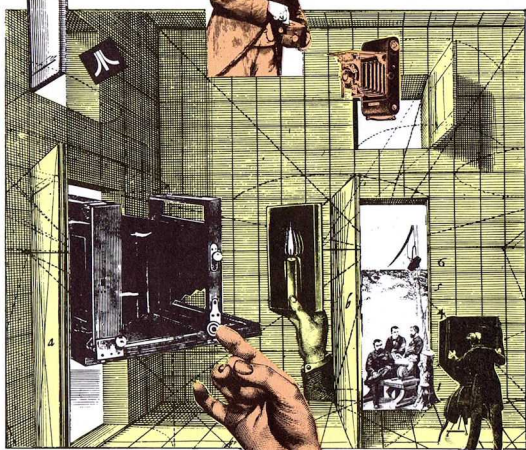
Even with slightly longer exposure times, you will frequently find a decided horizontal separation between darker and lighter portions of your image. Photos taken of images displayed on RGB monitors do not suffer from black bars, but short exposure times often result in uneven photos.

Say Cheese!

The following are some tips for taking excellent screen photos with an automatic 35mm SLR (single lens reflex) camera. The instructions are for an f-stop priority exposure system, i.e., a camera on which you set the f-stop and the camera selects (or sets) the exposure speed.

If you are taking color photographs for publication, slides are preferable to prints. (The color separations used in printing a magazine are always made from a positive color image, never a negative.) So rule number 1 is: use slide film, not color print film.

Because of the display refresh problem, it is desirable to have a relatively long exposure, which means using the slowest (lowest ASA number) film available. If you can find it, use film with an ASA rating of 25 or 32. If not, use Kodachrome 64, which is widely



Foolproof Photos

How to take pictures of your computer display

available. Under no circumstances should you use a film faster than ASA 64.

To further increase the exposure time, set the f-stop on your camera to a small opening; for ASA 25 or 32 films, use $f/11$ or $f/16$; for ASA 64 films, use $f/16$ or $f/32$.

To compensate for the screen being a light source, set the film speed indicator on your camera to a setting about *four* film speeds above the actual speed of the film you are using; compute this value by doubling your actual film speed four times. In other words, for ASA 25 or 32 films, set your camera to ASA 500 and for film speed 64, set it to ASA 1000. As these values may not be available, use the closest value—ASA 400 or ASA 800, for example.

Use a tripod, and set the camera distance so the plastic housing of the monitor shows on all four sides in your viewfinder. Use a cable release to open the shutter, as some of the exposure times will be fairly long. You can do your entire setup in a lighted room, but the

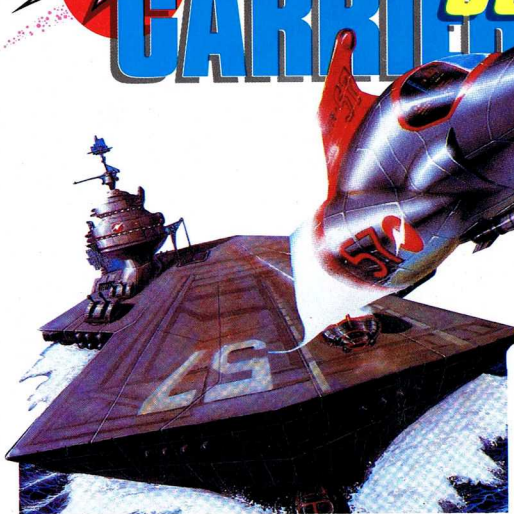
actual photos should be taken in total darkness (no lights down the hall, no moonlight through the window; nothing but the light from the screen itself). In general, the above settings should result in exposure times of from $1/30$ to 1 second or longer.

You should "bracket" your shots, taking at least three photos of every screen. This is most easily done by varying the ASA ratings; i.e., take one photo at one ASA rating under the indicated value, one at the indicated value, and one over. For example, with Kodachrome 64 and a lens opening of $f/16$, you would take one shot at ASA 400, one at the indicated ASA 800, and one at ASA 1600.

In summary, use film with a speed of ASA 64 or lower. For Kodachrome 64, set lens opening to $f/16$. Use a tripod and cable release. Take photos in total darkness. Take three photos, one with camera film speed indicator set to ASA 400, one set to ASA 800, and one to ASA 1600. Get film developed and hope for the best. ■

By DAVID H. AHL

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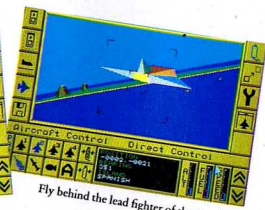
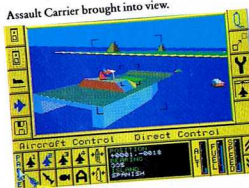
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Using The Atari SLM804 Laser Printer



Making the most of a sophisticated system

The Atari SLM804 is a sophisticated laser printer capable of producing near-typeset-quality text and graphics output at a rate of up to eight pages per minute. As advanced as the technology in the laser printer is, the SLM804 is actually very easy to operate, once you get it set up properly.

We have been using an SLM804 in our editorial offices for several months now and have become addicted to its high quality output. The ease with which letterhead can be inserted (and even created) has put the laser printer in high demand for all office correspondence, and we have even noticed staff members slipping in on weekends to get a slice of Mega/Laser time.

Our long-postponed *Atari Explorer Writers' Guide* was taken off the back burner and transformed into a successful experiment in desktop publishing, and Publisher David Ahl's "Marketing Tips" for advertisers was given a new lease on life.

Our relationship with the SLM804 was not all peaches and cream, however. It took us a little while and a lot of experimentation to master the finer points of operating this high-end peripheral. We learned a great deal in the process and hope to flatten your learning curve a bit by sharing our new-found knowledge. By the time you finish reading this article, you should have a thorough understanding of the software that comes with the SLM804 and how to make the most of it.

This article does not explain how to assemble the printer and attach it physically to the ST computer. That is a relatively simple operation that takes less than an hour, if you carefully follow the instructions that come packed with the

printer. The tricky part comes when you try to install the software.

Getting Started

The SLM804 comes with four single-sided disks containing a GDOS driver, a Diablo 630 emulator, and three printer fonts in a variety of sizes (see Table 1). Also included is a 63-page, spiral-bound owner's manual for the printer, and a 51-page Diablo emulator user's manual. If you do not find all of these things in the printer box, ask your dealer for replacements.

The minimum configuration for using GDOS and the SLM804 laser printer is an ST computer with at least 2Mb of memory and one floppy disk drive. However, if you have come to the point of purchasing a laser printer, you probably already own a hard disk drive. Therefore, for simplicity's sake, let's assume your system consists of a Mega ST with an SH204 hard disk drive.

Let us also assume that your hard drive is partitioned into two 10Mb segments called C and D (in actuality your drive may have more storage capacity and partitions, but the material presented here still applies).

Before attempting to use the laser printer with your own software, verify that it has been set up correctly and is operational. Simply double-click on the program TEST.PRG found on the SLM804 Printer Emulator disk. You should hear a click as the printer whirs into action and spits out a test pattern within seconds (see Figure 1).

If the border fails to frame the entire page, check the sliding tab on the right-hand side of the paper cassette, making sure it is in the proper position for the size paper you are using. The illustra-

By OWEN LINZMAYER

Printer Emulator:

AUTO\DIAB630.PRG	Diablo 630 emulator
TYPE10LS.FNT	10 pt. Typewriter font (Courier)
RAZR10LS.FNT	10 pt. Razor font
LIST06LS.FNT	6 pt. Listing font
SDUMP.PRG	Screen dump program
SETUP630.ACC	Printer control accessory
SETUP630.PRG	Emulator customizer
SETUP630.RSC	Customizer resource file
1ST_PRINT.DOT	1st Word printer driver
SLM804.HEX	1st Word driver source file
TEST.PRG	Self-test program

Font Disk 1:

ATTP10LS.FNT	10 pt. Typewriter font
ATTR10LS.FNT	10 pt. Dutch font
ATTR12LS.FNT	12 pt. Dutch font
ATTR18LS.FNT	18 pt. Dutch font
ATTR24LS.FNT	24 pt. Dutch font

Font Disk 2:

ATSS10LS.FNT	10 pt. Swiss font
ATSS12LS.FNT	12 pt. Swiss font
ATSS18LS.FNT	18 pt. Swiss font
ATSS24LS.FNT	24 pt. Swiss font

GDOS Driver:

AUTO\GDOS.PRG	GDOS program v. 1.0
ASSIGN.SYS	GDOS reference file
README.DOC	Disk-based documentation
SLM804.SYS	SLM804 Laser GDOS driver

Table 1: Contents of the four SLM804 disks

tion on page 21 of the owner's manual has the two positions reversed. After examining the self-test output to verify that the laser printer works correctly, you can configure your system to use the printer for everyday tasks.

Diablo Emulator

The SLM804 comes with a program that makes your computer think it is talking to a Diablo 630 daisywheel printer. Atari chose to emulate this particular printer because it is widely supported by most business applications and because the output of the SLM804, when used for normal printing tasks, most closely resembles that of a high-end letter quality printer.

You begin by copying the emulator program, DIAB630.PRG, into your AUTO folder. You then copy the font file TYPE10LS.FNT into the root directory of the boot partition. When you re-boot, the emulator will automatically execute itself, load the font file, and remain resident in memory. For all intents and purposes, any program you run subsequently will think that there is a Diablo 630 daisywheel printer attached to the parallel port.

To execute the emulator directly (i.e., not upon autoboot, but rather, by double-clicking from the desktop), the font file must be in the same directory as the

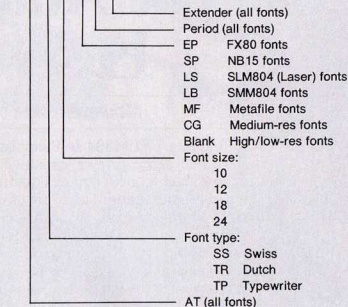
DIAB630.PRG program. If it is not, the message "Font file read error on: TYPE10LS.FNT" will appear. This does not mean that the integrity of the font file has been compromised; the problem is simply that the file is not located where the emulator expects to find it.

Casual users, as opposed to dedicated hackers, don't need to know how GDOS works; they really only need to know how to set up the program on their systems.

Customizing The Emulator

Embedded within the DIAB630.PRG file is a list of font files specified by the user. As shipped, the Diablo 630 emulator defaults to a 10 point, Courier type-writer face (TYPE10LS.FNT). However, the two font disks provided with the SLM804 laser printer contain what Atari calls "Swiss" and "Dutch" printer fonts in four different sizes—10, 12, 18, and 24 points. To instruct the emu-

AT cc ## nn . FNT



Example:

File name	Type	Size	Output device
ATSS10LS.FNT =	Swiss	10 point	SLM804 Laser printer

Table 2: GDOS Font Definitions

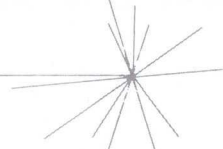
lator to load different fonts into memory upon booting, you must customize it using the set-up program provided.

The emulator customizer consists of two files, SETUP630.PRG and SETUP630.RSC, which must be in the same directory to function properly. A further stipulation is that these files must be in the same directory as the printer font files you want to use.

To keep your boot partition as uncluttered as possible, you may want to place all of these files in a new folder in a separate partition. For example, create a folder called GEMSYS in partition D and copy into it all nine files from the two SLM804 Font disks along with the SETUP630 program and the resource files from the SLM804 Printer Emulator disk.

Double-click on SETUP630.PRG to customize the emulator. You will be presented with a dialog box displaying the default "front panel" settings. Do not change these, instead, click on either Cancel or OK. Then go to the Options menu and select Install Fonts.

A dialog box, which allows you to install/remove fonts, appears. On the left is a scrollable list of available fonts. All files with the extension .FNT in the folder with SETUP630.PRG are displayed. If you have added font files from other GDOS packages to the folder, you must



be sure to install only SLM804 printer fonts with the set up program. Table 2 shows you how to tell from the filename of a font whether it is intended for use with the SLM804.

To install a font, select an available font file from the list on the left side of the dialog box. Click on one of the eight slots on the right and then on the Install button at the bottom. The name of the font file should appear in the selected Installed slot. Repeat this process for as many styles as you will want.

Note that the Diablo 630 emulator assumes that the first four font slots hold the styles it should use when instructed to print in normal, bold, italic, and superscript, respectively. If, for example, you want to print your letterhead in a different font than you plan to use for the body of the letter, you can place the letterhead font in the second slot and type your name and address in bold. Switch back to normal type for the letter, and when you print out, your correspondence will have the look of professionally printed stationery.

Of course, you will not be able to use regular boldface in your letter, but that is a small sacrifice. Furthermore, if you decide you need boldface in the body of the letter, you can move your letterhead font to the italic or superscript slot.

To change the style of an installed font, select it, and then choose the desired style (bold, light, italicize, or outline) from the pulldown Style menu. A check mark should appear next to the style chosen. Return to the Style menu and select the Install Style item. The font file in the Installed list should now be displayed in the chosen style. Not all fonts can be restyled correctly, nor can styles be combined.

To see what the fonts look like in the styles you have chosen, select the Examine Font item from the Option menu. In addition to showing you what the font will look like, this option tells you how much memory is required for the font and how many lines of text in that size/style will fit on a single page.

When you are satisfied with your changes, you must save the new emulator settings to disk to make them effective. The fonts shown in the Installed list are not really installed until you re-boot the system after saving the customized emulator.

After you have customized the emulator to your liking, you must copy any Installed font files from their folder to the root directory of the boot partition. Otherwise, the DIAB630.PRGM file will not

know where to find them. The only font files that must be in the root directory are those specified as Installed; the others can be kept out of the way until needed. Unfortunately there is no way

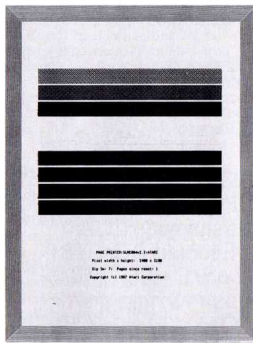


Figure 1. The test pattern confirms that the SLM804 is working properly.

to install/remove fonts without re-booting.

Laser Accessory

Also provided on the SLM840 Printer Emulator disk is an accessory program called SETUP630.ACC. Like all ac-

To use the SLM804 laser printer with its Diablo emulator and fonts installed, your software must know how to print to a Diablo 630.

cessory programs, it must be located in the root directory of your boot partition to be loaded on start-up. This accessory is not vital to operating the laser printer, but does come in handy occasionally.

Perhaps the most common application for this accessory is to force a form feed. For example, if you print a text file from the desktop, information is sent to a memory buffer until there is enough for an entire page to be printed. If you

send only several lines of text and want to force the laser to print it out, invoke the Setup630 accessory. The button marked Form Feed will have a grey background, indicating that there is something in the buffer. If you want to erase this information without printing it, click on the Reset button; otherwise, choose Form Feed.

Also note that among the top row of buttons is one labeled Self Test. This is different from TEST.PRGM; the accessory Self Test option tests the Diablo emulator. When you click on this button, a single page is printed, showing a sample character set for each of the installed fonts and styles (see Figure 2).

The other common use for the Setup630 accessory is to instruct the printer that you want to feed paper manually. Pages 21 and 22 of the owner's manual state that the SLM804 laser printer can accept manually fed paper and envelopes, but the instructions are misleading.

If your cassette tray is filled with plain, white paper, for example, and you want to send out some correspondence on company letterhead, select Manual feed from the Setup630 accessory dialog box. Tell your word processor to print the desired letter as you insert a sheet of letterhead into the manual feed slot. There is no need to remove the cassette tray or change your word processor to single sheet mode; the accessory setting takes care of these details for you. In practice, however, it is easier just to slip the letterhead into the paper cassette and forget about changing the accessory setting.

Diablo Drivers

To use the SLM804 laser printer with its Diablo emulator and fonts thus installed, your software must know how to print to a Diablo 630. That is, it must send the correct control codes necessary to make use of the special features of that printer.

Most programs require you to run through a configuration procedure the first time you use them, specifying information about your system, including number of disk drives, type of printer, and interface. Choose the Diablo 630 daisywheel if your program offers it as a printer option, and select parallel port output for the interface even though the SLM804 is physically attached to the DMA connector on the back of the ST.

The SLM804 Printer Emulator disk contains a printer driver file (IST-PRNT.DOT) for use with *1st Word*. If

```

!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~Δ
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!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~Δ
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αβΓπΣμτδθΩδφϕΓ≡±ζξ|∫÷≈°·√π²³

```

Figure 2. A few of the fonts available with the Atari SLM804 Laser Printer.

you want to use a different software package that does not come with a Diablo printer driver, you have several options.

First, check with the software publisher to see if the necessary driver is available. Many third-party developers have updated their products to take advantage of the SLM804. If available, a new driver should cost no more than a few dollars.

Failing that, you may be able to create your own printer driver. Well-documented applications contain instructions for building customized printer drivers. Appendix A of the Diablo emulator user's manual lists all of the control codes and escape sequences necessary to write a fully-functional Diablo printer driver, though such an undertaking may be beyond the capabilities of a novice.

Finally, a local user group or retailer may have a collection of Diablo drivers for different applications. To find the user group or dealer nearest you, contact Atari's Customer Relations department at (408) 745-2367.

GDOS Applications

Many new word processors and desktop publishing programs use GDOS to get the best possible printouts from the output devices used. Casual users, as

opposed to dedicated hackers, don't really need to know how GDOS works; they really only need to know how to set up the program on their systems.

Installing GDOS is really a piece of cake. For starters, copy GDOS.PRG from the AUTO folder on the SLM804 GDOS

We have been using an SLM804 in our editorial offices for several months now and have become addicted to its high quality output.

Driver disk into your AUTO folder. Then copy ASSIGN.SYS into the root directory of the same drive. Finally, copy the driver SLM804.SYS into the font directory you created previously. Before you can access all of those neat fonts, you must modify the ASSIGN.SYS file.

When executed on autoboot, GDOS looks at the ASSIGN.SYS file in the root directory to find out where the font and driver files are located. Load AS-

SIGN.SYS into your word processor and change the first line so that it reflects the directory in which these files are located.

The information below this directory path name tells GDOS the names of the screen, metafile, and printer fonts as well as drivers that are available. If you add fonts or drivers later, you must modify ASSIGN.SYS before GDOS will recognize them. For now, save ASSIGN.SYS as a text file and re-boot your system. That's all you need to do to set up your Atari ST to use GDOS programs.

Screen Dumps

Supplied on the SLM804 Printer Emulator disk is a program called SDUMP.PRG, which lets you print screen displays directly to the laser printer. According to the user's manual, "monochrome screens are printed on a scale of four laser printed pixels to one screen pixel. Color screens are printed by using the luminance of the displayed colors to produce a corresponding grey scale on the laser printer."

The program SDUMP.PRG actually replaces the standard screen dump code that is executed when the correct GEM system call is issued. Neither GDOS nor the Diablo emulator need be installed for the screen dump program to work correctly. These programs have nothing to do with one another. To install the screen dump program, double-click on SDUMP.PRG from the desktop.

With the screen dump program installed in RAM, whenever you press the Alternate and Help keys simultaneously, the screen pixels will change color for an instant, and within seconds a black and white representation of the screen will emerge from the laser printer.

Although the documentation doesn't say so, the SDUMP.PRG file can be placed in an AUTO folder, conveniently forcing the utility to install itself every time you boot the computer. This prevents the system from locking-up if you unintentionally invoke the screen dump routine without SDUMP.PRG in memory (it takes several seconds for the computer to realize that the printer has "timed-out").

We hope these tips will be helpful to you as you become familiar with your laser printer. Getting a device as sophisticated as the SLM804 up and running is bound to be a bit more daunting than plugging in a game cartridge, but we guarantee that the results are worth the effort.

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The programming environment is designed to stay resident in your Atari while you are programming. It controls the editor, the compiler, the linker and utility programs, and allows you to run the program you have compiled or any other program.

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The linker is fast and efficient; assembler language libraries may be introduced.

The debugger provides complete source line tracing and source variable display capability; break points can be set; the calling sequence may be shown, the last ten lines executed can be listed, as can any source lines from the main program or any libraries; you can execute SID or any other program; screen switching separates program text and GEM output.

```

Desk File Block Find Compile Link Run Options
-----
Compile PAJMC
PROGRAM prin(capt,output)
      Check spntax
      Compiler optless ... ME
      Repeatedly asks for
      out its smallest fact
      Compile other file
      Cross-reference
UMR factor, manufacturer: 0
number: integer;

REGN
{ Start of main loop }
REPEAT
  write:
  write('Input an integer up to a thousand million (0 to 1)
  readln(number);
  UNTIL number >= 0;
  write('Smallest factor of ', number, ' is ');
  
```

Windowing and graphics support is provided by GEM; the documentation gives all the explanation needed to use these powerful functions.

The three volume Documentation pack includes:

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- The programming language specification
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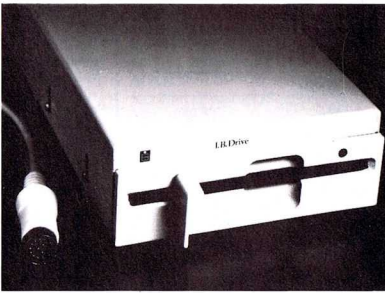
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*The companies and products
that can help you and your Atari
make beautiful music together*

Guide To Atari Music Software

By LARRY TAPPER

If you are serious about using your Atari for music composition or performance, you probably read *Music, Computers, & Software—MCS* for short. In case it has escaped your notice, *MCS* is an excellent bi-monthly magazine that deals with all aspects of music applications, including MIDI, sampling, scoring, controlling, and recording. Subscriptions cost \$15 per year from *MCS*, 190 E. Main St., Huntington, NY 11743, (516) 673-3241.

The following list of music software for Atari computers is based on "A Guide to Atari Music Software," which appeared in the August 1987 issue of *MCS* (pages 47 and 50). Additional product information was supplied by the manufacturers.

All products are for the ST, except where an 8-bit version is specifically mentioned.

