

**Atari ST
Resource**
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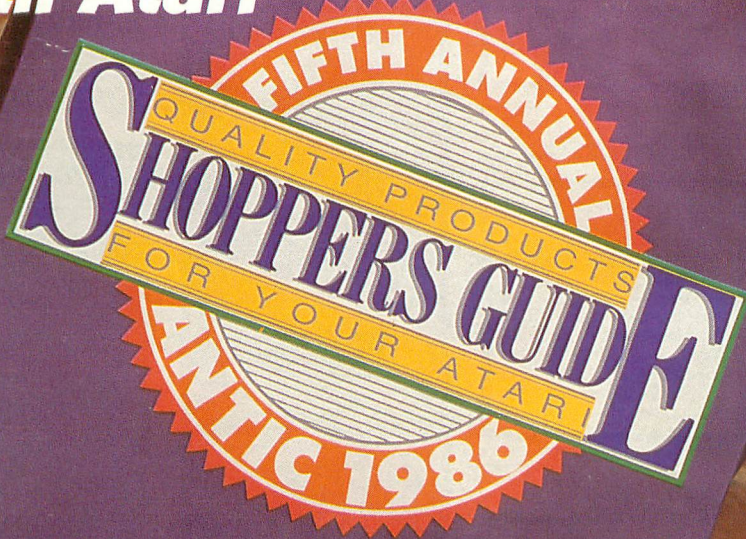
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| 1385 | 295 |

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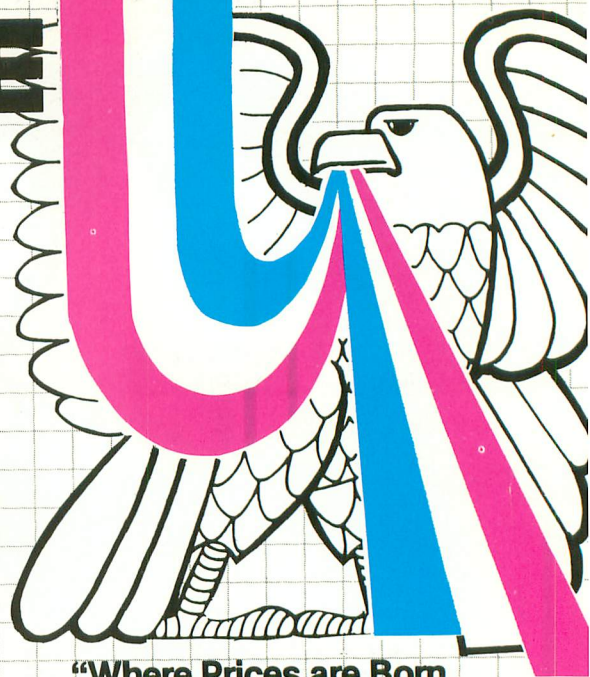
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| Basic XE | 48 |
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| Atariwriter + | 32 |
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| NB-15 | CALL |
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| 1380 | 229 |
| 1385 | 289 |

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Antic®

The **ATARI®** Resource

DECEMBER 1986, VOLUME 5, NUMBER 8

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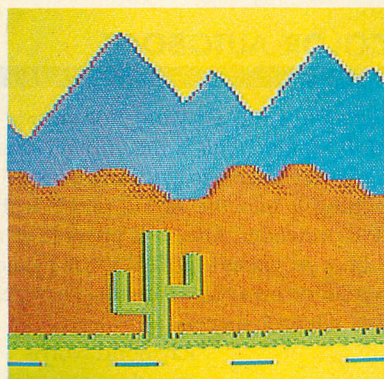
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Solve the mystery color patterns **TYPE-IN SOFTWARE**

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