Activision

Drawer 7286
Mountain View, CA 94039
(415) 960-0410

The Music Studio

A comprehensive music composition tool for home use. Prepare compositions from a simple tune to an elaborate 15-channel, three-verse score that can be played by electronic keyboard. Create

musical instruments, sound effects, and lyrics, which can be modified and edited into complete musical passages. 8-bit, \$34.95; ST, \$49.95.

Animated Music

124 H Blossom Hill Rd., Ste. 494
San Jose, CA 95123
(408) 227-3959

Animated Studio

Each track of this 99-Track MIDI Sequencer supports all 16 MIDI channels and non-sysex MIDI data. Programmable tempo changes, color coded editing, and a display of the music staff for editing with mouse (printer output not currently available). \$295.

Digidesign, Inc.

1360 Willow Rd.
Suite 101
Menlo Park, CA 94025
(415) 327-8811

Softsynth

A 32-oscillator additive and FM digital synthesizer versatile enough to create virtually any sound. Uses software based synthesis to create sounds using graphic programming screens. Specify

a group of mnemonics, envelopes, and other parameters to create a noise-free 16-bit sound that can be transferred to a sampler for playback. \$295.

C-Lab Creator

A MIDI sequencing program. Features include multi-tasking, recording of on-screen events, and enhanced high-speed graphics. All quantizing is performed in real time. Over 1000 tracks are available for recording. Can be used with the C-Lab export MIDI expansion interface to accommodate up to 64 individual MIDI channels. \$349.

Dr. T's Music Software

220 Boylston St., Ste. 306
Chestnut Hill, MA 02167
(617) 244-6954

Atari ST KCS, Version 1.6

Has all of the editing and structuring features of the C-64 KCS plus three separate modes of operation. Track Mode is a 48-track computerized tape recorder; Song Mode is for chaining of sequences into songs; and Open Mode is for flexible structuring. 16 songs, 126 sequences, and 50,000+ notes. Version 1.6 has a multi-program environment (MPE) that allows loading of up to four Dr. T programs under KCS. \$249.

CZ Patch Editor/Librarian

A tool for creating, editing, and storing patches for the Casio CZ series. Display and edit all patch parameters on a single screen. Patches can be named, and sets of 16 can be stored on disk or transferred between computer memory and the CZ. Does not support CZ1. \$99.

MIDI Recording Studio, Version 1.1

An introductory level sequencer—basically an 8-track automated tape recorder with full editing features. Plays internal voices of the ST. Sequence files are compatible with KCS. Punch-in, punch-out capability. Full trade-up allowance for Dr. T programs. \$59.

The Copyist, Version 1.5

A music printing and scoring program that allows mixing of text with musical notation. Reads and writes all Dr. T sequence files. \$249; Copyist Junior (entry level), \$99. Full trade-up allowance.





Drumware

12077 Wilshire Blvd., # 515
Los Angeles, CA 90025
(213) 478-3956

Soundfiler

Visual sampler editors for Akai S612, S900, X7000, and S700 digital samplers. Visual editing of loop points, cross fade looping, freehand waveform drawing, digital equalization, digital enveloping, cut-and-paste editing, and complete front panel programming. \$612, \$199; S700/X7000, \$249.00; S900, \$299.

Genwave

A generic waveform editor with editing capabilities of Soundfiler minus front panel controls. Works with E-mu, E-max, and SP-1200, Prophet 2000/2, Akai S900, and other instruments supporting MIDI Sample Dump Standard. Also acts as a sample translator between these instruments. \$299.

Electronic Arts

1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171

Music Construction Set

Built-in waveform editor; 16 instrument sounds; MIDI-in and MIDI-out capability; six time signatures; selectable tempo; separate instruments for three different voices. Add or split measures; transposition between treble and bass; on-screen keyboard for easy entry; cut-and-paste notes and refrains; whole-notes to 32nd notes and full notation (rests, etc.); automatic transposition; and printout capability. \$49.95.

Faris Compu-Mates

8621 Wilshire Blvd., # 177
Beverly Hills, CA 90211
(213) 271-7410
(818) 506-1903

FinalTrak ST

An 80-track sequencer with full automated mixing capabilities and MIDI faders. \$199.95.

SampleTrak 20

Entry-level sequencing. 20-track ver-

sion of FinalTrak, the professional sequencer. Basic editing capabilities. \$49.95. (When customer is ready to upgrade to professional version, FinalTrak can be purchased for \$149.95.)

Synthdroid Editors (for Korg DSS-1 and DW8000, Kawai K3PO+ and R100 Drumdroid, and CZ)

Editing and librarian software for the listed synthesizers with computer-generated patch capability. DSS-1, \$129.95; K3PO+ and R100, \$99.95; DW8000 and CZ, \$79.95.

MIDI Programmable Patcher

Program sequences of events and sequences of MIDI switching through eight inputs and outputs. Record switches on a separate sequencer for playback, or use the events sequencer in the software package. \$249.50.

SMPTe Brain

Lock to any SMPTE standard, sync, FSK, etc. for the purpose of synchronizing a Compu-Mates sequencer with the new digital tape machines, video machines, and the old stand-by systems.

Gen-Pedals

A set of eight MIDI-assignable controllers for use as standard volume pedals, modulation wheels, faders, etc. Editor allows assignment of the eight controllers to any MIDI parameter on any MIDI device with a system exclusive parameter change.

Future Music

Box 1090
Reno, NV 89504
(702) 826-6434

MIDITrax

Professional MIDI sequence library (Versions for Dr. T's KCS and MRS, Passport Designs' Master Tracks Pro and Junior sequencers, Steinberg's Pro-24, and C-Lab's Creator). Each disc contains ten popular songs arranged to match backing parts on original recordings. Songs can be played with two eight-voice synthesizers and drum machine. Each instrument plays through separate MIDI channel. Includes tips to get the most out of each sequence without editing. New volumes released every 2-4 weeks. \$59.95 per volume.

Hybrid Arts

11920 W. Olympic Blvd
Los Angeles, CA 90064
(213) 826-3777

SMPTe Track ST

Sequencing software with built-in SMPTE capability includes 60,000-note capacity, programmable tempo, real-time transpose, 191 levels of quantization, track offset, graphic editing, instant locate, simultaneous looping and linear tracks, cut-and-paste of track sections, and MIDI note or event editing screens. \$575.95 with SMPTE interface.

Sync Track ST All the capabilities of SMPTe Track except the SMPTE. \$375.95.

EZ-Track Plus

20-track, 60,000 notes on a 1040 ST. Auto-locate anywhere in the song with punch in and punch out, fast forward, cut-and-paste, and rewind. Internal and MIDI sync capabilities. Counters displayed as measures, beats and ticks. \$65. Compatible with HybriTwitch, a \$29 program that stores up to ten Hybri Arts programs in RAM.

EZ-Score Plus

A sheet music scoring program that allows all of the Hybrid Arts sequencer files to be converted into sheet music. Includes on-screen editing to add lyrics and chord symbols and define chart format. \$149.95.

GenPatch ST

A generic patch librarian system for all MIDI synthesizers and drum machines that offer sysx patch information. Press a command key to select an instrument. For older, less common, and very new instruments, there is a configuration editor that allows custom programming. Hybrid Arts supplies configuration files to GenPatch users. \$149.95.

ADAP 1

A 16-bit Recorder/Sampler for the Atari 1040 ST or upgraded 520 ST with at least one Mb of RAM. Samples at the same rate as a compact disk player (15 kHz up to 48kHz) with 16-bit linear resolution. Uses MIDI to produce up to 64 sampled sounds split across the keyboard with six-voice polyphony. \$195.



Intelligent Computer Music Systems

P.O. Box 8748
Albany, NY 12208
(518) 434-4110

M
An interactive composing and performing system. Specify basic musical material as notes and chords, determine the ways in which that material will be transformed, and then perform the music by manipulating screen controls, playing control keys on a MIDI keyboard, or "conducting" with the mouse on a multi-directional grid. \$200.

Key Clique

3960 Laurel Canyon Blvd., Ste. 374
Studio City, CA 91604
(818) 905-9136

Sys/Ex

A generic, universal MIDI librarian package that has been ported to the ST. Store songs and sounds on disk for future use. Construct MIDI dump files and concatenate files from various MIDI instruments. Works with about 90 synthesizers, samplers, and drum machines, including Yamaha, Roland, Oberheim, Sequential Circuits, Kawai instruments. \$150.

D-50 Command

A graphic editor and librarian for the Roland D-50 and D-550; runs on both color and monochrome. Features pop-up window graphics; draggable envelope graphics; A/B voices for comparison; cut-and-paste between voices; reverb editor; four voice buffers simultaneously available in memory. Reads files from any other D-50 editor. Offspring feature allows creation of new sounds by selecting two sounds to be used as "parents." \$160.

MichTron

576 South Telegraph
Pontiac, MI 48053
(313) 334-5700

Super Conductor

Record, edit, and play music, with or without the MIDI synthesizer. An advanced program designed for amateur and professional musicians. \$79.95.

Micro-W Distributing

1342 B Route 23
Butler, NJ 07405
(201) 838-9027

MIDI Magic

Music roll on a disk that allows playback through the included cable on MIDI synthesizers. Complete with six-song demo disk. \$39.95.

QRS Music Disk

Library of computer disks converted from the 10,000-song library of QRS music rolls for player pianos. Six songs per disk with over 150 to choose from. \$19.95.

MIDImouse Music

Box 877
Welches, OR 97067
(503) 622-4034

Capture (Versions for Roland MT-32, D-50/550)

Patch Editor/Programmer/Librarian with full GEM interface. Create, edit, and store patches and banks of patches, full and partial system settings, timbre (MT-32 version) and tone (D-50/550 version) settings. Parameters can be entered by mouse or keyboard. Sounds can be played from computer. Randomize feature for creation of new sounds. Access to MIDI sysx features. Full printout capabilities. MT-32 version includes a D-50 to MT-32 sound conversion program. \$99.95.

Sound Disks (Versions for Roland MT-32, D-50/550)

Sound collections designed for performance, studio recording, and movie soundtrack production. Includes acoustic and electric piano, layered sounds, strings, brass, bass, acoustic orchestral instruments, voices, organs, percussion, and sound effects. Sounds can be dumped to synthesizer using enclosed Self Load program, or used with Capture Editor/Librarian. \$29.95.

FB-01 Sound Disks

96 sounds on disk. No librarian needed. For performance, studio recording, and movie soundtrack production. \$24.95.

Voice Master ST (Versions for Yamaha FB-01, Casio CZ series)

Editor/Programmer/Librarian with full GEM interface. Features full bank and individual patch copy. Holds several patch and configuration banks in memory. Graphical display of envelope data, algorithms, waves, during editing. Randomize feature for creation of new sounds. Full print functions. Undo. On-line help. CZ version supports CZ-1 fully. \$99.95.

MIDISoft Corp.

P.O. Box 1000
Bellevue, WA 98009
(206) 827-0750

MIDISoft Studio Standard Edition

Comprehensive MIDI sequencing software. Features include: 32 tracks; 30,000 notes (70,000 on 1040 ST), full track editing and region editing of any part of the music. Real-time tempo changes and track mixes. Fast real-time record, playback, and overdub along with step recording. \$99; demo disk, \$10.

MIDISoft Studio Advanced Edition

Professional music software. Features include MIDI event editing, support of MIDI files, programmable tempo changes, system exclusive librarian. Supports up to 16 MIDI channels per track. Real-time MIDI volume control for each track; real-time octave transpose for each track. MIDI Thru controls on main screen. Loads and performs simultaneously. Loads individual tracks from song files. Saves set-up preferences including colors. \$149.

Navarone Industries

454 Kenneth Ave.
Campbell, CA 95008
(408) 378-8177

ST Sound Digitizer

High-quality digital sampling sequencer digitizes sounds from any source and allows playback through a MIDI keyboard or external speaker. Mouse-driven software for graphic cut, copy, paste, and mixing of sound data. Eight-bit A/D and D/A conversion hardware plugs into the ST cartridge port. \$99.95.

Passport Designs

625 Miramontes St.
Half Moon Bay, CA 94019
(415) 726-0280

Master Tracks Pro

Professional music sequencer for recording and editing on the 1040 and Mega ST. Has five main modules to provide 64 tracks of real-time and step-time input, graphical song editing, graphical step editing. A system exclusive librarian and keyboard control mapper all in one package. Master





Tracks Pro also reads and writes standard MIDI files. \$349.95.

Master Tracks Jr.

Low-cost personal MIDI recording studio. Extensive tools for composing, recording, and editing music with a graphic user interface. Fully compatible with Master Tracks Pro files and standard MIDI files. \$129.95.

Savant Audio

2140 Bellmore Ave.
Bellmore, NY 11710
(516) 826-6336

Edit 8000

A graphically oriented editor/librarian/patch creator for the Atari ST and Korg DW/EX8000 series synths. Program allows parameters to be adjusted by moving "faders" and "knobs" and pressing "buttons" on-screen. All waveforms and parameters are updated in real time. Features include a built-in mini-sequencer, merge patches, MIDI Thru, eight banks in memory, numeric edit/printout, and save and load banks/patches/keys. Package includes a bank/patch loading desk accessory and 500 patches. Runs in color and monochrome. \$79.95.

Quiet Lion

P.O. Box 219
Sun Valley, CA 91353
(818) 765-6224

Mu-Script I

A professional quality 16-track sequencer with built-in note printing and MIDI event editing. Fast turnaround between performance and notation. Has all standard features, including quantizing and auto-punch-in, drum clocks, and external MIDI synch for synch-to-tape operations. Text entry into single or multi-stave scores allows creation of lead sheets, conductor's scores and player's parts. Also useful for transcribing music recorded on hardware sequencers. \$99.95.

Cat Tracks ST

Same sequencing and editing program as Mu-Script I without the notation. \$59.95.

Sonus

2140 Strathern St., Ste. H
Canoga Park, CA 91304
(818) 702-0992

SST: Super Sequencer

State-of-the-art sequencing program for the Atari ST. Features dual MIDI-ports, real- and step-time recording; 18 sequences of 24 tracks each, and complete MIDI implementation. 192 PPQN (pulses per quarter note) internal resolution; quantization from whole-note to 1/28 note; song pointer; selectable count off; loop, flag, sequence, and track displays; multiple track selections; transpose—song, track, or sequence; multiple meter selection; MIDI data viewer; play through multiple channel capability; tempo selection; drum channel transpose protect. Built-in system exclusive librarian. \$149.95.

SuperScore

Mega 2, Mega 4, 1040, 520 with 1 Mb of memory. Fully integrated desktop music publishing system. Offers built-in 32-track sequencer and 32 staves of professional-quality scoring. Text and lyric placement; titles, labels, unique headers, and footers on every page. Extendable library with layout for jazz, orchestral and solo formats. Mouse-based screen editing. \$299.

Steinberg/Jones

17700 Raymer St.
Northridge, CA 91325
(818) 993-4091

Pro-24, Version 3.0

Complete, versatile sequencer for the Atari ST. Note capacity: 150,000 events (999 measures, 5000 patterns). Tracks: 24 polyphonic; 32 monophonic. Linear and song-mode sequencing modes; drum-machine mode; graphic editing of all MIDI note and event information via note-grid, music score or rhythm editor; logical editor; real-time visual display of velocity per track; real-time editing while song is playing/re-

coding; MIDI sysex dump utility. Remote control from any MIDI device. \$295.

Synthworks DX/TX

Librarian, editor, and intelligent patch creator for DX-series synthesizers and Atari 1040 ST. Compatible with all six-operator FM synths. Library holds up to 2100 sounds simultaneously in RAM; four edit buffers allow simultaneous editing of multiple sounds. Produces new sounds via intelligent "voice-create," "voice combine" of up to 32 sounds, or slight/medium variations of existing sounds; 3-D harmonic analysis and waveform analysis. Built-in 10,000-note Pro-24 compatible sequencer. \$259.

Synthworks D-50

Librarian, editor, and patch creator for D-50 and D-550 synthesizers and Atari 1040 ST. Displays all parameters simultaneously. Envelopes, filters, and E.Q. are displayed and edited graphically. Four edit buffers. Produces new sounds as above. 10,000-note Pro-24 compatible sequencer. Relational database for storing and recalling sounds. \$259.

Synthworks MT-32

Librarian, editor, and patch creator for MT-32 synthesizer and Atari 1040 ST. Envelopes, filters, and E.Q. are displayed and edited graphically. Four edit buffers. Produces new sounds as above. Mapping of sounds with mouse. 10,000-note Pro-24 compatible sequencer. \$199.

Virtusonics Corp.

123 Duke Ellington Blvd.
New York, NY 10025
(212) 316-6744

Virtuoso

8-bit only. A single disk that combines full-color rotational graphics plus text, music, and telecommunications. Draw and move up to 16 independent images at once, using keyboard, joystick, touch pad, or mouse to produce music. \$49.95. ■



Choose One From Column A...

Future Systems offers 3 1/2" and 5 1/4" floppy drives for the ST

It almost seems that in the past ten years we've come full circle with respect to putting together a computer system. Ten years ago, you selected one component from Manufacturer A, one from B, another from C, and so on until you finally had a complete system.

But then along came Apple, Commodore, and Tandy who made everything—computer and all the other components. Voila! One-stop shopping. Take a floppy disk drive, for example. How many people shop separately for a disk drive? If it isn't built into the computer, it is usually purchased at the same time as the computer, generally from the same manufacturer as the computer.

However, today, thanks to the hundreds of different IBM PC clones—which frequently are assembled from a

hodge-podge of components by the manufacturer, retailer, or even the end user—people are again beginning to think about shopping for individual components. While this trend has been slower spreading to the Atari ST market, ST owners are also beginning to have a choice of printers, modems, hard disk drives, and floppy disk drives. Two new disk drives, the GTS-100 and GT-1000, from Future Systems are good examples.

GTS-100 3 1/2" Drive

The GTS-100 is a 3 1/2" double-sided, double-density floppy disk drive with a data handling rate of 250K bits/sec. It reads and writes 80 tracks at a density of 135 tracks per inch and stores 320K bytes on each side of a disk for a total of 720K. Doesn't that all sound impressive? Well, actually, these specifica-

tions are *exactly* the same as the Atari SF314 external drive and the drive built into the 1040ST.

On the other hand, the GTS-100 boasts quite different styling and several features not found in the Atari drives. The GTS-100 measures 8.1" x 4.1" x 2.1" for a total cubic volume about one-half that of the Atari drive. It is finished in matte black and looks more like a high-tech audio component than a disk drive.

The power switch is on the back—couldn't Future Systems have taken a lesson from Astra and put it on the front?—but the front, in addition to having the usual busy LED indicator, also has a power-on LED and a flat panel display that shows the current track location of the read/write head.

No, you don't actually *need* a track indicator, but it is kind of neat. And when you are saving a large quantity of data, it is useful to know when you are nearing the end of the disk. It is also interesting to watch the head jump around searching for free sectors when you store a large file on a disk that has seen a great many deletions and additions.

Future Systems GTS-100

System: Atari ST

Price: \$279

Interface: Standard ST cable

Summary: Compact 3 1/2" drive with track readout and other extra features

Manufacturer:

Future Systems, Inc.
21634 Lassen
Chatsworth, CA 91311
(818) 407-1647



Future Systems GT-1000

System: Atari ST

Price: \$269

Interface: Standard ST cable

Summary: Stylish 5 1/4" drive with track readout, hardware write-protect, and other extras

Manufacturer:

Future Systems, Inc.
21634 Lassen
Chatsworth, CA 91311
(818) 407-1647

By DAVID H. AHL

Surface Mount Technology

What is surface mount technology and what does it mean to you? Until recently, an integrated circuit (IC) chip—consisting of transistors, resistors, capacitors, and diodes—was normally bonded into a rectangular plastic carrier with wire legs on each side known as a dual inline package (DIP). This entire package is frequently, but erroneously, called a chip.

Typically, a printed circuit (PC) board—the foundation of most computers and peripherals—has electrical circuits printed (or deposited) on one or both sides. Holes are drilled in the board where the DIP circuits and other components are to be mounted and, after they are inserted, their wire leads are soldered in on the bottom of the board—the side opposite where the components are mounted.

Surface mount devices (SMD), on the other hand, are soldered to the PC board on the same side on which they are mounted. In the early days of surface mounting, the legs of standard DIP circuits were simply bent outward and soldered in place. But by doing away with the DIP package and replacing it with a square assembly with wires coming out all four sides, it is possible to provide more connections and thus fit many more components on the device than is possible with a DIP circuit. Furthermore, the large plastic DIP carrier (large in proportion to the size of the circuit itself) can be drastically reduced in size.

Not surprisingly, the small size of SMDs makes it almost impossible to mount them by hand. Instead they are put in place by an exotic computerized numerical control placement machine (or robot). The machine places the SMDs on the PC board and attaches them with a special adhesive. The board then passes through an ultraviolet curing chamber, which activates the adhesive.

The circuit board is then inverted and the remaining parts (ICs in standard DIP mounts, resistors, etc.) placed on the top surface. It is then passed over a flowing bath of molten solder, a technique known as wave soldering. The SMD components are fully exposed to this 500° bath, which makes all the electrical connections and permanently mounts all of the components. ■

We looked inside the case of the GTS-100 to see if we could find a clue to its construction or reliability. The drive itself is made by NEC in Japan and uses the latest surface mount technology. Future Systems adds its own Atari controller board, indicators, and connectors. It is a tidy package.

Future Systems boasts of its "GTS Cruise Control," which is described as a "low friction metal band head positioning" device that is supposedly more accurate than other head positioning methods and thus, more reliable.

We had no way of checking this out; the published mean time between failures is 12,000 power-on hours which means over five years of six hours per day operation. Clearly, you don't want to wait five years to read this review. Suffice it to say that we ran a great deal of data through the GTS-100 with no trouble whatsoever . . . and watching that little track indicator sure is fun.

GT-1000 5¼" Disk Drive

The GT-1000, like the GTS-100, is finished in high-tech matte black. The external dimensions of the unit are 10.8" × 7.3" × 2.8", just slightly larger than the I.B. and Paradox 5¼" drives. The AC plug is fixed to the largish external power supply, which has the potential for creating crowded conditions on your power strip. The power switch is on the back (bah!), but the front boasts power-on, in-use, and write-protect LEDs.

Why a write-protect indicator? Because the GT-1000 has two switches that allow you to turn on and off the ability of the drive to write to a disk. It is as though you put a write-protect tab right on the disk itself; even if the software says, "Write some data on this disk," the hardware won't let it happen.

Also on the front panel is a track indicator, which shows the current position of the read/write head. Nifty. And while I'm discussing ergonomics, I should mention that the drive has a protective fold-up smoked plastic dust cover to keep dirt out of the drive when it is not—or even when it is—in use.

Two versions of the GT-1000 are available—one with 40 tracks and 360K capacity and one with 80 tracks and 720K capacity. Since the vast majority of IBM PC and other 5¼" disk software is published in 40-track format, that is the drive we reviewed, and

the one we would recommend.

By the way, don't buy an 80-track drive thinking that it will read both 40 and 80 tracks—the 5¼" drive world doesn't work like the Atari 3½" world in which 80-track drives read 40-track disks. In the 5¼" world, 80-track drives read only 80 tracks, period.

Installing the GT-1000 drive is trivial; it simply plugs into the ST like any external floppy disk drive.

The GT-1000 comes with a 3½" floppy disk, which contains two programs. The first program, FSRESTOR, which you must install in your AUTO folder, slows down the stepping rate of drive B so it will read and write 5¼" disks correctly. Incidentally, most 5¼" drives, including the GT-1000, are reasonably forgiving and may well read 5¼" disks without running this program, but if you do much data interchange between PC and ST without using the program, sooner or later you will have problems.

The second program is an ST/PC format program that allows you to format MS/PC-DOS disks on your ST. The empty directory and tables that the program places on the disk for MS/PC-DOS are different from the ones that TOS creates when you use the standard format option on the ST desktop. Interestingly, TOS makes proper use of the MS/PC-DOS format, but it can't create it.

We used the GT-1000 with a wide variety of files that had been created by several different IBM PCs and clones and had no trouble going in either direction.

The GT-1000 drive itself is a Tandon mechanism with a nice, reliable quarter-turn lever to lock in the disk. The drive and associated electronics—used in many PC clones—are augmented by a Future Systems board to allow it to talk to the ST.

The GT-1000, like the GTS-100, comes with an astonishing five-foot long cable, so if you happen to want to locate your drive halfway across the room, you can do it.

The documentation for both drives is rather sparse, but then, how much can you say about a disk drive?

All in all we were favorably impressed with both drives, their performance, styling, extra features, and, best of all—an indication that Future Systems really stands behind its products—their full one-year warranty. ■

Programming Made Easier

A pair of useful utilities for serious 8-bit programmers

Basic Turbocharger

From Alpha Systems comes *Basic Turbocharger*, a programming aid which should appeal to novices and advanced hackers alike. It is a disk-based library of 150+ machine language routines that make Basic programs easier to write and faster to execute.

The *Turbocharger* package includes an unprotected, 5 $\frac{1}{4}$ " floppy disk and a spiral-bound user's manual. The 128-pages of documentation are filled with listings, examples, and explanations of how each routine works. For die-hard hackers, the assembly source code is available on two disks for \$10 if purchased with *Turbocharger*, or \$15 separately.

System: 48K 8-bit Atari

Required equipment: Disk drive

Copy protection: None

Summary: 150+ machine language routines to include in your Basic programs

Price: Turbocharger, \$24.95; source code, \$10

Manufacturer:

Alpha Systems
1012 Skyland Dr.
Macedonia, OH 44056
(216) 467-5665

You do not need to understand machine language programming to use the routines contained in Turbocharger.

You do not need to understand machine language programming to use the routines contained in *Turbocharger*. However, you should be familiar with Basic if you want to incorporate these routines in your own programs.

Machine language programs consist of numbers that represent instructions that the 8-bit Atari 6502 CPU (central processing unit) executes directly to perform various functions. Basic, on the other hand, is an interpreted language that uses commands (such as PRINT and GOTO) which are easy for people to re-

late to. The problem, for the computer, is that each time a Basic program is run, these commands must be interpreted or translated into instructions that the CPU can understand. This is time-consuming and explains why programs written in machine language are much faster than their Basic counterparts.

Luckily, machine language routines can be used in Basic programs via the USR command. The syntax of this com-

mand is Variable = USR(address, parameters). This tells the computer to go to the address indicated and begin executing the machine language routine found there using the parameters supplied. When that routine is completed, the computer returns to the Basic program and assigns the results of any calculations to the specified variable.

In general, there are three ways to access machine language routines from Basic: direct memory access, string addressing, and direct access. All of the routines in *Turbocharger* use the direct access method whenever possible, making it possible to relocate them in memory if needed. However, according to the documentation, some of the sample Basic programs may not work correctly if renumbered.

There are 120 short, ready-to-run Basic programs on the disk, some of which contain more than one routine. The routines are grouped together by function in the documentation (see Table 1). Each program is listed in the documentation, along with a parameter table and an explanation of how the routine works. Unfortunately, the print quality of the manual is so poor that some ATASCII characters in the program listings are illegible.

The sample programs show how to use the routines and can be run without modification. The routines themselves can be implemented and modified in

Table 1. Basic Turbocharger contents.

Chapter	Number of Programs
Moving Memory	4
Fun With Text	5
Fun With Memory	10
Numeric Arrays	9
Graphics & Antic Modes	7
Disk I/O	3
Loading & Saving Pictures	8
Koala Pad & Atari Touch Tablet	5
Fun With Pictures	5
Display List Interrupt Routines	14
Joystick Routines	7
Player/Missile Graphics	9
Player/Missiles in Vertical	
Blank Interrupt	6
Miscellaneous	11
Number System Conversions	6
Bit Flipping, Reading, Clearing, and Setting	8
Text on a Graphics 8 Screen	1

By JOHN JAINSHIGG AND OWEN LINZMAYER

your own programs and even distributed commercially without credit or royalties to Alpha Systems.

Just how useful you will find *Basic Turbocharger* depends on how much programming you do and the applicability of the supplied routines to your tasks. As you can see by glancing at Table 1, *Turbocharger* contains rou-

tines for the most common programming applications. These routines are fast, and perhaps most important, debugged. If you place any value whatsoever on your own time, in the long run *Turbocharger* will save you money by greatly reducing the number of hours you must devote to developing new programs.—*OWL*

from decision-making constructs (ranging from very low-level substitutes for the 6502 native Branch on result instructions to a very high-level CASE construct with more flexibility than the Basic ON ... GOTO clause) to looping structures (DO ... OD, WHILE ... END-WHILE, and others commonly found in structured, high-level languages like C and Pascal) to powerful instructions for I/O, video control, player-missile graphics, and interrupt handling.

A system of generic, high-level data types (strings, jump tables, etc.) is employed and supported by certain of the *QuickCode* macros, making it possible to do assembly-language programming without losing much of, say, Basic's, capacity for abstraction. However, since these data types are fully and clearly documented, you can use them without fear of getting trapped by them; at any time, the *QuickCode* user can drop into pure assembly language and muddle with things directly.

QuickCode comes with a 66-page manual that clearly describes the use of each of the macros and gives general instructions for working with the package. The manual also offers programming hints; documents the special data types, conventions, assembly and run-

QuickCode

The big advantage of assembly language is that it lets you get close to the machine, handling the details of video, I/O, and data manipulation in a very precise and detailed manner. The price of this power, unfortunately, is that the assembly programmer is compelled to abandon most of the abstraction possible with high-level languages like Basic.

Consider: adding two numbers in Basic requires one instruction, regardless of the data types involved or the results expected. Literally nothing can go wrong.

By contrast, there is no such thing as a simple addition problem in assembly language. The programmer has to think about the operands (are they floating point? BCD? Two's-complement integer? Byte-wide integer?) and the procedure (how am I going to handle overflow? Negative values? Result accumulation?) in excruciating detail, simply to get usable results.

It is thus very easy to "lose the forest for the trees" when programming in assembler—to sweat the details at the expense of overall structure. Second-generation assembly-language programming tools, such as Atari's Macro Assembler and Optimized Systems Software's MAC 65, address this problem by incorporating *macro* capabilities in their assembler environments.

Using macro conventions, a programmer can prepare and debug generic patches of assembly code for later reference as pseudo-instructions—in effect, adding higher-level commands to the very limited command set native to the 6502 microprocessor. By amassing a substantial library of macros that reliably perform oft-repeated programming tasks, you can simplify the coding of new projects and even, conceivably, recover some of the higher-level abstraction of Basic, while keeping pure assembly near to hand.

The problem is, however, that it is

System: 48K 8-bit Atari

Required equipment: Disk drive; OSS MAC 65 Assembler/Editor cartridge

Copy protection: None

Summary: 110 MAC 65-compatible macros and support subroutines for machine-language programming

Price: \$34.99

Manufacturer:

Stardust Software
P.O. Box 33192
Indianapolis, IN 46203
(317) 788-7403

The QuickCode macros comprise a kind of programming language in and of themselves, though one that has its roots firmly grounded in assembler.

very difficult to pull together a well-thought-out, generic, well-documented macro library. In a sense, the job of creating macros is comparable to that of creating new commands in a high-level programming language: it is complex and difficult to do well, particularly for the beginner.

QuickCode, a comprehensive collection of macros and support subroutines, compatible with the OSS MAC 65 assembler, addresses this problem directly. In fact, the *QuickCode* macros comprise a kind of programming language in and of themselves, though one that has its roots firmly grounded in assembler.

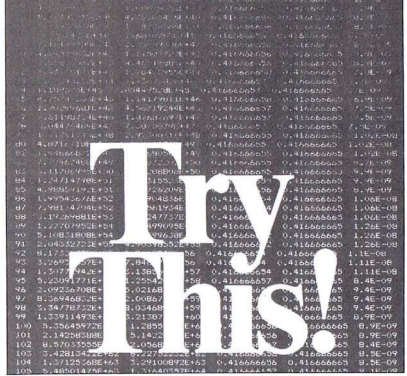
The 110 macros included with *QuickCode* provide all the elements of a standard programming language—

time errors found in *QuickCode*; and even includes comparative benchmarks for some of the most powerful *QuickCode* constructs.

Beyond its completeness, the quality of the manual is a big surprise. Usually, programming tools are documented in something resembling Urdu, but the *QuickCode* manual is beautifully—even elegantly—written. It is a pleasure to read and adds markedly to the value of the package.

In sum, *QuickCode* will be a useful addition to the software library of anyone who has made a real commitment to Atari 6502 programming. Because its subject is inherently complex, it is not a package to be taken lightly, but for the professional or weekend programmer with ambition this is a must-buy.—*JB*

A reader attempts to find the upper limit of the area bounded by a Sierpinski curve



In the January/February 1988 issue of *Atari Explorer*, we challenged readers to write a short program to determine the area bounded by the "upper limit" Sierpinski curve, expressed as a fraction if possible.

Reader Edwin Vaughan took up the challenge and sent us the following discussion of his efforts.

The Brute Force Approach

The first few terms of the Sierpinski sequence are given in Table 1 in the article. Using my Atari Basic cartridge (Rev. C) in desk calculator mode, I computed the decimal equivalents (approximated, if necessary) of the six fractions that appear in that table plus six additional terms in the sequence and their decimal equivalents. (See Table 1.)

It appears that these fractions are approaching some sort of limit. The challenge posed by the article is to determine the exact value of that limit.

To investigate this, I wrote a quick and dirty Basic program to compute more of the fractions from the recurrence relations given in the original article and to compute, at each step, the decimal value of the fraction thus obtained.

I eventually realized that, although these fractions do seem to be converging, the numerators and denominators grow so large so quickly that the effect of truncation obscures the value of the limit, making it difficult to guess what the limit might be and impossible to derive an exact representation of it (which would be possible if the decimal could be shown to be a "repeating decimal"). In fact, after iteration 161, the values of both numerator and denominator become too large to be represented internally by Atari Basic.

Also, even a very large number of examples is insufficient to prove convergence. For these reasons, I decided to approach the problem analytically.

By EDWIN T. VAUGHAN

The Analytical Approach

To begin with, let N(n) be the numerator and D(n) the denominator of the fraction that represents the area of the nth order Sierpinski curve. We know from the original article that the following relations hold:

$$\begin{aligned} N(1) &= 11 &= 4^0 * N(1) + 7 * (0) \\ N(2) &= 4 * N(1) + 7 &= 4^1 * N(1) + 7 * (0 + 1) \\ N(3) &= 4 * N(2) + 7 &= 4^2 * N(1) + 7 * (0 + 1 + 4) \\ N(4) &= 4 * N(3) + 7 &= 4^3 * N(1) + 7 * (0 + 1 + 4 + 4^2) \\ N(5) &= 4 * N(4) + 7 &= 4^4 * N(1) + 7 * (0 + 1 + 4 + 4^2 + 4^3) \end{aligned}$$

It can be shown by mathematical induction that the following general relationship holds true for any n = 1, 2, 3, ..., where it is understood that there are n terms (starting with 0) in the series following 7*:

$$N(n) = 4^{(n-1)} * N(1) + 7 * (0 + 4^0 + 4^1 + \dots + 4^{(n-2)})$$

Summing the geometric series in the second term:

$$N(n) = 4^{(n-1)} * N(1) + 7 * ((4^{(n-1)} - 1) / (4 - 1))$$

Simplifying slightly:

$$N(n) = 4^{(n-1)} * N(1) + 7/3 * (4^{(n-1)} - 1)$$

Simplifying further, by collecting the coefficients of the term 4⁽ⁿ⁻¹⁾:

$$N(n) = (N(1) + 7/3) * 4^{(n-1)} - 7/3$$

Now, proceeding similarly with respect to the denominator:

$$\begin{aligned} D(1) &= 32 &= 4^0 * D(1) \\ D(2) &= 4 * D(1) &= 4^1 * D(1) \\ D(3) &= 4 * D(2) &= 4 * (4^1 * D(1)) = 4^2 * D(1) \\ D(4) &= 4 * D(3) &= 4 * (4^2 * D(1)) = 4^3 * D(1) \\ D(5) &= 4 * D(4) &= 4 * (4^3 * D(1)) = 4^4 * D(1) \end{aligned}$$

It can then be shown by mathematical induction that for n = 1, 2, 3, ...:

$$D(n) = 4^{(n-1)} * D(1)$$

Therefore, the ratio of the numerator and the denominator, that is, the value of the fraction itself—the area bounded by the nth order Sierpinski curve—is equal to:

$$N(n)/D(n) = (4^{(n-1)} * (N(1) + 7/3) - 7/3) / (4^{(n-1)} * D(1))$$

This ratio can be written as the sum of a constant term and an n-dependent term:

$$N(n)/D(n) = (N(1) + 7/3) / D(1) + (7/3) / (4^{(n-1)} * D(1))$$

Rewriting this in a more instructive way:

$$N(n)/D(n) = (N(1) + 7/3) / D(1) + (7/3) * (1/4)^{(n-1)}$$

Now, as n becomes "infinitely large," the second term of this expression becomes "vanishingly small," and only the first (constant) term remains. Therefore:

$$\lim(n \rightarrow \infty) N(n)/D(n) = \lim(n \rightarrow \infty) \text{Area}(n) = (N(1) + 7/3) / D(1)$$

But because N(1) = 11 and D(1) = 32, and because N/D represents the Area:

$$\text{Area}(\text{"Upper Limit"}) = (11 + 7/3) / 32 = (40/3) / 32 = 40/96 = 5/12$$

Note that the decimal value of this fraction is:

$$5/12 = 0.416666666+$$

This should come as no surprise, because the (approximated) decimal value of this "limit fraction" is in the neighborhood of the values of the initial calculations derived in the Brute Force approach described above.

Modified Brute Force Approach

Now that we have derived these results, we can go back and approach the problem in a slightly different (and hopefully more fruitful) way. Returning to the two basic recurrence relations, let N(n) and D(n) be the numerator and denominator of the fraction representing the area of the nth order Sierpinski curve. Now we know that the following relations

are true:

$$N(n) = 4 * N(n-1) + 7$$

$$D(n) = 4 * D(n-1)$$

Therefore, we can write the following:

$$N(n)/D(n) = (4 * N(n-1) + 7) / (4 * D(n-1))$$

Separating into two terms:

$$N(n)/D(n) = (N(n-1)/D(n-1)) + (7/(4 * D(n-1)))$$

If we let $A(n)$ denote the area of the n th order Sierpinski curve, we can rewrite the equation above as follows:

$$A(n) = A(n-1) + 7/(4 * D(n-1))$$

But, in the Analytical Method discussed above, we established that

$$D(n) = 4^{(n-1)} * D(1), n = 1, 2, 3, \dots$$

Therefore,

$$D(n-1) = 4^{(n-2)} * D(1)$$

Using this result, we can rewrite the recurrence relation just derived for the area as follows:

$$A(n) = A(n-1) + (7 / (4 * (4^{(n-2)} * D(1))))$$

$$A(n) = A(n-1) + (7 / (4^{(n-1)} * D(1)))$$

Simplifying:

$$A(n) = A(n-1) + (7/D(1)) * ((1/4)^{(n-1)})$$

Substituting the value of $D(1)$ into the equation:

$$A(n) = A(n-1) + (7/32) * ((1/4)^{(n-1)})$$

Then we can express both fractions as their exact decimal equivalents preparatory to translating this recurrence relation into Atari Basic:

$$A(n) = A(n-1) + 0.21875 * 0.25^{(n-1)}, n = 2, 3, 4, \dots$$

It is, of course, understood that $A(1) = 11/32 = 0.34375$ begins the sequence.

Note that we have derived a recurrence relation for the area that does not require the calculation of very large (internally truncated) numbers. We may well expect that this method will converge in a more stable manner than the relation derived under the Brute Force method.

I have verified my conclusions about rapid convergence in this second case by writing another quick and dirty Atari Basic program (see Listing 1). Unfortunately, the absence of a built-in formatting command leads to somewhat slovenly output. ■

Table 1. The decimal equivalents of the fractions that appeared in the original article.

11/32	= 0.34375
51/128	= 0.3984375
211/512	= 0.412109375+
851/2048	= 0.415527343+
3411/8192	= 0.416381835+
13,651/32,768	= 0.416595458+
54,611/131,072	= 0.416648864+
218,451/524,288	= 0.416662216+
873,811/2,097,152	= 0.416665554+
3,495,251/8,388,608	= 0.416666388+
13,981,011/33,554,432	= 0.416666597+
55,924,051/134,217,728	= 0.416666649+

Sample output.

Iteration (N)	Numerator (N)	Denominator (N)	Area 1 (N) = Numerator(N)/Denominator(N)	Area 2 (N) = Area(N-1) + (7/32) * ((1/4)^(N-1))	ABS(Area 1(N) - Area 2(N))
1	11	32	0.34375	0	0.34375
2	51	128	0.3984375	0.3984375	0
3	211	512	0.412109375	0.412109374	4E-10
4	851	2048	0.415527343	0.415527343	6E-10
5	3411	8192	0.416381835	0.416381835	7E-10
6	13651	32768	0.416595458	0.416595458	7E-10
7	54611	131072	0.416648864	0.416648863	8E-10
8	218451	524288	0.416662216	0.416662215	8E-10
9	873811	2097152	0.416665554	0.416665553	9E-10
10	3495251	8388608	0.416666388	0.416666387	1.0E-09
11	13981011	33554432	0.416666597	0.416666596	1.0E-09
12	55924051	134217728	0.416666649	0.416666648	1.0E-09
13	223696211	536870912	0.416666662	0.416666661	1.1E-09
14	894784851	2147483640	0.416666665	0.416666664	1.1E-09
15	3579139410	8989934390	0.416666666	0.416666665	1.1E-09
16	1.43165576E+10	3.43597383E+10	0.416666665	0.416666665	5E-10
17	5.72662304E+10	1.37438953E+11	0.416666665	0.416666665	5E-10

UPPER LIMIT



- Any Atari 8-bit computer
- Atari Basic

```

5 LPRINT " "
10 DIM NUMER(161), DENOM(161), AREA1(161), AREA2(161), DIFF(161)
15 LET NUMER(1)=11
20 LET DENOM(1)=32
25 LET AREA1(1)=NUMER(1)/DENOM(1)
27 LET AREA2(1)=AREA1(1)
29 LET DIFF(1)=ABS(AREA1(1)-AREA2(1))
30 LPRINT 1;" ";NUMER(1);" ";DENOM(1);" ";AREA1(1);" ";AREA2(1);" ";DIFF(1)
35 FOR ITER=2 TO 161
40 NUMER(ITER)=(4*NUMER(ITER-1))+7
45 DENOM(ITER)=4*DENOM(ITER-1)
50 AREA1(ITER)=NUMER(ITER)/DENOM(ITER)
53 AREA2(ITER)=AREA2(ITER-1)+(0.21875)*((0.25)^(ITER-1))
54 DIFF(ITER)=ABS(AREA1(ITER)-AREA2(ITER))
55 LPRINT ITER;" ";NUMER(ITER);" ";DENOM(ITER);" ";AREA1(ITER);" ";AREA2(ITER)
57 " ";DIFF(ITER)
60 NEXT ITER
65 END
    
```

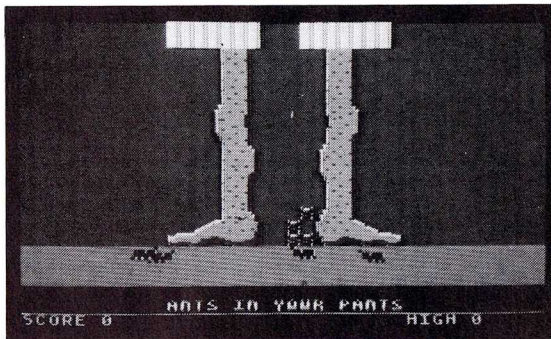
Ants In Your Pants

Can you stop the ants from spoiling Benny's picnic?

While on a summer picnic, Benny is attacked by ants intent on invading his Bermuda shorts. His only defense is to stomp on them, but he is fighting a losing battle; it

is only a matter of time before he is overcome by sheer numbers and suffers the ultimate indignity. How long can he hold on?

Ants in Your Pants is a game for



Atari 8-bit systems. It makes use of page flipping for the movement of Benny's legs, which you control with a joystick. Each of the seven leg positions is stored on a different screen, and movement is achieved by linking each screen with a position of the joystick.

Player/missile graphics are used for the ants, which are independent of the page flipping. The screen colors for the sky, grass, and the flashing title are implemented using a display list interrupt.

If you have trouble typing in the control characters in Lines 840, 845, and 850, the program in Listing 2 will create them for you. If you use the program in Listing 2, be sure to save it before you run it, because it deletes itself from memory when run, leaving just the three lines (840, 845, and 850). You can then LIST those lines to disk or cassette and ENTER them into the main program.

Ants in Your Pants is reprinted with permission from *Page 6* magazine, P.O. Box 54, Stafford, ST16 1DR, England. Subscription price is \$19 per year (6 issues).

By ALLAN KNOPP

ANTS IN YOUR PANTS



- Any Atari 8-bit computer
- Atari Basic

```

1 REM *****
2 REM *      ANTS IN YOUR PANTS      *
3 REM *              by              *
4 REM *      ALLAN KNOPP              *
5 REM *                               *
6 REM * ----- *
7 REM * PAGE 6 MAGAZINE - ENGLAND *
8 REM *****
9 REM
100 GOTO 1080
105 RAMTOP=PEEK(106)
110 GOSUB 1045
115 TX=4
120 GOSUB 355:GOSUB 400
125 GOSUB 355:GOSUB 405
130 GOSUB 355:GOSUB 410
135 GOSUB 355:GOSUB 415
140 GOSUB 355:GOSUB 420
145 GOSUB 355:GOSUB 425
150 GOSUB 355:GOSUB 430
155 POSITION 12,22:?"PLEASE WAIT"
160 POKE 257,182:POKE 258,120:POKE 259
,40:POKE 260,6:REM * DILICOLOURS *
165 POKE 708,36:POKE 709,24:POKE 711,1
4:POKE 710,74

```

```

170 POKE 752,1
175 GOSUB 835:GOSUB 810
180 GOSUB 525:GOSUB 865
185 Z=4.5:GOSUB 445
190 POSITION 12,22:?" "
195 POKE 756,CHI
200 Y=85:XC=200:XD=200
205 REM * MAIN LOOP *
210 ST=STICK(0):STR=STRIG(0)
215 IF ST=15 AND 50=1 THEN POKE DL+5,R
AMTOP-28:50=0:500=0
220 IF ST=6 THEN POKE DL+5,RAMTOP-4:GO
SUB 300
225 IF ST=5 THEN POKE DL+5,RAMTOP-8:GO
SUB 300
230 IF ST=7 THEN POKE DL+5,RAMTOP-12:G
OSUB 300
235 IF ST=11 THEN POKE DL+5,RAMTOP-16:
GOSUB 300
240 IF ST=9 THEN POKE DL+5,RAMTOP-20:G
OSUB 300
245 IF ST=10 THEN POKE DL+5,RAMTOP-24:
GOSUB 300
250 POKE 53278,1
255 IF PEEK(53255) OR PEEK(53253) OR P
EEK(53254) OR PEEK(53252) THEN GOSUB 4
75
260 KA=KA+KAA:XB=XB+XBB:XC=XC+XCC:XD=X
D+XDD
265 IF KA>124 THEN KA=40:GOSUB 455
270 IF XB>124 THEN XB=40:GOSUB 455
275 IF XC<128 THEN XC=208:GOSUB 455
280 IF XD<128 THEN XD=208:GOSUB 455

```

```

285 GOSUB 315
290 GOTO 210
295 REM "STOMPING SOUND"
300 IF 500<0 THEN RETURN
305 FOR X=16 TO 0 STEP -2: SOUND 0,200-
10*X,0,X:NEXT X: SOUND 0,0,0,0:50=1:500
=1: RETURN
310 REM "MOVE ANTS"
315 IF IMAGE=1 THEN IMAGE=0: PR=PAR1: PL
=PAL2: GOTO 325
320 IF IMAGE=0 THEN IMAGE=1: PL=PAL1: PR
=PAR2
325 A=USR(MOVE,0,PMB,PR,KA,Y-1,4)
330 A=USR(MOVE,1,PMB,PR,KB,Y,4)
335 A=USR(MOVE,2,PMB,PL,XC,Y-1,4)
340 A=USR(MOVE,3,PMB,PL,XD,Y,4)
345 RETURN
350 REM "SET UP SCREENS"
355 GRAPHICS 0: DL=XSCREEN(560)+256*MPEEK(5
61)
360 POKE DL+3,68: FOR X=6 TO 26: POKE DL
+X,PEEK(DL+X)+2:NEXT X: "K"
365 POKE 106,RAMTOP-TX: POKE 559,34: POK
E 752,1
370 POKE 89,RAMTOP-TX: TX=TX+4
375 POSITION 11,0: " $$$$$$ $$$$$$
"
380 POSITION 11,1: " $$$$$$ $$$$$$
"
385 POSITION 11,21: "  _+  _  _+  _
  +: REM OVER "ANTS IN YOUR PANTS"
390 POSITION 0,22: " SCORE ";50;"
HIGH ";H5C
395 RETURN
400 POSITION 13,2: ? LLEG$(6,LEN(CLEGS))
: POSITION 23,2: ? RLEG$(RETURN
405 POSITION 14,2: ? LLEG$(6,LEN(CLEGS))
: POSITION 24,2: ? RLEG$(RETURN
410 POSITION 15,2: ? LLEG$(6,LEN(CLEGS))
: POSITION 25,2: ? RLEG$(RETURN
415 POSITION 13,2: ? LLEG$(POSITION 23,
2: ? RLEG$(6,LEN(CLEGS)): RETURN
420 POSITION 14,2: ? LLEG$(POSITION 24,
2: ? RLEG$(6,LEN(CLEGS)): RETURN
425 POSITION 15,2: ? LLEG$(POSITION 25,
2: ? RLEG$(6,LEN(CLEGS)): RETURN
430 POSITION 15,2: ? LLEG$(6,LEN(CLEGS))
: POSITION 23,2: ? RLEG$(6,LEN(CLEGS)):
RETURN
435 RETURN
440 REM "AMOUNT OF ANT MOVEMENT"
445 KAA=RND(0)*Z+.5: KBB=RND(0)*Z: KCC=
RND(0)*Z: KDD=RND(0)*Z+.5: RETURN
450 REM "DINE ANTS"
455 KM=INT(RND(0)*3): FOR SC=0 TO 28 ST
EP 4: POKE 89,RAMTOP-5C
460 COLOR ASC("X"): PLOT 19*XM,16-INT(H
EIGHT): NEXT SC: HEIGHT=HEIGHT+.4: IF H
IGHT>15 THEN GOTO 990
465 FOR X=0 TO 20 STEP 2: SOUND 0,X,0,1
2: NEXT X: SOUND 0,0,0,0: Z=Z+.1: POKE 77
,0: RETURN
470 REM "SQUASH"
475 IF PEEK(53252) THEN KA=40: GOTO 495
480 IF PEEK(53253) THEN KB=40: GOTO 495
485 IF PEEK(53254) THEN KC=207: GOTO 49
5
490 IF PEEK(53255) THEN XD=207
495 FOR X=60 TO 0 STEP -10: SOUND 0,X,1
0,14: NEXT X: SOUND 0,0,0,0
500 SC=SC+1: Z=Z+.03: POKE 77,0
505 GOSUB 445
510 FOR X=0 TO 28 STEP 4: POKE 89,RAMTO
P-X
515 POSITION 6,22: ? SC0;" " : NEXT X: P
OKE 53278,1: RETURN
520 REM "EDIT CHSET"
525 POKE 106,PEEK(106)-5: CHSET=(PEEK(1
06)+1)*256
530 CHI=CHSET/256: CLO=0: POKE 203,CLO: P
OKE 204,CHI
535 DIM XFR$(28): RESTORE 540: FOR M=1 T
O 28: READ ML:XFR$(M,M)=CHR$(ML): NEXT M
540 DATA 104,169,0,133,205,168,169,224
,133,206,177,205,145,203,200,208
545 DATA 249,230,204,230,206,165,206,2
01,228,208,239,96
550 XFR=USR(ADR(XFR$))
555 RESTORE 575
560 READ A: IF A=-1 THEN RETURN
565 FOR Z=0 TO 7: DL=X: POKE CHSET+A*M
+Z, J: NEXT Z
570 GOTO 560
575 DATA 1,10,10,10,6,6,1,1,1
580 DATA 3,170,170,170,106,170,170,170
,169
585 DATA 4,254,254,254,254,254,254,254
,254
590 DATA 5,65,125,20,20,65,20,65,65
595 DATA 32,160,160,160,160,144,80,64,64,6
4
600 DATA 64,0,0,0,0,0,0,0,0
605 DATA 65,16,68,136,168,204,204,68,0
610 DATA 73,84,16,32,32,48,252,84,0
615 DATA 78,80,84,136,136,204,204,68,0
620 DATA 79,16,68,136,136,252,252,84,0
625 DATA 80,80,68,136,168,128,192,64,0
630 DATA 82,80,68,136,160,204,204,68,0
635 DATA 83,20,64,128,32,12,252,84,0
640 DATA 84,84,16,32,32,48,48,16,0
645 DATA 85,68,68,136,136,252,252,84,0
650 DATA 89,68,68,136,32,32,48,32,0
655 DATA 96,7,94,250,170,170,105,85,20
660 DATA 97,255,170,170,170,170,86,21,
5
665 DATA 98,170,170,170,165,165,149,85
,80
670 DATA 99,170,170,150,85,85,85,0,0
675 DATA 100,170,170,170,106,86,85,21,
1
680 DATA 101,170,170,170,170,169,85,85
,85
685 DATA 102,164,164,164,148,84,84,80,
80
690 DATA 103,26,26,22,6,6,5,1,1
695 DATA 104,170,170,170,170,169,85,85
,85
700 DATA 105,170,170,150,85,85,85,80,0
705 DATA 106,170,170,170,106,86,85,5,1
710 DATA 107,170,170,170,170,165,85,84
,80
715 DATA 108,255,170,170,170,90,86,21,
5
720 DATA 109,0,232,188,168,168,164,84,
80
725 DATA 110,0,0,0,3,14,58,234,170
730 DATA 111,15,58,234,170,170,170,170
,170
735 DATA 112,170,106,170,170,170,170,1
66,170
740 DATA 113,168,168,168,168,168,152,1
68,164
745 DATA 114,170,166,170,170,170,170,1
05,150

```




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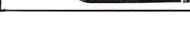
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GIANT WALL SIZE POSTERS.

Topics in ST C-language programming: Recursion

Life

Perhaps more than any other programming language, C provides a complete frame of reference for thinking about computers—a framework permitting considerable abstraction while remaining intimately tied to computational detail. It is this scope that accounts for the enormous intellectual leverage C can offer, but also for much of the puzzlement beginners feel when tackling the language for the first time.

This column is for talking about C as a tool for Atari ST programming. In this and coming issues, we'll be examining some of the things that make C unique—things that make the language difficult to master, but also render it an elegant and powerful tool.

Certain of our concerns will be conceptual, involving knotty aspects of the C language itself. Elsewhere, we'll focus on procedures; we'll discuss programming style, learn how to manage projects using multiple source files and libraries, and take a look at how professional programmers use C tools to improve productivity. Throughout, we'll be working with TOS and GEM, hands on, perfecting our understanding of the ST applications environment.

Insofar as possible, I will try to keep

this column independent of any particular compiler or development system. In cases where I am obliged to clarify or expand on implementation-specific details, however, I will be using the Mark Williams C-Language development system (currently in version 3), as a reference. This is a "full-blown" C-programming environment, which incorporates a standard, Unix-type command-line "shell" and employs the popular MicroEMACS editor. For more information, contact Mark Williams Company, 1430 Wrightwood Ave., Chicago IL 60614.

Nominal Recursion

Recursion, in programming, means something like "self-referentiality"—the ability of a computational object (function, definition, etc.) to call upon or refer to itself. C supports two basic types of recursion. The first might be called *nominal recursion*—essentially an outgrowth of the naming conventions of C—and involves the definition of computational objects in terms of themselves.

For example, suppose your program

is obliged to manage an indefinite number of one-word strings entered from the keyboard. One way of handling storage requirements might be to allocate a very large character array, indexed, perhaps, by an array of pointers to the start of each string. The problem is that you can't know in advance how much storage to allocate. Thus you might end up making the array too large or too small for the data that eventually shows up.

Ideally, you would prefer to allocate memory dynamically—setting aside just enough for each input string. You could do this with a function such as

`malloc()`, called as in Figure 1, which reserves a block of the desired size out of a pool of system free memory called the *heap*, and returns a pointer to the start of this block. Well and good—but something still has to be done with the returned pointers—something more efficient than storing them in a pre-allocated array.

A good solution to this type of problem employs a data structure called a *linked list*. A simple linked list is composed of elements called *nodes*, each of which contains an element of data and a pointer to the "next" node in the list. Because the "logical" order of nodes is maintained by this chain of pointers, their real location in memory doesn't matter. Nodes can be allocated dynamically and linked into the list as required; this makes linked lists perfect for organizing dynamic storage of unpredictable amounts of data.

The first step in setting up a linked list is to define an appropriate structure for the individual node as shown in Figure 2. Since we are storing strings in our example, the data portion of the node will be a character pointer.

The "next element" pointer of the node is defined recursively in terms of the node structure itself. Note that this recursion is only a convention of naming

```
/* Figure 1: storing a string dynamically */
char input_string[128]; /* buffer of arbitrary size */
char *start_of_data; /* pointer to start of string */

/* get one-word string from user */
scanf("%s", input_string);

/* allocate memory space in heap */
start_of_data = (char *) malloc(strlen(input_string));

/* move string to reserved area */
strcpy(start_of_data, input_string);
```

```
struct node{
char *string; /* pointer to start of stored string */
struct node *next; /* pointer to next node in list */
};
```

Figure 2. A recursive structure definition for a linked list node.

in that "next" is, at base, simply a pointer to memory, not a new type of data object whose format is dependent on aspects of the not-yet-fully-defined structure of which it is a part.

Figure 1. Storing a string dynamically.

Figure 3 is an example program which demonstrates the linked-list approach to data storage. It will accept words entered at the keyboard and store them in memory until you enter the word END, at which point it will print out all the words you have entered.

Functional Recursion

Nominal recursion is ultimately simply an extension of the C data-naming conventions. More interesting is what might be called *functional* recursion, in which a defined function calls itself or calls another function which, in turn, calls back to its original caller.

At base, this looks like a form of looping—of re-using code to perform a repetitious task. Figure 4 shows a function that prints a countdown of integers, starting with its original argument and ending at zero, using a recursive loop.

This is legal C and will compile and execute as advertised. However, you are strongly discouraged from writing this type of function in practice. C supports explicit structures for looping (for, do/while, while), which are clearer and more straightforward than tricky self-referential code.

Moreover, while recursive code may look efficient, consider that for each iteration of the above, a function call must be made—an argument and a return address must be pushed onto the stack. Were the function to employ automatic variables (it doesn't), space for all these variables would have to be allocated with each call. In other words, a recursive loop involves a significant amount of overhead not incurred when using standard looping structures.

Add to this inelegance a certain potential for catastrophe in the event of error unique to recursive programs. Consider what would happen if you handed a negative value to the above function as an initial argument. The terminating condition would not be met until *n* had been decremented past its maximum negative value (-32767 for integers) and had "wrapped around" back to zero. Each iteration performed along the way would require a stack entry.

Why is this a problem? Because most compilers allocate a certain fixed amount of stack space and do not include code to perform "stack overflow" checking unless specially requested to do so. Wildfire execution of the above function would thus most likely result in a dazzling system crash as the stack overwrote executable code.

```
#include <stdio.h> /* standard I/O header */

struct node{
char *string;
struct node *next;
};

main()
{
struct node *head; /* pointer to head of list */
struct node *current; /* pointer to current item */
struct node *next; /* pointer to next item */

char buffer[128]; /* input buffer (size arbitrary) */
/* Initialize head element of list */
head = current = (struct node *) malloc(sizeof(struct node));
/* Begin loop to accept user input */
while(1){
/* Current item is end of list, so make its 'next' pointer NULL */
current -> next = NULL;
/* Accept string from user */
printf("Input word: ");
scanf("%s",buffer);
/* Leave loop if user has entered "END" */
if (!strcmp(buffer,"END")) break;
/* Allocate space for string in memory and save pointer to it */
current -> string = (char *) malloc(strlen(buffer));
/* Move string to dynamically-allocated space */
strcpy(current -> string,buffer);
/* Allocate space for next linked list item and set 'next' pointer */
current -> next = (struct node *) malloc(sizeof(struct node));
/* Make that item current and repeat */
current = current -> next;
}
/* To print out items, start with 'head' pointer to first item */
current = head;
while(current -> next != NULL){
/* Print out string associated with item */
printf("%s\n",current -> string);
/* Save pointer to next item */
next = current -> next;
/* Deallocate space for string and item */
free(current -> string);
free(current);
/* Move to next item, and repeat */
current = next;
}
/* Deallocate space for last item */
free(current);
}
```

Figure 3. Example program using recursively-defined linked lists.

```
countdown(n)
int n;
{
printf("%d\n",n);
if (n == 0) return;
countdown(--n);
}
```

Figure 4. Recursive function to print countdown of integers.

Recursive Programming

For these reasons, it is important *not* to consider recursion as a tool for building looping structures in the general sense. Where functional recursion does come in handy is in approaching a certain class of programming problem that is itself recursive in nature.

Imagine that you have set up a binary tree type data structure composed of nodes defined as in Figure 5. Note that the treenode structure is itself recursively defined, incorporating three pointers to similar treenode structures.

```

/*****
/* find: Searches for a given file or directory, through
/* the current directory and all directories subordinate
/* to it. Uses recursive algorithm.
/*
/* To call:
/* find filename -- return full paths of all files or
/* directories with matching names
/*
/*****

#include <stdio.h>
#include <osbind.h>
#include <stat.h>
#include <errno.h>

#define FILE 0x0F
#define FOLD 0x10

main(argc, argv)
int argc;
char **argv;
{
char path[66];
int i = 1;

get_drvnpth(path);
while (argc-- > 1) find(path, argv[i++]);
}

find(path, name)
char *path, *name;
{
char pathname[128];
DMABUFFER d;
int ret;

Fsetdta(&d); /* Set disk transfer address to buffer d */

sprintf(pathname, "%s\\%s", path, name);

ret = Ffirst(pathname, FILE | FOLD);
while (ret == AE_OK) {
printf("%s\\%s\\n", path, d.d_fname);
ret = Fnext();
}

Fsetdta(&d);

sprintf(pathname, "%s\\%s", path, ".");
ret = Ffirst(pathname, FOLD);

while (ret == AE_OK) {
if (d.d_fattr == FOLD && *(d.d_fname) != '.') {
sprintf(pathname, "%s\\%s", path, d.d_fname);
find(pathname, name);
Fsetdta(&d);
}
ret = Fnext();
}

get_drvnpth(path); /* Get current drive and path */
char *path;
{
int drv;

*path++ = (drv = Dgetdrv()) + 'A';
*path++ = ':';
Dgetpath(path, drv);
}

```

Listing 1.

One of these points to the right-hand child node, one to the left-hand child, and a third to the parent. An example of the kind of complex data structure that can be built from such nodes is shown in Figure 6.

For purposes of argument, let's leave aside the details of how or why such a structure may be built and consider the simpler problem of writing a function that can print out the data contained in it. Movement through the tree is elementary; clearly, you can move down

the tree starting at the root, following the links from parent to child, or regress back up to any level by following the pointers from child to parent. The question is how to manage a search path through the tree that hits every node and that won't involve printing out the datum for a given node more than once.

To see how to attack this problem in the general case of an arbitrarily-deep binary tree, let's examine the special case of a single node with two children. It is obvious that if we start at the parent

node, there is no way to visit both child nodes without re-crossing the parent. A workable basic procedure thus involves handling the children before the parent, as follows:

```

For a given node . . .
    handle its left child . . .
    then handle its right child . . .
    before printing out its value.

```

Of course, we have finessed the issue

```

struct treenode {
int datum; /* Data item */
struct treenode *parent; /* Pointer to node's parent */
struct treenode *left; /* Pointer to left child */
struct treenode *right; /* Pointer to right child */
};

```

Figure 5. Recursively-defined structure for tree node.

of what we mean by "handling" a child node. In the special case we are discussing here, the child nodes have no children of their own, so we just have to print out their values before moving back up to the parent node and printing its value.

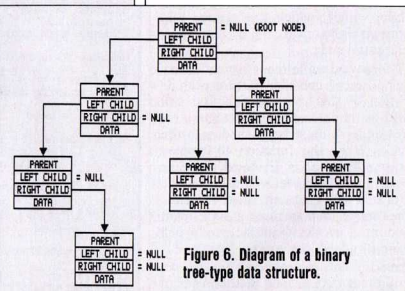


Figure 6. Diagram of a binary tree-type data structure.

But suppose they did have children? We would have to handle them individually in the same manner as we did their parent—dealing first with their children before printing out their values in turn.

Handling a child node turns out to be a recursion of the process used to handle its parent. The special case solution for a single node can "call itself," recursively, to handle extended cases:

```

To handle a node . . .
    handle its left child
    then handle its right child
    then print out its value

```

Framed as a C function, our procedure might look like the one shown in Figure 7.

```

print_tree(p)
struct treenode *p;
{
/* If there's a left child, handle it */
if (p -> left != NULL) print_tree(p -> left);
/* If there's a right child, handle it */
if (p -> right != NULL) print_tree(p -> right);
/* All done? Print out the value at this node, and return */
printf("%d\n", p -> datum);
}

```

Figure 7. Function to print out values in a binary tree.

Called once, with a pointer to the root node as the initial argument, the function calls itself to handle the left child of the root node, then its right child. Each of these calls initiates a further pair of calls to handle the left and right children of each child, and so on. When the leaves of the tree are reached (those nodes at the bottom with no children), the nested function calls begin to return, printing out the values associated with each node as they go.

Note that stack size is still a concern, as it is with any recursive solution. The function shown in Figure 7 will pile up as many calls as there are levels in the tree before beginning to return. You must, therefore, be able to anticipate

the depth of tree structures the function is likely to encounter so that enough stack space can be provided. Methods for specifying stack size and the amount of stack allocated by default vary by compiler.

A Recursive Utility

Have you ever run into the problem of knowing what a given file was called but forgetting what folder you left it in? This can be cause for panic when you are working with a hard disk containing a complex file system with many levels of nested folders.

In such cases, it is very handy to have access to a little utility that will run through all the directories on your disk

until it finds the missing file. As it turns out, such a utility is very easy to write in terms of a recursive algorithm framed as follows:

1. Look for the file in the current directory. If you find it, announce the fact.
2. If you don't find it, check to see if there are any subdirectories (folders) in the current directory.
3. If there are, switch to them, in order, and call yourself to handle them.
4. Otherwise, return

The program in Listing 1 is a full-fledged utility based on the above procedure. The program can be compiled and run directly from a TOS shell (such as Mark Williams' MSH shell) or renamed with a .TTP (TOS, takes parameters) extension and executed from the desktop. It demonstrates the use of TOS functions for directory search, directory and drive control, and filename matching. ■

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DBSense CDBSense for Atari ST computers

DBSense and CDBSense are both database programs with their own programming language and word processor. Keyboard commands can be used to store, retrieve, edit, update, rearrange, display on screen, and print out data. Programs can use information from any number of DBs to generate a spreadsheet, fill out preprinted forms, create bills or other documents for a list of clients, customize a letter to a list of clients (using the word processor under program control), etc.

- One type of data (ASCII), column widths not specified
- DBs have up to 255 columns, 0 to 254 characters/column
- Number of rows limited only by available memory
- Double precision floating point calculations, 16 digits
- Includes log, exp, sqr, sin, cos, atan, int, abs, powers

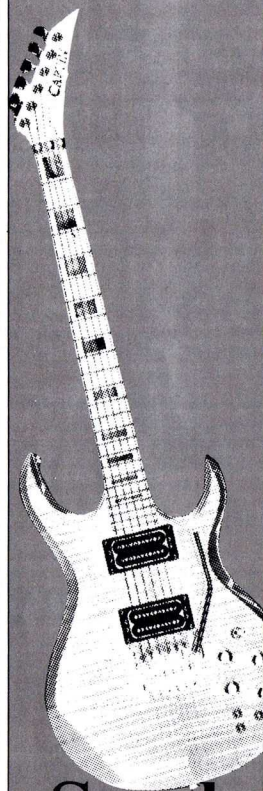
DBSense has an interpreter to execute programs, and CDBSense has a compiler. Compilation of a program is very fast (12 seconds for the longest program we've ever written, less than 5 seconds for most programs). Most compiled programs run several times faster with CDBSense, than the uncompiled versions do with DBSense. Five times as fast is common. CDBSense has more programming commands, making it more versatile.

See Review of DBSense in ATARI EXPLORER, March/April 1988

Available by check from the above address.

DBSense (for those who prefer the interpreter):	\$49.95
CDBSense (for the speed of compiled programs):	\$49.95
N.Y. State residents add sales tax.	

Finally, MIDI for guitar!



Sound
Chip

By CHARLES FARIS

This year's Frankfurt Music Messe had to be the most amazing display of state-of-the-art music paraphernalia in the history of the industry. The Atari 1040 was in evidence in almost every booth at the show—hooked up to keyboards, SMPTE interfaces, samplers . . . you name it! Everything but . . . sigh . . . a guitar.

Because the guitar was my first instrument (and because I believe that there are many more guitarists than keyboard players in the world—at least in the ranks of rock 'n' rollers), I have long been on the lookout for a MIDI converter that would allow me to sit down with my guitar and play the various parts I need into my ST MIDI sequencer.

The last time I checked there was very little available that was useful to me. Most of the general-purpose pitch-to-MIDI converters on the market are better suited to instruments like the clarinet that play only a melody line. When used with a guitar, which can produce more than one note at a time, there is usually an appreciable delay between hitting the strings and seeing the MIDI event register with the sequencer.

Actually, I can tolerate the delay—I am used to a little delay from digital effects and other stuff. The thing that really bothers me is that many of the devices haven't proved very reliable—notes sometimes drop out, and other unpredictable gremlins rear their ugly heads.

Just after I returned from Frankfurt, however, a fellow musician told me of a device that really does the trick—the IVL Pitchrider. After a brief demonstration, I was totally amazed . . . "It was MIDI, dude!" I didn't just borrow one to do this review; I bought it with the manual, foot pedal, and everything. The very next day I was in the recording studio with the IVL and my 1040 ST.

Pitchrider Features

The IVL Pitchrider is loaded with handy features. For example, it contains a display-based guitar tuner that eliminates the need for a separate tuning box. If you want to tune your guitar to a value other than A440, you can adjust the tuning between 400 and 460Hz. Pitch bend capability is available in 12 semitone steps, letting the Pitchrider follow string bends and produce MIDI pitch wheel data accordingly. If you assign each string to a separate

IVL Pitchrider

System: Atari ST

Interface: MIDI

Summary: A pitch-to-MIDI conversion system for guitar

Price: \$799

Manufacturer:

IVL Technologies Ltd.

3318 Oak St.

Victoria, BC V8X 1R2

(604) 383-4320

(800) 663-8850

U.S. Representative:

Doug MacAskill/Marketing

#1-3615 Clark Ave.

Burbank, CA 91505

(818) 842-7399

MIDI channel you can adjust the pitch bend differently for each string.

As stated before, you can transpose the MIDI note numbers that the IVL Pitchrider sends. Moreover, you can assign a different transposition to each string. A volume dynamics feature allows you to have volume dynamic scaling from 0 to 9. Zero sends no volume information. This information is not MIDI volume controller information but MIDI velocity information. If the synthesizer does not have a velocity sensitive keyboard, this feature will not affect the sound.

I believe the MMA (MIDI Manufacturers' Association) chose the word *velocity* for this parameter because it is affected by how vigorously the keyboard is struck. In fact, different volume levels are transmitted as you strike the keyboard with different intensities. This feature can be used along with the Keyboard Scaling Factor on your velocity sensitive keyboard to get the right feel for your playing style.

Having the sensitivity of a pitch-to-MIDI converter set correctly helps avoid dropouts and false notes. This can be troublesome if you want to use such a device with several different guitars; normally you have to adjust the sensitivity of the unit for each instrument. The Pitchrider, however, sets its input sensitivity automatically when you first turn it on and play a note.

You can also modify the input sensitivity with the input sensitivity option. A foot switch allows you to Hold, Sustain, Bypass MIDI, Patch change, and even set a chain of presets that you can

I have long been on the lookout for a MIDI converter that would allow me to sit down with my guitar and play the various parts I need into my ST MIDI sequencer.

step through. There is a special memory expansion for this foot switch, so you must be sure to get the version that is already equipped with this modification.

Pitchrider and ST

The one flaw I have found in most MIDI guitar interfaces is that they need several cycles to determine the frequency of low notes. Low notes have a very long wave length—it takes a low, open E string 12 times as long to sound as it takes a high E string to sound. Time is also eaten up as the computer samples the waveform, processes it, converts it to a MIDI event, and sends it out over the

MIDI interface. Together, these processes can cause quite a delay between the time notes are struck and the time your sequencer picks up the data in MIDI form.

There are several ways around this problem. One method involves playing the part an octave higher to shorten the delay. The Pitchrider itself can handle the chore of transposing the input back to its original range. Alternatively, your sequencer can manage the retransposition after the fact.

It was my Atari ST and FinalTrak sequencer, however, that gave me the ultimate workaround for the Pitchrider timing problem. The great thing about

using a sequencer, as opposed to recording "live" to tape, is that the sequencer is aware only of the MIDI data content of your performance; it doesn't care about sound at all. This gave me the freedom to hook up a standard guitar amp to the Pitchrider line out, which let me hear the reality of what I was playing and reduced any confusion in my performance due to the delay factor.

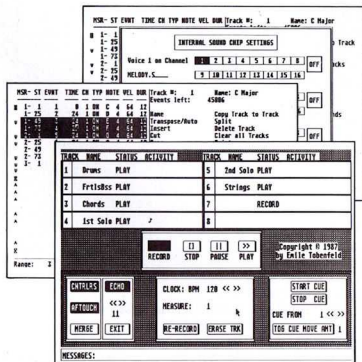
What I ended up with on my sequencer was a guitar track that was at least well-timed in relation to itself, though it was subject to a uniform delay with respect to other tracks. Fixing this problem was easy. I simply determined how many MIDI clocks that delay represented (using the FinalTrak delay track feature to play around with the guitar track until all the parts were in synch), subtracted that number of clocks from the start of the guitar track using the note/event editor, making the change permanent, and voilà! I had contra, cello, viola, and high violins playing through my Kurzweil K-1000 under control of the Atari with no overdubs, all from that one guitar track! ■

MIDI Recording Studio™ V1.1 for Atari ST Computers



Features Include:

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- Full editing** of all MIDI parameters of individual MIDI events
- Edit using the **mouse-controlled HI-LITE** event list (like your favorite word processors)
- Cut, copy, paste, transpose, compress, expand, and scale velocity** on a single event or global basis
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A potpourri of entertaining,
educational, and utilitarian
software packages

Software Survey

F-15 Strike Eagle

Bringing dogfights and bombing missions into today's headlines, *F-15 Strike Eagle* puts you into the cockpit of a fully decked out modern aerial fighting machine. What you accomplish from there is totally up to you.

The seven missions available are as familiar as yesterday's news. In Libya 1981, for example, the object is merely to patrol the air space and bomb the enemy's air command center only if provoked. Other missions take you to Egypt, North Vietnam, Syria, Iraq, and Iran. Each mission has a different objective, and each can be attacked on four different skill levels.

An update to the program has added an eighth mission: attack the Libyan naval station at Sidi Bilal, the military section of Tripoli International Airport and the military compound at Bab al Azizia, where Muammar Kaddafi resided.

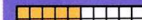
F-15 Strike Eagle is probably not the best place to start if you haven't flown combat air simulations before. On a scale of 1 to 10, the complexity level is about 11. The cockpit layout alone features 32 different system checks and



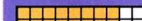
EASE OF LEARNING



CHALLENGE



GRAPHICS



DOCUMENTATION



OVERALL RATING

System: Atari ST

Required equipment:
Color monitor

Copy protection: Yes

Summary: Aerial battle
and bombing
simulation

Price: \$39.95

Manufacturer:

MicroProse
180 Lakefront Dr.
Hunt Valley, MD 21030
(301) 771-1151

readouts, and you will need nearly 20 keys to control the aircraft.

The flight operations manual does the best it can to keep the learning simple. In 44 pages you learn about flight, modern aerial combat, and the missions

Trailblazer

Games don't have to be complex to be enjoyable; some of the simplest games have enormous staying power (remember *PacMan*?). The latest release in this category is Mindscape's *Trail Blazer*.

The game is a marble/maze-type challenge like several that have appeared in the wake of *Marble Madness*, but *Trail Blazer* is unique in several respects.

You do control a ball on the screen, and your objective is to get it from the beginning of the trail to the end in the time allotted. The difference is that the perspective of the game is from right behind the sphere rather than from some detached point over head.

You must have a joystick to take on this challenge. Pushing the stick forward causes the ball to gain speed; pulling it back slows it down. Move left or right with the corresponding joystick movement, and press the fire button to jump.

Your path, which is composed of different colored squares, is littered with obstacles. Each color causes the ball to do something different: white bounces the ball, yellow increases the speed,



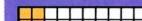
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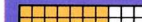
CHALLENGE



GRAPHICS



DOCUMENTATION



OVERALL RATING

System: Atari ST

Required equipment:
Color monitor;
joystick

Copy protection: Yes

Summary: Marble trail
race against the
clock

Price: \$49.95

Manufacturer:

Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
(312) 480-7667
(800) 221-9884

green decreases the speed, blue reverses the joystick control, purple sends the ball backward, and black swallows it (costing you valuable seconds) and spits it back out moments later.

My main complaints about the program concern the test mode. In actual



that await you. Still, there is a lot of material for the uninitiated to absorb.

Graphically, the game does a good job of making it easy to identify all objects, but there is nothing about any of the presentations that I would call spectacular. What you see on the screen is all you need to see, but perhaps less than you would like to see.

The F-15 is certainly well equipped with weapons. It boasts a rotary cannon capable of firing 6000 rounds per minute, and missiles are abundant. The arsenal includes four Sidewinders, which are good up to 10 miles, and four Sparrows, which are good up to 62 miles. There are also 18 bombs on board.

But the craft isn't exclusively for of-

fense. You also have radar and infrared warning receivers and radar jammers.

Nor does the craft lack for speed. Hitting 1440 knots at 36,000 feet, it can climb at 50,000 feet per minute.

The scoring system offers points for hitting targets on the ground and in the air. As you progress from arcade to rookie to pilot to ace, these targets increase in value, because they become more difficult hit. The program will keep track of each player's career ranking, and a Hall of Fame can be displayed with the best 10 scores achieved to date.

F-15 Strike Eagle can be played with either joystick or mouse, but I prefer the joystick; it just seems more natural to control the aircraft in this manner.

Once you learn what indicators are where on the cluttered control panel and wean yourself away from constant reference to the documentation, *F-15 Strike Eagle* can be a very good simulation with the potential for a long life next to the computer. Novice pilots with low frustration levels should exercise caution and perhaps practice with a less complex flight simulation before stepping up to this level.

—Rick Teverbaugh



play, you complete 10 different courses in succession. The manual implies that it is possible to control which of the 10 courses you play first. This is not true.

It is possible, however, to control which courses you use in the three-course test. The difference between actual play and the test is that in the arcade mode you are limited to three

jumps, while the test allows unlimited jumps.

That's another minor quibble I have with the program. If the purpose of the test is to practice the courses with which you are having difficulty, I think it would be best to keep the rules the same. What good does it do to plot a strategy for a course that uses five or six jumps

and then not be able to use that strategy in play?

Several special features of game play are accessed through the function keys on the keyboard. You can make the border around the trail or the trail itself strobe when the ball jumps. A lunar bounce mode sends the ball higher into the air, and a fast inertia setting enables you to slow the ball much more quickly. You can also make the course hilly or flat, change the shape of the ball, and turn the sound effects on and off.

The most valuable "extra" included in the game is the ability to create your own trails and save them on a blank disk. A simple editing program makes it relatively painless to make a trail. To use your own trails in the arcade mode, it is necessary to create 10 different versions, giving each a name. If you want to run the new courses only as a three-course test, you need create only three.

Aside from these minor shortcomings, *Trail Blazer* is a delightful switch from what is rapidly becoming a world of complex and difficult-to-learn games. The rules are only five pages long, making it easy to bring the program home and start playing all in the same day.

—Rick Teverbaugh

President Elect


EASE OF LEARNING


CHALLENGE


GRAPHICS


DOCUMENTATION


OVERALL RATING

System: Atari ST

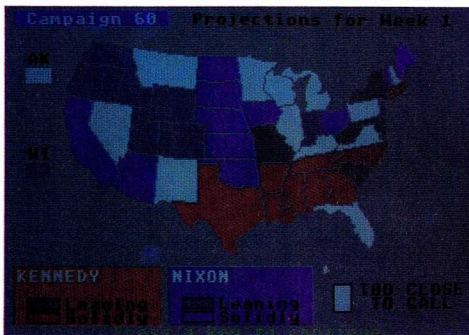
Required equipment:
Color monitor

Copy protection: None

Summary: U.S. Presidential election simulation

Price: \$24.95

Manufacturer:
Strategic Simulations
1046 N. Rengstorff Ave.
Mountain View, CA 94043
(415) 964-1353



With the presidential primaries well under way and the 1988 election not too far off, interest in the political process is at a predictable high. What better time for Strategic Simulations to reintroduce its popular *President Elect*.

When the program was first released, 16-bit machines were found primarily in the business world, and most games were released only in 8-bit form. Times have changed, however, and you will be truly amazed at what the 16-bit Atari ST does for the appearance and speed of this product.

The game is mainly text, but the map, which is an important tool during the campaign phase, is stunningly colorful and informative. At a quick glance, you can assess your strengths and weaknesses and to plot the next week's strategy.

You begin the game by selecting two candidates from among three basic categories—figures from the recent past, participants in the current political scene, and fictional characters you create. With candidates from the first group, you can replay the past several elections to see what might have been. With the second set you can look into a computerized crystal ball and perhaps pick our next leader. Using the third set you can place yourself or a friend in the political arena.

If you choose to create a candidate, the program will ask some basic questions about political beliefs in order to create a profile. Candidates are rated by a numeric system from 0 (extremely conservative) to 50 (moderate) to 100 (extremely liberal). These ratings are applied to the areas of social views, economics, and foreign policy. Candidates

are also rated from 1 (low) to 9 (high) in speaking ability, magnetism, and poise.

Once candidates have been selected, the game shifts into high gear. You organize your nine-week campaign, deciding where to spend advertising funds and which states to visit.

At the end of each week, which is also the end of a turn, you find out how you did, the status of each state, and what the projected electoral vote count would be if the election were held that week.

The election is the most enjoyable part of a program that will produce many hours of entertainment even in non-election years. Once election day arrives, there is very little you can do

but sit back and wait for the results to come in.

If you choose to watch the results trickle in, you get a true election-night-on-network-television feel. The computer projects the winner in each state as key precincts come in, a process that takes 15-20 minutes, depending on how close the race is. If you want a quick game, you can skip right from election day to the final results in a matter of seconds. The result is the same, but the level of enjoyment is lessened.

From beginning to end, *President Elect* is a top-notch simulation. It is believable in every way—a game whose time has come. —Rick Teverbaugh

In *Gridiron*, Bethesda Softworks has a good program that should hold the attention of true football fanatics for some time. Keep in mind, though, that the focus isn't on graphics—you won't see bruising tackles and leaping catches in spectacular animation.

The viewpoint is directly over the field, with all players and the ball represented by large, colored dots. This makes it a very easy to see how the formations and plays evolve but doesn't qualify the game for any arcade graphics awards. There are, however, digitized sound effects to add interest.

The strongest feature of *Gridiron* is the playbook. Two reference cards show players the default plays (offense and defense on opposite sides) as a football coach would chart them. You aren't limited to that set, however; you can use the Play Creation Utility to create a custom set of plays to be loaded in from disk. Team Data Disks are also avail-

Gridiron


EASE OF LEARNING


CHALLENGE


GRAPHICS


DOCUMENTATION


OVERALL RATING

System: Atari ST

Version reviewed: 1.2

Required equipment:
Color monitor;
joystick (optional)

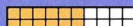
Copy protection:
Password from documentation

Summary: Strategically accurate football simulator

Price: Program, \$49.95; data disks, \$19.95

Manufacturer:
Bethesda Softworks
P.O. Box 1665
Bethesda, MD 20817
(301) 469-7061

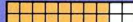
Roadwar Europa



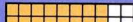
EASE OF LEARNING



CHALLENGE



GRAPHICS



DOCUMENTATION



OVERALL RATING

System: Atari ST

Copy protection: None

Summary: Adventure game featuring "Road Warrior"-like gangs

Price: \$44.95

Manufacturer:

Strategic Simulations
1046 N. Rengstorff Ave.
Mountain View, CA 94043
(415) 964-1353

The screenshot shows a top-down view of a map with various terrain types and a network of roads. A statistics panel on the right displays the following information:

Team Shunanju II	
Vehicles:	26
Max:	54
People:	202
Max people:	910
Food:	100
Medicine:	50
Tires:	700
Fuel:	200
Guns:	5000
Ammunition:	0
Antitoxin:	0
Supplies:	1960
Free Space:	0
Fuel usage:	21
Healthy:	

At the bottom of the screen, it reads "Tabriz 6:00 a.m. Day 24 2021".

Strategic Simulations, capitalizing on the continuing popularity of Road Warrior-type films, has released another high quality game in this genre.

Following on the heels of *Roadwar 2000* is the new *Roadwar Europa*, which allows you to load a seasoned crew saved from the earlier game into the thick of new problems in Europe.

But previous playing experience isn't necessary to enjoy *Roadwar Europa*. You begin with 15,000 construction points with which to select and configure up to six vehicles for your gang. Not only can you select from a great many different modes of transportation, but

you can modify the vehicles after you have chosen them.

Your next chore is picking a crew. The number of people in the crew depends on the capacity of the vehicles you have constructed. There are five different types of crew members from which to choose. The more efficient the type, the greater the cost in personnel points. Once you have outfitted the crew (it does make good sense to use the suggestions in the manual for a sample gang the first time you play) you are ready to hit the road.

Once you see the map display on the screen, you have several options. To move on the map, simply use the mouse

to point in the direction you want to travel and hit the button.

Other choices include abandoning a vehicle, scouting a city for nuclear devices, dropping supplies, fixing tires, checking on status, healing the sick, and looking for loot and vehicles.

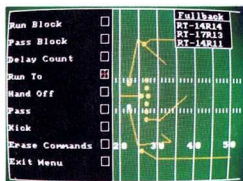
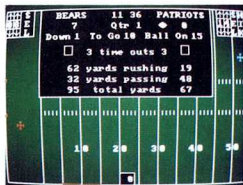
Each square on the map represents 50-75 miles. Gaining wealth, supplies, vehicles, and occasionally new members are the chief objects of the map trips. But the real excitement centers around combat with other gangs roaming Europe.

You can engage in a battle in one of three ways: abstract, quick, or tactical. In the abstract, you see none of the action on the screen; the computer handles the job and tells you the results. The other two modes display a map showing the road and each gang's vehicle. The quick combat is just what you would expect; the results are shown on the screen, and you have very little input.

The most satisfying and time-consuming mode is tactical combat, in which you can control every move and every shot. Among the techniques you can use are ramming another vehicle and boarding and sometimes capturing another gang's transportation, which then becomes part of your arsenal.

You can save the game at almost any juncture, and the 21-page manual is easy to read, well organized, and full of charts and illustrations. Overall the game is relatively easy to play, even though the scenarios can be as detailed as some of SSI's war games.

Roadwar Europa should keep the Road Warrior in you satisfied—at least until the next Mad Max film festival hits your town. —Rick Teverbaugh



able for loading in past years' NFL player abilities.

The documentation is also a plus, covering all the strategies and tips needed to beat a computer or human opponent. Timing is critical for handoffs and passes, for example, and the booklet explains how best to handle these transactions. Fortunately, you can pick a difficulty level from beginner to pro.

Chris Weaver of Bethesda Softworks tells us that the ST version of the program was released with "a few small bugs," such as a message that asks you to "insert the AmigaDOS disk." Users can obtain a fix disk (version 1.2bST) for \$5.00.

The games I've played to date have been very challenging and enjoyable, and *Gridiron* offers one of the first computer-controlled opponents that is not impossible to beat. If your propensity is for the coach's side of football, you'll get a big boost from *Gridiron*. —Andy Eddy

Slaygon



EASE OF LEARNING

CHALLENGE

GRAPHICS

DOCUMENTATION

OVERALL RATING

System: Atari ST
Version reviewed: 1.0

Required equipment: Color monitor

Copy protection: Yes

Summary: Challenging graphic adventure that could use better graphics

Price: \$39.95

Manufacturer:

MichTron
576 S. Telegraph
Pontiac, MI 48053
(313) 334-3553

GFA Basic, distributed by Microdeal (via Michtron in the U.S.), is showing itself as a serious language for developers, as witness *Slaygon*, an arcade adventure created entirely in GFA Basic.

Slaygon is an example of a new adventure sub-genre, which includes *Dungeon Master*, that has been made possible by the proliferation of large-RAM computers like the ST. One of the features that distinguishes these new larger games is the panel of icons that allows you to point-and-click your way through the adventure—picking up an object and placing it in a storage cell or firing a weapon, for example.

Slaygon takes place inside Cybordynamics Laboratories, a company that is planning to take over the world by unleashing fatal germ warfare. As an agent of the United Defense Force—the good guys—you must work your way into Cybordynamics and disable the computer that controls their building. The *Slaygon*, a remote-controlled robot, is your ally in this mission.

The game is very simple to play: on your control panel you have a series of buttons and indicators for manipulating the operation of the robot. As you cruise through the building, you must gather such crucial objects as Energy Pods and key cards with which to open doors.

With as docile an interface as this, the documentation is reasonably thin; the bulk of it contains hints that you may decide to pass up in order to keep the discovery aspect of the game as fresh as possible.

The remainder of the booklet covers loading of the program and data and

describes how the B disk (there are two program disks) is unprotected. Game saves are stored on the B floppy, and while only one save can be kept on each disk, making multiple copies permits you to store various play positions. To me, it seems like too much trouble.

Nor are the low-resolution graphics as detailed as they could be. As you roam the halls, a map of territory covered is automatically created, but it is displayed in a scale so small as to make it almost worthless. Similarly, I would prefer a larger display window showing what your *Slaygon* sees within the Cybordynamics complex. Perhaps I am jaded after playing *Dungeon Master*, but I do feel that more could have been accomplished visually.

Don't let me give you the impression that *Slaygon* isn't worthy of your attention; I just think that *Dungeon Master* has thrown off the curve for reviews of this genre of software. *Slaygon* is definitely a challenging game, and it will take you quite a while to wend your way through the enemy's territory as you search eagerly for the next piece in the puzzle.

—Andy Eddy

Classy Chassy

In the not too distant past, pinball was king of the arcades. Then *Pong* ushered in the era of video games, and full-size, mechanical pinball games fell by the wayside. Recently, however, the personal computer has revived the pinball craze—in video form.

One of the newest releases for Atari 8-bit systems is *Classy Chassy* from Clearstar Sofotechnologies.

Classy Chassy is distributed on a single, 5¼" floppy. The disk autoboots upon startup, provided no cartridge or Basic is installed.

The game screen is divided into three sections, with the pinball playfield in the center occupying most of the display. To the left of the playfield are the score, ball, tilt, and credit indicators. On the right is a picture of a woman; ostensibly your "cheering section." More on her later.

Before you can play a game, you must "insert quarters" by pressing Select—a silly holdover from mechanical pinball games that should have been left in the arcade. Only one person can play *Classy Chassy* at a time. The object of the game is to score points by keeping the ball in motion on the playfield for as long as possible.

The game can be played using either the keyboard or a joystick. With the keyboard, you can flip the flippers, pull the plunger, and apply "English" to the ball by "shaking" the table. However, the control keys were chosen based on the keyboard layout of the Atari 800, making it nearly impossible to play the game comfortably on other models. I found it quite reasonable to forfeit use of the "English" keys in exchange for the convenience of the joystick on my 130XE system.

The *Classy Chassy* playfield contains many standard pinball features: a bonus multiplier, bumpers, rollovers, lanes, drop targets, impulsers, a spinner, and a single set of flippers. As your ball bounces realistically around the playfield, points accumulate, lights flash, and sound effects emanate from the speaker.

If you do well enough, you can win extra balls and free games. Also, the girl of easy virtue in your cheering section sheds articles of clothing commensurate with your performance. Prudish parents need not be concerned, as she never reveals more than a bra and garter belt. Depicted in coarse graphics, she is hardly a titillating sight. Cheaters can use the undocumented Shift-Option combination to help the young lady out of her



EASE OF LEARNING



CHALLENGE



GRAPHICS



DOCUMENTATION



OVERALL RATING

System: 48K 8-bit Atari

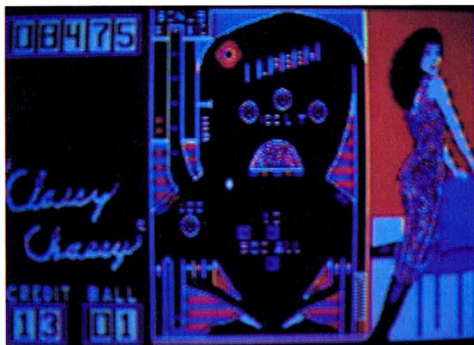
Required equipment:
Disk drive, joystick
(optional)

Copy protection: None

Summary: An
inexpensive pinball
game

Price: \$9.95

Manufacturer:
Clearstar
Softtechnologies
P.O. Box 140
Rte. 2, Box 135-D
Harrells, NC 28444
(919) 532-2359



clothes.

Currently, *Classy Chassy* is part of Clearstar's Brown Baggin' It line of budget software offerings, literally packaged in a no-frills brown paper bag with a single sheet of photocopied in-

structions. The documentation contains several inaccuracies regarding keyboard functions, but I am told that Clearstar is currently working on new packaging and instructions.

While not as full-featured as Elec-

tronic Arts' *Pinball Construction Set*, *Classy Chassy* is still a fine game in its own right. But perhaps the most appealing aspect of *Classy Chassy* is its rock-bottom \$9.95 price.

—Owen Linzmayer

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Mixed-Up Mother Goose

EASE OF LEARNING

CHALLENGE

GRAPHICS

DOCUMENTATION

OVERALL RATING

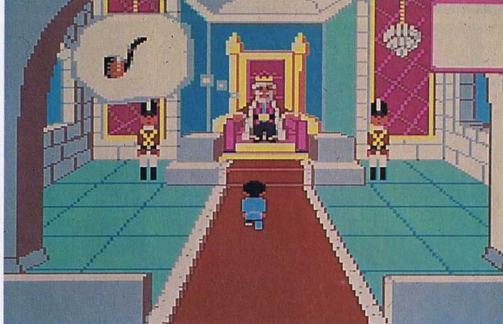
System: Atari ST
Required equipment:
Joystick recommended
for kids under 6

Copy protection: None
Summary: Animated
adventure game for
children ages 4 and up

Price: \$29.95
Manufacturer:
Sierra On-Line
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858
(800) 344-7448

Score: 0 of 18

Sound: on



Software adventures for the nursery school set are rare. It's a notable event when a major publishing house like Sierra turns its crack talent to pleasing junior computerists. It's even more unusual to find a children's program written by a top-flight game designer like the Queen of Adventures, Roberta "King's Quest" Wil-

liams. This makes *Mixed-Up Mother Goose* one of the most special programs to be published this year. In addition, it is undoubtedly the most exciting game ever created for preschoolers.

Something has gone wrong in Mother Goose Land. The rhymes have been scrambled, and bits and pieces of each are scattered around the kingdom. It's

up to the junior computerist to find the missing part of each rhyme and take it back to its correct spot. When each rhyme is completed, the characters act it out in clever animated sequences.

Mother Goose Land is a colorful, well-drawn fantasy kingdom bounded by river, forest, and mountainside. Inside this small country, the characters

MichTron's latest educational release is aimed at children aged 3 to 6. Designed specifically to stimulate the development of the preschool set, *Preschool KidProgs* offers three separate activities on one disk.

The disk, which is not copy-protected, autoboots when the computer is turned on—whether by parent or child. The title screen displays four large

blocks—one for each of the activities and one to exit. The activity blocks have pictures to help the non-reader; the exit block has only the word EXIT, a word that was not familiar to the children who tested the program for us.

The child uses the mouse, clicking with either button, to make all selections in the program. Our playtesters, neither of whom had used a mouse before, had no trouble mastering the

point-and-click technique.

Kidgrid+ is a drawing program, which presents the child with a screen full of triangles—192 of them to be exact. At the left-hand side of the screen are 12 color blocks. Erase grid, see sample, and exit are the other options.

The child chooses a color with the mouse, and thereafter, each triangle he clicks on fills instantly with that color. To change colors, he has only to click on

Preschool KidProgs

EASE OF LEARNING

GRAPHICS

DOCUMENTATION

OVERALL RATING

System: Atari ST
Required equipment:
Color monitor

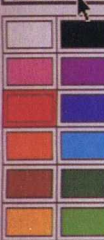
Copy protection: None
Summary: Clever
program promotes
independence in
young computerists

Price: \$39.95

Manufacturer:
MichTron
576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700

KIDGRID+ USE THE MOUSE TO CHOOSE COLORS AND MAKE A DESIGN.

SEE SAMPLE



EXIT ERASE GRID

from 18 rhymes live in their cottages, fields, and meadows.

But, all is not well in the kingdom. The Crooked Man has lost his crooked six pence. Jack Be Nimble can't find his candlestick. Mary's little lamb is missing, and Jack Horner's Christmas Pie is gone. When the on-screen player-surrogate walks up to the Mother Goose characters, they tell what they need to complete their rhyme. This information appears first in a word balloon; then the missing object is pictured in the word balloon for the benefit of non-readers.

The player guides the on-screen hero or heroine around the land with mouse, joystick, or keyboard control. When the child finds an object and moves next to it, it is added to the inventory. Moving to its proper position returns it to its owner. The rhyme is then displayed in text along with a musical accompaniment, and the characters act out the rhyme in a lively sequence designed to enchant young gamers. Games can be saved on disk and recalled for later play.

The graphic style is reminiscent of *King's Quest*; everything is story-book pretty. Parents enter the child's name when they boot the program, and

choose an on-screen character that looks like the player. Children definitely will need parental help to learn how to play. Once they understand the technique, however, they should be able to manage alone. Even non-readers can master the game, since each rhyme character displays the missing object pictorially.

The game comes packed with an excellent parent's guide plus some great player aids, including an attractive poster that displays the 18 rhymes. Best of all, a pictorial map shows the layout of Mother Goose Land and the location of each of the characters.

With one exception, the missing items are randomly redistributed with every new game. Mary's watering can, which she needs in her Contrary Garden, is always in the same spot. Roberta Williams thoughtfully fixed the location of this one item so it can be used to teach children how the game operates.

Mixed-Up Mother Goose is a delightful trip through a magic kingdom. It is a guaranteed child-pleaser that parents can enjoy with their kids, and kids will enjoy playing over and over again.

—Joyce Worley

a different color block.

Kidgrid+ was definitely the favorite activity of our playtesters. The four-year-old was content to sit for long periods, carefully creating patterns. Our six-year-old immediately recognized the potential for creating actual pictures with the triangles, but had a bit of difficulty executing the elaborate designs he had in his head.

Unfortunately, pictures and patterns created with Kidgrid+ cannot be saved to disk. This, the documentation explains, is because the author was unable to devise a method for saving and loading saved pictures that young children could handle on their own.

The display for Kidkeys, a music program, shows a three-octave piano/organ keyboard across the bottom of the screen. At the left are a picture of a piano and a picture of an organ; by clicking on these icons, the child can change the sound of the music generated by the program. On the right-hand side is a large box containing a picture of a music note and the words "pick a tune." Under the box is the exit option.

Kidkeys offers two modes. In the first, the child can "press" the keys on the keyboard by pointing and clicking with the mouse. In the second, a tune is played for him. He clicks on "pick a tune," and the screen fills with pictures,

each of which represents one of 20 tunes, including "I've Been Working on the Railroad," "Pop Goes the Weasel," "Happy Birthday," and "Jingle Bells."

The child then chooses the song he wants to hear, and watches as the keyboard plays it. Lyrics are included in the documentation booklet.

Kidblocks is a video version of an old favorite child's puzzle. Each of 16 blocks is in the correct location, but the child must turn them by clicking with the mouse until they form a complete picture.

Preschool KidProgs, its somewhat unepithetous name notwithstanding, is an excellent program. The activities are simple but satisfying to children in the target age range, and the author has succeeded admirably in creating a program that young children can use on their own. Although both of our playtesters were non-readers, they needed very little instruction to feel comfortable with the program.

The documentation tells you everything you need to know about the program, and the well-drawn pictures and consistent format make the program easy for your child to use. We congratulate MichTron for recognizing that there is more to preschool education than letter and shape recognition.

—Betsy Staples

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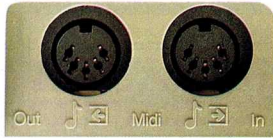
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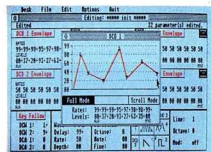
And then you'll have to make sure everything is installed correctly.

What's that like?

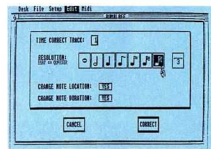
You know the song, "What are you doing for the rest of your life?"

Atari ST™ and MEGA computers, on the other hand, have a MIDI port built right into the back of the computer.

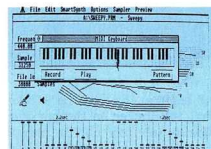
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Blockbuster



EASE OF LEARNING



CHALLENGE



GRAPHICS



DOCUMENTATION



OVERALL RATING

System: Atari ST

Required equipment:

Color monitor

Copy protection: Yes

Summary: A space-age

Breakout game

Price: \$39.95

Manufacturer:

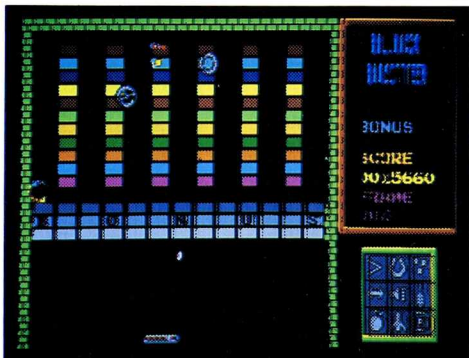
Mindscape

3444 Dundee Rd.

Northbrook, IL 60062

(800) 221-9884

(312) 480-7667



Where the arcade classic Breakout left off, Mindscape's new *Blockbuster* takes off in high gear. Fashioned after the currently popular coin-op arcade game *Arkanoid* from Taito, *Blockbuster* borrows the simple concept of bouncing a ball off a wall of bricks and embellishes it with fanciful screen designs, roving aliens, and futuristic weapons.

The latest in a string of arcade adaptations from Mindscape, *Blockbuster* was originally released in Europe under the name *Impact*. The *Blockbuster* package contains a single-sided, copy-protected disk and a user's manual. The documentation is thoroughly uninspired, cramming instructions for four different computer systems into 11 pages without a single illustration. In addition, I was distressed to see that the IBM version of *Blockbuster* can be installed on a hard disk drive, but the Atari version can not.

When you boot the game disk, you are presented with a title screen. At that point you can enter a password to jump to an advanced level or click the mouse

button to begin at the first frame. Despite what the sticker on the package says, *Blockbuster* can not be played with a joystick; you must use the mouse.

The game is quite simple in concept, but not easy to play. The object is to destroy all of the blocks in a frame by keeping the bouncing ball in play. To do this, you must not let the ball get past your paddle which can move only horizontally along the bottom of the screen. As the ball picks up speed, this becomes about as easy as playing tennis against Boris Becker. You begin each game with five balls and have the opportunity to earn extra ones if you are good enough. The game ends when you run out of balls.

If you destroy all of the blocks in a frame, you advance to the next frame. However, completing a frame is not as easy as it sounds. Some blocks require multiple hits before they are destroyed. Others are invisible, and some are indestructible. And let's not forget the roving aliens that drop stun bombs and deflect the ball if struck.

Luckily, you can "buy" weapons to

even the odds. There are nine different weapons available, each with its own unique properties. One weapon splits the ball into three, another makes your paddle wider, and some even let you shoot blocks with projectiles.

To buy a weapon, you must catch the yellow tokens that fall randomly when bricks are destroyed. The more tokens you catch, the better the weapon you can buy. The arsenal is displayed in the bottom right-hand corner of the game screen.

If you ever tire of the 80 pre-defined frames, you can create your own in the editor mode. Although it uses the keyboard instead of the mouse, the editor allows you to place blocks on the screen in any pattern you choose, and set variables such as number of tokens, type of aliens, initial and maximum ball speed, and rate of acceleration.

Up to 48 custom-made frames can be saved to the original disk, but there is no way to edit the pre-existing frames or swap custom-made frames with friends. Another drawback is that you can't play-test your frames from within the editor; you must re-boot.

Blockbuster is an excellent variation on *Arkanoid*. With 80 frames and the ability to create 48 more, it is doubtful that you will ever master this game. In fact, I found the game so challenging, I had to cheat to discover the passwords that allow you to skip to higher level frames. Using the *MichTron Utilities* package, I searched the disk sectors until I found them: GOLD, FISH, WALL, PLUS, HEAD, FORK, and ROAD. Without these ill-gotten passwords, I would never have experienced all this game has to offer.

—Owen Linzmayer

A Sorting Tip

HELP KEY

To sort multiple fields in a database or spreadsheet that allows you to sort on only one field at a time, sort each field you are interested in, from least important to most important.

For example, if you have a database file containing employee names that

you want to alphabetize, sort in ascending/increasing order on middle initials, then first names, and finally surnames. The resulting list will be in alphabetical order based on last name, first name, and middle initial.

This technique usually works, but not always. If the program sorts the last version of the file in memory, it will work; if the program always "starts over," sorting the same master image of the file, it will not work. ■

David Ahl's Basic Computer Adventures

"Starting from Venice in the year 1271, you travel by sailing ship to Armenia, whence you set out on a 6000-mile trek over the Silk Road to the court of the Great Kublai Khan in Shang-tu, Cathay. You have clothing, balms, and unguents that you brought from Venice, but you must barter for camels, food, and other supplies in Armenia."

Thus begins the computer simulation of the journey of Marco Polo, in which you, with the help of a personal computer, become the leader of a group of merchants on a most unusual business trip. On the way, you must deal with many hazards and problems: injured camels, sandstorms, bad water, marauding animals, and savage bandits. In addition, you must make wise decisions about trading jewels for food, clothing, crossbow arrows, and medicine.

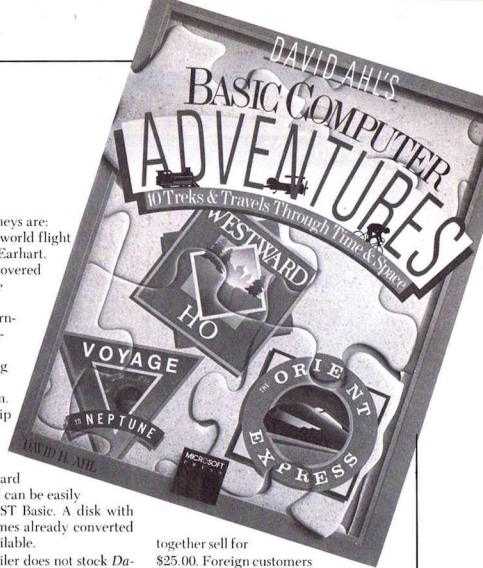
Marco Polo is just one of 10 realistic and accurate computer journeys in the big 272-page book, *Basic Computer Adventures*. Each simulation is accompanied by a story of the actual historical journey, a map, a Basic program, and a detailed explanation of the program.

- Some of the journeys are:
- The round-the-world flight attempt of Amelia Earhart.
 - A treacherous covered wagon trek over the Oregon Trail.
 - A dangerous turn-of-the-century automobile race.
 - A day delivering packages using the N.Y. Subway system.
 - A mysterious trip on the famous Orient Express.

The programs are written in standard Microsoft Basic and can be easily converted to Atari ST Basic. A disk with eight of the ten games already converted to the ST is also available.

If your local retailer does not stock David Ahl's *Basic Computer Adventures*, you can order the book directly for \$10.00 postpaid. The Atari ST disk (available only by direct order) costs \$15.00; book and disk

together sell for \$25.00. Foreign customers must add \$1.00 for surface delivery or \$5.00 for air. Send payment by check or M.O. in U.S. funds to David Ahl, 12 Indian Head Road, Morristown, NJ 07960.



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Word Writer ST



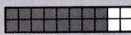
EASE OF USE



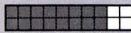
PERFORMANCE



ERROR HANDLING



DOCUMENTATION



OVERALL RATING

System: Atari ST

Version reviewed: 2.01

Copy protection: None

Summary: Enhancements make this a very powerful, easy-to-use program at a reasonable price

Price: \$79.95

Manufacturer:

Timeworks

444 Lake Cook Rd.
Deerfield, IL 60015
(312) 948-9200

With the release of the new *Word Writer ST 2.01*, Timeworks has made an excellent word processor even more impressive. The new features are as well executed within the GEM environment as the those of the original, making this a seamless, painless upgrade.

The original *Word Writer ST* had the advantage of being a stand-alone word processor that worked in close harmony with its sibling products, *SwiftCalc ST* and *Data Manager ST*. While that is still true, the new version has an added feature which lessens its dependence upon an external database for advanced features such as form letters and mail merge capabilities.

Data Manager files can still be exported to *Word Writer*, but Timeworks has added that ability to *Word Writer* itself.

To create a form letter, you simply type the letter as usual, pressing Alternate-L followed by a number and another Alternate-L whenever a variable is encountered.

Of course, there must be data to merge into the letter. Creating this is also a simple matter. You merely open a new file and key in the information, taking care to match each line with its

place in the letter. That is, if the first line in the letter is a date, the first line in the data file has to be a date, and so on. Once all the records (names and addresses of those who are supposed to receive the letter) are entered, you save the file in ASCII format.

The final step is printing the final letters using the Print Form Letter option. An item selector box appears and asks for the name of the form letter, and a dialog box asks for your printing parameters. Finally, another item selector box request the name of the data file.

As exciting as that is, the expanded dictionary and the ability to create personal dictionaries is even more impressive. The dictionary now contains 90,000 words; personalized versions are limited only by the amount of disk space available. Because *Word Writer ST* is hard disk compatible, the number of entries can be considered near limitless.

Though part of the original release, the interactive, real-time spell checker must be discussed. I once considered these things nuisances that beeped every time I hit a wrong key during entry of a rough draft. However, this one changed my mind, because it is such a pleasure to use.

When you make a mistake, the pro-

In *Partner ST* Timeworks has provided a useful selection of customizable desk accessories.

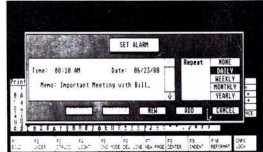
Partner provides a 60,000 word thesaurus, an appointment calendar with datebook, a memo pad, a phone list with auto dialer, and an expense account manager. Other functions include name and address listings; a time keeper (to track of exactly how you spend your time for billing purposes, etc.); an alarm clock with message; HEX, RPN (Reverse Polish Notation), financial and standard function calculators; and a typewriter (great for envelopes and forms, as it sends a line at a time to a printer).

A database of vital statistics (mileage between cities, metric/US measurement equivalents, holidays, etc.) is included for fast reference; SwiftDOS provides direct DOS access to copy, erase, rename, and format commands; extended printer control makes it easy to send special output commands. And there is even a quick and dirty version of Breakout to relieve tension. All this and a GEM interface too!

The full package, including the de-

Partner ST

A File Edit Block Layout Style Spelling Graphics Help



Alarm

fault memory setting for data storage, occupies 165K. On a 1040 that leaves plenty of room for an application and data storage. On a 520 the story is somewhat different. For 520 owners, Timeworks has provided a smaller scale version that does not automatically load all the accessories.

You can decide exactly which accessories are included on any startup/application disk. That means a calculator and timekeeper can go with your word processor and the phone list/auto dialer and a memo pad can go with your tele-

System: Atari ST

Version reviewed: 1.0

Copy protection: None

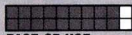
Summary: Powerful collection of easy-to-use RAM resident desk accessories

Price: \$49.95

Manufacturer:

Timeworks

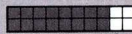
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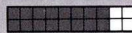
EASE OF USE



PERFORMANCE



ERROR HANDLING



DOCUMENTATION

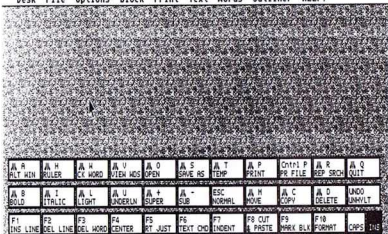


OVERALL RATING

communications package.

For example, using my 1040, I have

Desk File Options Block Print Text Words Outliner HELP!



Command key equivalents.

gram beeps and highlights the offending word, but it happens so quickly that it does not interrupt, obstruct, or otherwise hinder the creative process. Words pointed out in this way can be ignored, corrected, or added to the dictionary.

My only complaint about the spell-checker is its lengthy loading process. The busy bee hangs around for some time before the item selector asks which dictionary file should be loaded.

Related, but not too closely, is the all-new thesaurus, a compilation of 60,000 synonyms for commonly-used words.

It works two ways. Place the cursor on a word and press Control-T. Presto!

Alternatives, which can automatically replace the highlighted word, appear. The other method is useful when you are considering a word that has not been entered yet. Via menus, you can access the thesaurus and type in the desired word. Click on the proper selection box, and you can review additional entries. Either way, it is a great tool.

For convenience an ABC icon has been added to the document windows. Clicking on this icon displays the column and row position of the cursor.

The last addition, a major one, facilitates data retrieval and storage without returning to the GEM desktop. Set Path

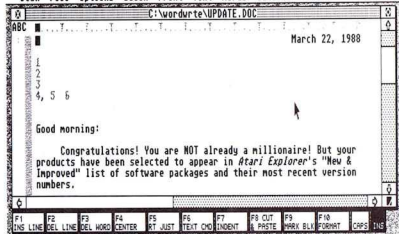
Names is the function, and it is used to describe the location of files such as data, the dictionary, the thesaurus, and the Help screens. Disk drives, directories and sub-directories can be identified or changed at will. This information is then saved to disk as a part of a configuration file.

The documentation has been updated to reflect the growth of the program.

Considering the benefits from the added features, the benefits of the original version, the attractive price, and the ease of using/learning the program, *Word Writer ST* is an excellent value.

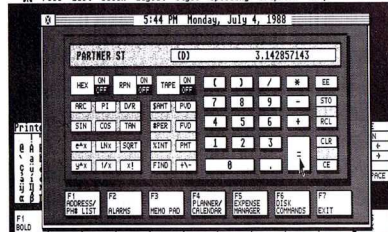
—Ted Salomone

Desk File Options Block Print Text Words Outliner HELP!



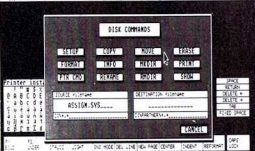
Mail merge sample letter.

A File Edit Block Layout Style Spelling Graphics Help



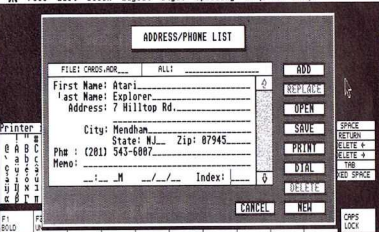
Calculator

A File Edit Block Layout Style Spelling Graphics Help



Disk commands

A File Edit Block Layout Style Spelling Graphics Help



Address/phone list

loaded the full *Partner* with complete thesaurus onto a double-sided disk with *1st Word*, and there is still room for data storage.

On the negative side, *Partner* does not automatically check your system to see if a hardware clock or a modem is installed; you must tell it at setup time. And, while it works with a monochrome or color monitor, it does not work in low-resolution mode. The program boots, but it overscans, so large portions of

windows are not visible.

Partner ST fills a need and fills it well. The documentation is complete, well organized, and professionally produced. The pop-up screens are a delight to behold and use; the functions, full-featured. When used as an adjunct to traditional applications like spreadsheets and databases, *Partner ST* can increase your productivity many times over. I consider it indispensable.

—Ted Salomone

*A look at life
beyond Basic and Pascal*

In this issue, we look at two slightly esoteric products that should be of interest to serious programmers and developers as well as less experienced computerists who want a better understanding of life beyond Basic and Pascal.

APL.68000

A modern desktop computer like the ST is such a versatile tool—one that can be used for playing games, processing text, generating graphics, or controlling a synthesizer—that it is easy to forget that computers were first conceived purely as calculating machines. APL.68000 from the Spencer Organization is a unique computer language that takes us back to the mathematical roots of computing.

In the early sixties, Dr. Kenneth Iverson, an applied mathematician at Harvard, developed a system of symbolic notation to communicate the results of mathematical processes he had been studying. He described the notation that was to become APL, in a book titled *A Programming Language*. He continued to develop his ideas, while working at IBM's Thomas J. Watson Research Center, and the first APL interpreter was implemented there in 1965. The convenient working environment and problem solving power of APL made it popular with those who had an opportunity to use the new language.

How Does APL Differ from Other Languages?

Modern computer languages have become more and more alike as the concepts of structured programming have spread, allowing programmers to make their programs easy to read and maintain by using simple looping and decision structures that operate on arrays of data. APL stands apart, because it allows simple functions to perform their operations on more complex data structures and in that way eliminates the need to code repetitive operations.

A variable can be a scalar, a single number or character; vector, a one-dimensional

APL.68000 And The Cross-16 Meta Assembler

System: Atari ST
Version reviewed: 6.05C
Copy protection: None
Summary: A unique language suited to serious mathematical work in engineering, statistics, and business
Price: \$99.00
Manufacturer:
Spencer Organization
P.O. Box 248
Kindermack Rd.
Westwood, NJ 07675
(201) 666-6011

dimensional array of numbers or characters; matrix, a two-dimensional array; or a multi-dimensional array of as many as eight dimensions. In Basic, the code to add two vectors of ten elements would look like this:

```
FOR I = 1 to 10
  X(I) = A(I) + B(I)
NEXT I
```

In APL it would look like this:

```
X ← A + B
```

For each additional dimension, the Basic version would need another FOR NEXT loop, while the APL statement would remain the same. Basic and other procedural languages (Pascal, C, Fortran) are concerned with how a task is performed, APL is concerned with what is done.

The ideal of programming in APL is

to create a function in one line—to perform a task that in other languages would require an entire program. To make this possible, APL has more than 50 functions that are represented by single symbols, and most operate in different ways, depending whether they are given one *argument* (item of data) or two. Functions that require one argument are called *monadic*; those that require two arguments are called *dyadic*.

Because the APL interpreter has so many functions to deal with, the language has one other unusual characteristic: a line of code is always evaluated from right to left, except when modified by the presence of parentheses.

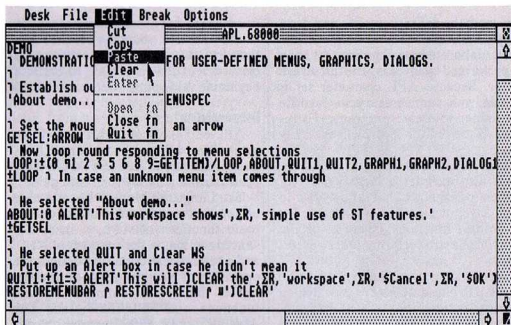
The functions themselves have no order of precedence. If you were given the equation $X = 3 * 6 + 2$, the proper algebraic order of precedence would be to multiply 3 times 6 and then add 2 to the product. The APL expression $X ← 3 * 6 + 2$ would cause 2 to be added to 6 and the sum to be multiplied by 3.

What Kinds of Functions?

The only way for me to convey the power of APL to you is to describe the operations performed by the functions. If you are familiar with mathematical programming, you will recognize that many of these functions constitute an entire program, or at least a subroutine or procedure in other languages.

Remember while reading the descriptions, that the operation of a function is performed on each element of an array in the monadic (one argument) form and between corresponding elements of

By STUART DUDLEY DIMOND III



The ideal of programming in APL is to create a function in one line—to perform a task that in other languages would require an entire program.

two arrays in the dyadic (two argument form). With functions that may be used either way, the monadic form is described first and then the dyadic.

Arithmetic Functions

The arithmetic functions are the simplest; add, subtract, multiply, and divide in their dyadic form operate just as you would expect them to. When used in the monadic form, add returns the identity (same number); subtract performs negation; multiply returns 1 if the sign of a number is positive, 0 if it is 0, and -1 if it is negative; and divide returns the reciprocal.

There are three remaining arithmetic functions. The first rounds a real number up to the nearest integer or picks the larger of two numbers. The second rounds a real number down to the nearest integer or picks the smaller of two numbers, and the third makes a number positive (absolute value) or gives the remainder of division of one number by the other (modulus).

Algebraic Functions

The algebraic functions begin to display a great deal of the power of APL. Starting simply, you can raise any number to a power. You can also take the logarithm base e or with any base.

The symbol with the largest number of functions is called "circle." It multiplies one argument by π ; a left-hand argument of 0 through 7 selects which circular or hyperbolic trigonometric function of the right-hand argument will be generated; and -1 through -7 selects the inverse trigonometric functions.

The random function called "roll" or "deal" returns a random integer from 1

through the argument (like rolling a die of that many faces) or selects as many integers as indicated by the left argument from those contained in the right argument (like dealing cards).

There is a factorial function, and its dyadic function tells you the number of possible combinations. The function called "iota" produces a series of integers from 1 to the number given it or searches a list of numbers on the right for the number on the left and gives an index indicating its location in the list.

The final algebraic function performs a matrix inversion on a single matrix, or performs matrix division on a pair of matrices. This kind of power in a single symbol in a language is really impressive.

Comparative Functions

Most of the comparative functions are like those of any other computer language: less than, less than or equal, equal, greater than or equal, greater than, and not equal. The function "contained in" returns a 1 if the argument on the left is contained in the argument on the right. Equal, not equal, and contained in can be used with numeric or character data; the others are numeric only.

Logical Functions

The logical functions work only with Boolean data (1's and 0's), as you would expect. "Not" is monadic and converts 1 to 0 and 0 to 1. The dyadic functions are the standard logic operations or, and, nor, and nand.

Manipulative Functions

Because APL uses such complex data structures, several data manipulation

functions are necessary. "Rho" is one of the handiest; it will tell you the dimensions of an array or create an array to dimensions you specify and fill it with data from a list. The function represented by the comma will disassemble a multi-dimensional array and turn it into a vector, or it will concatenate (join) two data items to make a single larger item.

Another function reverses the elements of an argument or rotates the elements a given number of positions. Yet another function transposes the columns and rows of a matrix. A complementary pair of functions, will take a specified number of elements from an array or drop a specified number of elements from an array.

There is also an operator that will select specified elements from an argument, and finally, one to expand an argument with blanks or zeros.

Sorting and Coding Functions

The sorting and coding functions are more elegant functions that would require a great deal of programming effort in any other language. The two sorting functions are for ascending and descending sorts; they return indices that can then be used to arrange the data in sorted order.

The coding functions allow you to convert a number from decimal to some arbitrary base and from some other base back to decimal.

Miscellaneous Functions

There are also functions that accept numbers or characters from the keyboard, format data for display, and allow the mixed display of characters and numbers. Another function allows comments in a user-defined function.

Five additional operators can be used to provide instructions to the built-in functions to control how they perform their tasks.

The APL Keyboard

This brief summary of APL functions may cause you to wonder how this large vocabulary of functions can be represented with single symbols. In fact, when APL ran on large time-sharing systems, special terminals were used to handle the unusual symbols. The ST, however, with its graphics power can easily display all the necessary characters.

You can customize your keyboard with a set of stickers provided with the APL.68000 package. To do this, you must use tweezers to apply the stickers to the front of the key caps (I don't think they are durable enough to survive on the top of the keys). This takes a higher degree of dexterity and more patience than I have.

Instead, I turned my 1040 over and removed the screws in the square holes in the bottom. I then turned it upright again and lifted the plastic cover off the top of the computer to expose the keyboard. The working electronics are under an EMI shield and are safe from static damage, if you keep your fingers out. I took the key caps off the key switches, by pulling each one straight up. If you try to pry the key caps off at an angle, it is possible to break the switch. When I had removed all the key caps, I applied the labels and reinstalled them.

If you are not mechanically inclined, it would be better to have your local Atari dealer install the labels for you. The labels are a problem on two counts: they are not the ideal shape for the key caps on the Atari, and the colors are less than aesthetically pleasing. The symbols are in red and green and clash with the classy gray of the ST. I think blue and dark gray would have been a much more attractive color choice.

Using the APL.68000 System

APL.68000 boots from a single-sided, unprotected disk that holds the interpreter program and several workspaces that contain auxiliary functions. The program activates in the calculator mode, so you can immediately enter numbers and functions and see the results. This mode is so powerful and easy to use that instead of reaching for my trusty HP-41CX, I now load APL for all but the very simplest calculations.

To create a user-defined function,

you enter the definition mode and use a simple line editor to write the function. More elaborate programming tasks can be performed by invoking the full screen editor. Because APL character set is unique, you cannot use your favorite text editor to create programs. Fortunately, the editor provided is fairly good.

The APL.68000 operating environment also includes a large variety of system commands that allow you to load, save, or clear the workspace; list all defined functions; delete a specific function; and perform other useful tasks.

Six workspaces of functions specific to the ST, plus a demo are provided on the distribution disk. DIALOG.WKS supplies functions that allow you to use dialog boxes, and MENUS.WKS supports the use of menus. You can use graphics either within the APL window or on the full screen through the functions in STGRAPH.WKS.

The mouse, keyboard, and function keys are controlled by the functions available in the TOOLS.WKS.

These functions allow you to use your computer not only as a glorified calculator, but also to create some really significant scientific, business, and statistical software. File handling is made easy by STFILE.WKS, and ARBIO.WKS provides arbitrary input and output functions.

One great weakness of the APL.68000 system is that the only printer supported is the APL daisy-wheel. Since most programmers use dot matrix printers, it would seem reasonable to supply a workspace containing

functions to drive a standard dot matrix printer. Instead, you must use the functions in ARBIO and TOOLS to write your own—a feat that is certain to baffle a beginning APL programmer.

Documentation

APL.68000 comes with a good documentation package. It contains a Language Manual, an Atari ST APL.68000 Manual, and a handy reference guide.

The Language Manual has a section on getting started, which introduces the basic functions of APL; a more advanced section on the concepts of APL; and a reference section that defines the operation of all the functions and describes the system commands, system functions, and APL file system. The Atari ST APL.68000 manual documents all of the ST-specific features and the functions contained in the auxiliary workspaces.

Conclusion

This is a good product, the only annoying shortcoming being the lack of dot matrix printer support. People who came to APL from mainframe computing environments in the sixties and seventies must have found it a revelation. If you regularly do varied kinds of mathematical work you, too, will find APL.68000 a joy to use. If you are an average computer user who wants to learn to program, stick with True Basic or Pascal.

If, like me, you like to explore different languages, this one has a lot to teach you. ■

Memocom Cross-16 Meta Assembler

System: Atari ST
Version reviewed: 1.21
Copy protection: None
Summary: Versatile cross-assembler that can be used in developing software for a variety of systems
Price: Cross-16, \$299; Memulator II, \$425; both, \$575.
Manufacturer:
 Memocom Development Tools
 1301 Denton Dr., Ste. 204
 Carrollton, TX 75006
 (214) 446-9906

The first microprocessor system I worked with back in the mid-seventies was the Jolt. It had a 6502 and a monitor program in ROM, and was equipped with a magnificent 512 bytes of RAM. The only advantage in developing software on a machine that limited was that you couldn't fit many bugs into 512 bytes of code.

Through the years I have developed code on many small systems; my employers have always been more willing to spend money on my salary than on good development tools.

Now Memocom has introduced the Cross-16 Meta Assembler and the Memulator II, and for a very reasonable price you can use your Atari ST to develop software for any microprocessor

you might care to use.

One of my worries, as I have watched the progress of electronic technology through the years, is that the increasing sophistication and expense of development tools will keep small entrepreneurs from playing a significant role in the electronics industry.

This cross-development system makes it possible for a low budget innovator to write software for any existing or future processor without an expensive specialized development system. The Cross-16 system can be used to develop software for a single-board microprocessor or cartridge software for home computer systems.

The Cross-16 Meta Assembler

A cross-assembler is a program that allows you to write an assembly language source file on one machine and compile it to object code that will run on another machine. The Cross-16 Meta Assembler is a *table-driven* cross-assembler, which uses a table for each possible microprocessor. Each table contains the information necessary to translate the instruction mnemonics in the source file into the object code of the target processor. See Figure 1 for a list of the microprocessors supported.

Additional tables will be available in the future, and the package contains information and a sorting routine that allows you to construct your own tables.

Cross-16 does have some limitations you should know about, the first being that it will handle only microprocessors with an address word length of 24 bits or less. This includes all the micros anyone is likely to use for an engineering project, so it is not a significant limitation.

In addition, each line of source code may include only one instruction, and there is no support for macros. Finally, there is no linker or librarian, which makes it impossible to compile separate listings into blocks of object code and then link them to make a complete program.

Creating a Source File

Supplied with Cross-16 is an editor, STMACS, adapted from MicroEMACS by David Conroy. Jerry Hartcock of Memocom has modified it to function better on the ST, giving it a mouse-controlled cursor, windows, a function-key menu, and a control-key command structure similar to that of *WordStar*.

The C source code for STMACS is included, so you can customize it if you like. If you prefer another editor, you

can use it; Cross-16 ignores the most significant bit of ASCII characters, so it is not adversely affected by listings generated on word processors that set that bit.

The source listing must start with a

The Cross-16 comes with tables to support these microprocessors:	
1802	68000
TMS32010	TMS7000
3870	SUPER 8
SMC4050	Z8
64180	Z80
6502	COP800
65816	8048
6801/3	8051
6805	8085
6809	8086
68HC11	

Figure 1.

line that tells the cross-assembler which processor table to use. Following is a line specifying the output format of the hexadecimal machine language file after assembly. The available formats are: Intel 8-bit hex, Intel 16-bit hex, Motorola 8-bit hex, Motorola 16-bit hex, and straight binary.

Cross-16 allows conditional assembly through the use of IF, ELSE, and ENDI compiler directives, which makes it possible to write a single program that can be compiled for somewhat different target machines. There is also an INCLUDE directive that helps make up for the lack of a linker and librarian. If you regularly use certain blocks of code—I/O routines, for example—you can keep them as separate listings and include them using this directive.

After your source file is complete, you invoke Cross-16 and it makes two passes through the code, generating a listing file and the object code. The next step is to use the MCOM communications program to download the object code to the Memulator II EPROM emulator or to an EPROM burner.

Using the Memulator

There are two versions of the Memulator, the 8-bit Memulator II, which I tested, and the Memulator 16 for use with 16-bit processors. The Memulator II, which plugs into the RS-232 port of the ST at one end and a 28-pin socket at the other (a 24-pin adapter is also supplied), can simulate any EPROM from a 2716 through a 27256.

The target board supplies power to the internal circuitry of the Memulator, which includes a CMOS microprocessor and a 256K byte RAM. Because it

contains CMOS devices, you should always store the Memulator in an anti-static wrapping and observe proper handling precautions when using it.

The firmware built into the Memulator contains a complete set of monitor

For a very reasonable price, you can use your Atari ST to develop software for any microprocessor you might care to use.

and debugger commands. Before any other commands are sent, you should execute the appropriate T (target) command to set the size of EPROM that the Memulator appears to be.

The next step is to use the F (fill) command and block fill the memory with the No Op instruction (or the Halt instruction if it exists) of the microprocessor you are using, so that no random instructions are executed if a bug causes a branch to a location not containing object code.

Now use either the DI command to download an object in Intel Hex format or DS for the Motorola S record format. The Memulator places itself in the stopped mode on power-up and, when loaded with the object code, can be started with the G (go) command. The S (stop) command returns it to the inactive state.

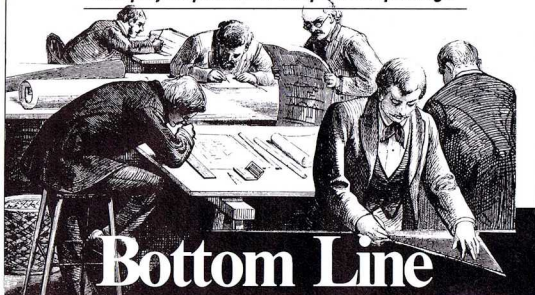
There are also commands to display a block of memory on the screen, to examine and alter the contents of a specific location in memory, and to copy a block of memory to another location.

Conclusion

This is an extremely useful hardware/software combination for anyone who develops software for a variety of microprocessors. I wish it were possible to define macro-instructions in the instruction tables, because they make the programmer's job easier, but it is nice to be able to write code for so many different micros in a uniform development environment.

To use this product successfully, you should have at least intermediate level skills in both software and hardware—advanced level skills are preferable. ■

*Logistik offers spreadsheet, database, graphics,
and project planner in one powerful package*



Bottom Line

By TED SALAMONE

Logistik is a high-end business product that integrates a spreadsheet, a database, and graphics with a project planner timesheet. It is the timesheet that makes Logistik more of a manager's tool than many of its competitors, most of which bundle telecommunications or word processing with the spreadsheet/database/graphics ensemble.

The program consists of two disks, a program master and an examples disk, both of which can be copied. ST owners should consider themselves trusted; the IBM version of Logistik is heavily copy protected, and the Amiga version requires a joystick port security key.

First You Kick the Tires

The usefulness of integrated programs such as this is often compromised by the limitations placed on individual modules. Though this is true of Logistik to some extent, the program circumvents most of the usual problems by taking full advantage of the power of a 1040 ST or an upgraded 520.

The spreadsheet can accommodate 1024 columns by 2048 rows, offers average cursor movement capabilities, and includes more than six dozen built-in functions. Advanced date, day, lookup, and trigonometric functions provide a glimpse of the power waiting to be unleashed.

The timesheet is a helpful resource

SKILL	COST PER DAY				
laborer	50				
lumber	100				
carpenter	150				
painter	100				
THIS IS THE DATABASE					
JOB	SKILL	COST PER DAY	LENGTH	COST PER JOB	DATE
BUILD STAIRS	carpenter	150	1.00	150	10/10
FIT DOORWAYS	carpenter	150	1.00	150	10/10
FIT DOORWAYS	lumber	100	1.00	100	10/10
PAINT CORNERS	painter	100	1.00	100	10/10
PAINT STAIRS	painter	100	1.00	100	10/10
PAINT AND BUILDER	lumber	100	1.00	100	10/10
LABORER	laborer	50	1.00	50	10/10
				TOTAL:	6150

Database.

manager. You position manpower, materials, machinery, and services over time to bring a job to completion within the allowable timeframe and budget. The ability to rearrange and reschedule the components of a job to reflect changes and actual progress gives you considerable flexibility in planning and decision making. Knowing in advance

**Logistik has the power
to become the 1-2-3 of the ST
market.**

Logistik

System: Atari ST

Version reviewed: 1.15

Required equipment: 1Mb RAM

Copy protection: None

Summary: Powerful integrated package lacking a GEM interface

Price: \$149.95

Developer:

Grafox

England

Distributor:

Progressive Peripherals

& Software

464 Kalamath St.

Denver, CO 80204

(303) 825-4144



Spreadsheet.

the probable effects of a poor product run or a missed delivery or the impact of penalty charges allows you to prepare alternatives and react with more certainty should disaster strike.

Grafox endowed Logistik with a cornucopia of graph types (two pie, two bar, line, scatter, Gantt, and others), ten fill patterns, ten fonts, ten line types, numerous color palette choices, ten character sizes, and ten scattergram markers. You can open up to four graphs simultaneously, memory permitting. Color hardcopy output is supported in the form of the Epson JX-80 printer and HP 7550 plotter and workalikes.

The graphic capabilities of Logistik are nothing short of outstanding, especially for an integrated package. (IBM

PC users of Lotus *Freelance Plus* are just now approaching the level available here.) All data areas are identified as to type: labels, titles, and legends are entered directly into the matrix (on the spreadsheet) along with font, type size, line style, and other relevant chart building information. You can, for example, specify a stacked bar chart containing data in rows 1, 5, 6, and 7, where the entire range runs from 1 to 42, or to infinity for that matter.

The database routine allows you to sort on more than one key field or column and to extract, find, and delete files. You can set up data tables, perform inquiries, and retrieve/manipulate information. If the need arises, you can import *dBase*, Lotus 1-2-3, or *Supercalc* files (the versions supported are not specified). You can also import DIF, comma separated values (CSV), and text (ASCII) file formats.

Logistik writes files to disk in its own format and in CSV and DIF formats.



Project planner.

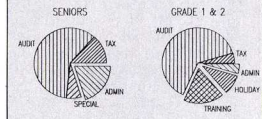
Infinite Instructions

The user's manual is impressive in its size and thoroughness if not in its customization to the ST; a four-page supplement is all that stands between you and the MS-DOS version of the program. In addition to detailing the differences between this and a smaller version of the program (for 512K RAM systems—no graphs available), the supplement explains how to use *Logistik* with floppy drive and hard disk systems. Installation information and an explanation of the function keys are also included.

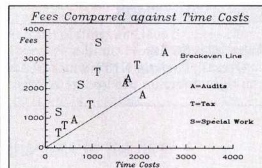
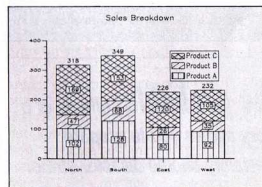
The tome is replete with working examples, references, and crystal clear screen shots. Operations are explained in some depth.

But the specter of MS-DOS intrudes. *Logistik* is a port from the IBM PC, so

Distribution of Staff Time



While worksheets can be joined and graphs produced from database, spreadsheet, or timesheet inputs, there is no "hotlink" facility to update graphs interactively as data changes are made.



Sample graphs created with Logistik.

some features—the names of special keys, for example—are not of the ST world. This MS-DOSitis prolongs the learning curve needlessly.

What is not mentioned anywhere is the fact that *Logistik* does not support GEM. The interface is limited to a TOS version of the IBM character (non-icon, non-graphic) interface. Be forewarned, you will not find a pull-down menu here.

Like most MS-DOS programs, *Lo-*

gistik comes with a keyboard template—a simple affair with six of the ST function keys identified: help, work with files, perform recalculations, view graphs, and page left and page right. The remaining four function keys serve no purpose; what a waste!

The availability of on-line help is poorly documented. F1 calls for help, as noted in the manual and on the keyboard template. The manual, however, does not state that pressing the Help key works just as well. So does pressing the ? key.

Deeper Yet

The MS-DOS contamination goes deeper than the manual. As noted before, *Logistik* does not support GEM. It wants nothing to do with long-tailed rodents; nor does it know what a pull-down menu is. The program does not even support Lotus-like menus; instead, slash commands, made famous by *VisiCalc*, are the order of the day. *Logistik* has the power to become the 1-2-3 of the ST market; unfortunately that power is obscured by an MS-DOS facade.

The ability to create auto commands, as well as the more traditional macros, is overwhelming. Limited(?) to 254 characters, an "auto" is an automated command sequence tied to a particular key. A macro is an auto superscript that is limited only by the amount of available memory. Both autos and macros reside in a worksheet and help tailor applications and operations.

The Critical Path of Project Management

While worksheets can be joined and graphs produced from database, spreadsheet, or timesheet inputs, there is no "hotlink" facility to update graphs interactively as data changes are made.

On a 1040 ST, a whopping 518K bytes are left for data after the program loads. With that kind of ceiling, few users will ever have to worry about linking spreadsheets to overcome memory shortage problems.

Power with a Price

The spreadsheet operates in a straightforward, if antiquated manner (*Visicalc* interface). As noted previously, the graphic capabilities are amazing, particularly so for an integrated package of this scope and size. Unfortunately, it takes a lot of work to harness the power.

Defining a chart is a near-Neanderthal task. First you specify the chart type, then instead of setting data ranges via mouse points and clicks, you must re-enter the chart type command on ev-

The critical path method (CPM) of project management on which the *Logistik* project planner is based was developed by the Remington Rand UNIVAC division of Sperry Rand and E.I. duPont de Nemours in 1957.

CPM was originally developed for use in the planning and scheduling of tasks related to the construction of petrochemical plants. It uses time-oriented bar charts to tie tasks together in sequential and sometimes simultaneous or overlapping order. The shortest time required to complete a job is called the *critical path*, hence the name for this type of project management.

Project planning is an integral part of the control and decision-making processes used every day in business, government, scientific, and academic circles. The process, com-

puterized or not, can be broken down into the following tasks: defining goals, identifying key tasks, applying key resources (manpower, machinery, materials), assigning responsibilities (a person or people to do the job), and creating a plan of attack. The plan can then be adjusted to reflect changes in conditions or available resources, time left to complete the job, and so on.

A computer program such as *Logistik* makes it easy to adjust to rapidly changing conditions, or better yet, to play "what-if" games by simulating varying resource levels and timeframes. Although different possibilities can be explored in a manual CPM system, the effort needed to enter changes in a timely fashion by hand makes the power of a computer highly desirable. ■

Knowing in advance the probable effects of a poor product run or a missed delivery allows you to prepare alternatives and react with more certainty should disaster strike.

ery line of data to be included in the chart. Labels, fonts, type size, and all other graph attributes are set through similar worksheet entries. Even though most of this can be automated with macros, the entire setup is a mindless exercise. A few clicks on icon choices or menus, followed by mouse-designated ranges could handle the entire process in much less time, regardless of macros.

Despite a host of advanced features, it is hard to get excited about a program that does not support GEM—a program that ignores the very features for which many of us bought our STs in the first place.

On the plus side, the program is bulletproof; the error-trapping is exemplary, and the error messages even make sense!

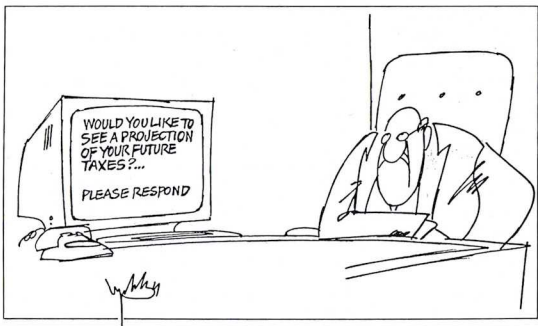
All things considered, the developers have provided a surprisingly complete set of programs.

Tweaking is the Key

Overall, *Logistik* 1.15 is a nice step in the right direction. An update address-

ing the MS-DOS-induced shortcomings of the program could make it one of the hottest selling ST packages on either side of the Atlantic.

Until then, as much as there is to like in this program, there are too few ST incentives to make it a major force in the marketplace. If you need the unique combination of applications the program offers and can live without GEM and other ST conveniences, be sure to take a look at *Logistik*. If, on the other hand, you feel strongly about having access to the features for which you bought your ST, keep searching. ■



Puzzles & Problems

By DAVID H. AHL

In this issue, we have some problems that require a bit of high school geometry, basic programming, and common sense to solve. So rev up your Atari and your grey matter, and get to work. Oh yes, there is a prize for the best solution to "Total 100." Answers are on page 80.

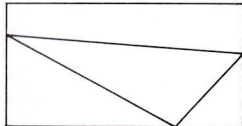
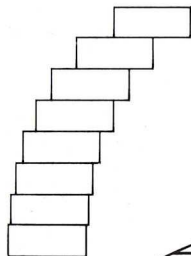
Square Root

Suppose the built-in square root function on your computer (or calculator) did not work. Can you determine a method and write a short program to take the square root, to five decimal places, of any number between 0 and 1?

Leaning Bricks

A perfectly made brick measures $8" \times 4" \times 2"$. If we pile them on each other as shown in the diagram, how many bricks are required so that no part of the top brick is over the bottom brick.

Is it possible to make a pile that is three bricks wide ($24"$)? If so, how many bricks would be required?

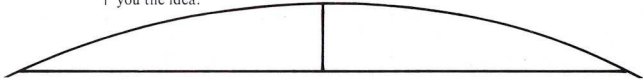


Obtuse Triangles

If we have a rectangle $1" \times 2"$ and draw an inscribed triangle with one vertex on three different sides of the rectangle, what are the chances that it will be obtuse? Incidentally, a precise solution to this problem in analytic terms is not known at present, so unless you want to blaze new mathematical trails, your best approach would be to use the Monte Carlo method of choosing random points, drawing a rectangle, and checking to see if it is obtuse. You can use your computer to do this a great number of times and look for the ratio to approach a limit. Hint: if the square of the length of the longest side is greater than the sum of the other two squares, the triangle is obtuse.

Distance to the Rim

A straight walkway connects two points on the circumference of a large cyclotron. The length of the walkway is exactly one-half mile, while the length of the circumference that the walkway intersects is exactly one foot longer. From the midpoint of the walkway, how far is it to the cyclotron tube at the rim? The sketch is greatly distorted, but gives you the idea.

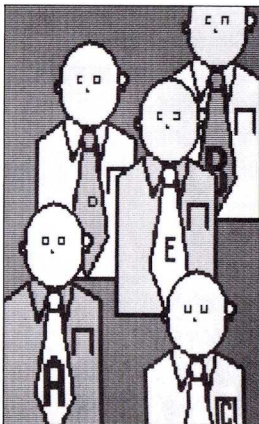


Total 100

Here is a new twist on an old problem. With the digits 1 through 9 arranged in order, using only addition and subtraction, it is possible to have them total 100. For example:

$$1 + 2 + 3 - 4 + 5 + 6 + 78 + 9 = 100$$

How many possible ways are there to do this?



Department Store

You won't need your computer for this one. The positions of buyer, cashier, clerk, floor walker, and manager of the local department store are held by Messrs. Allen, Bennett, Clark, Davis, and Ewing.

The cashier and floor walker eat lunch from 11:30 to 12:30; the others eat from 12:30 to 1:30. Allen and Bennett always bring their lunch and play cribbage during lunch hour.

Davis and Ewing have nothing to do with each other since Davis, returning from lunch earlier than usual, found Ewing already gone and reported him to the manager.

Mrs. Allen and Mrs. Clark are sisters. The cashier and the clerk share bachelor quarters.

What position does each man hold?

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Puzzles & Problems

ANSWERS

Problems are on page 75.

Square Root

Because most square roots are irrational, methods to calculate them require successive approximations. The method we used (see Listing 1) to find the square root of N starts with a trial value of $X = 0.1$. If $X * X$ is equal to N , we have found the square root. If it is

```
10 PRINT "Take square root of"
20 INPUT N
30 X=0 : XINCR=1
40 XINCR=.1*XINCR
50 X=X+XINCR
60 IF X*X=N THEN 100
70 IF X*X<N THEN 50
80 IF XINCR<.00001 THEN 100
90 X=X-XINCR : GOTO 40
100 PRINT "Square root =":X
110 PRINT : GOTO 10
Take square root of .25
Square root = .5
```

```
Take square root of .1
Square root = .316228

Take square root of .4
Square root = .6324562
```

Listing 1.

less than N , we increase the trial value by 0.1. If it is greater than N , we return to the previous value of X , which becomes the first digit of the root.

We then start advancing by 0.01 and continue in this way until we reach the desired precision. Although the computer prints out more than five decimal digits, only the first five digits are accurate; the others should be discarded.

Leaning Bricks

The top brick can be piled on the one under it so that half of its length overhangs. The center of gravity of these two bricks is now $1/4$ of the length of the underneath one, so an additional $1/4$ of the length of a brick can now overhang the third brick. Similarly, the fourth brick can clear by no more than $1/8$ of its length. Thus, we have the series $1/2 + 1/4 + 1/8 + 1/16 + 1/32$.

The program in Listing 2 calculates the denominator of each new term in the series, sums the terms, and continues to add terms until the sum equals or exceeds 1 (one brick). If you run the program, you will find that the number of bricks required so the top one completely overhangs the bottom one is 4.

Intuitively, it does not seem that it would be possible to form a pile three bricks wide. However, we see that the series is actually a diverging one, so that the sum can be made as large as you please by simply adding more terms. By changing the test value in Line 30 to 2, you will create a pile three bricks wide

```
10 D=D+2 : 'Denominator
20 S=S+1/D : 'Sum of overhang
30 IF S<1 THEN 10
40 PRINT D/2 "bricks"
```

Listing 2.

(it takes 31 bricks to do so).

You can create a very wide pile, but you will find that this process is extremely slow because the series itself diverges more and more slowly. You will also find that the denominator becomes so small that it exceeds the number handling limits of your computer. The fraction, therefore, will reach a definite value and stop increasing; we leave it as an interesting challenge for you to determine what the sum is when this happens.

Obtuse Triangles

Since the problem specified that the vertices must lie on different sides of the rectangle, we can have one vertex always on the bottom side, one on the left side, and the other alternating between the top and the right sides. Thus the coordinates of the vertex on the left side are 0, Y1; of that on the bottom, X2, 0; and of that on the other side, either 2, Y3 or X3, 1.

It is easiest to calculate the lengths of the sides by means of the analytical geometry formula $d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$ and keep the lengths in the squared form, since those are what we will use in our test for an obtuse triangle.

You could sort the three sides and then make only one comparison, but we found that comparing all three squares (Line 120) was simpler and faster.

The probability of the triangle being obtuse is 0.688.

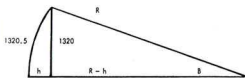


Figure 1.

Distance to the Rim

It is easier to solve this problem if we picture it in a different way (see Figure 1). From this figure, we have the following relations: $\sin B = 1320/R$ and $1320.5 = 2 * \pi * R * B/360$ in which B is expressed in degrees. From this, we can simplify as follows:

$$(\sin B)/B = 1320 * \pi / (1320.5 * 180) = 0.01744668393.$$

If we call this constant K , we must then solve for B in the equation $(\sin B)/B = K$. From this, we find that B is an angle of approx. $2^\circ 44'$.

We can then easily solve for the radius R and, using the law of right triangles, solve for $R-H$ and for H itself. Doing so, we find that H is about 31 feet, although this answer is not exact—indeed, it is suspect—because it is not possible to maintain the required number of digits of accuracy in all the calculations.

Incidentally, using Basic, Atari 8-bit computers will produce a more accurate answer than ST machines. We leave it to you to write the program.

Total 100

Here are some other examples:

$$1 + 23 + 4 + 56 + 7 + 8 + 9 = 100$$

$$12 + 3 + 4 + 5 + 6 + 7 + 89 = 100$$

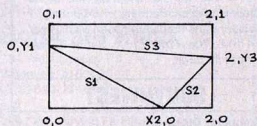
$$123 + 45 + 67 + 89 = 100$$

A one-year subscription (or extension) goes to the person who sends in the best program to generate all such sequences. Mail your program to *Atari Explorer*, 7 Hilltop Rd., Mendham, NJ 07945.

Department Store

Allen, Bennett, Clark, Davis, and Ewing are respectively the manager, clerk, floor walker, cashier, and buyer.

```
10 'Select three vertices
20 FOR I=1 TO 100
30 Y1=RND(1) : X2=2*RND(1)
40 IF X3=2 THEN 60
50 X3=2 : Y3=RND(1) : GOTO 70
60 X3=2*RND(1) : Y3=1
70 'Calculate side squares
80 S1=X2^2+Y1^2
90 S2=(X3-X2)^2+Y3^2
100 S3=X3^2+(Y3-Y1)^2
110 'Test for obtuse triangle
120 IF S1>S2+S3 OR S2>S1+S3 OR S3>S1+S2 THEN 140
130 ACUTE=ACUTE+1
140 NEXT I
150 'Print results
160 PROB=(100-ACUTE)/100
170 PRINT PROB : ACUTE=0 : GOTO 20
```



Listing 3.

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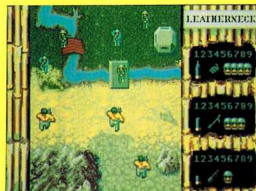
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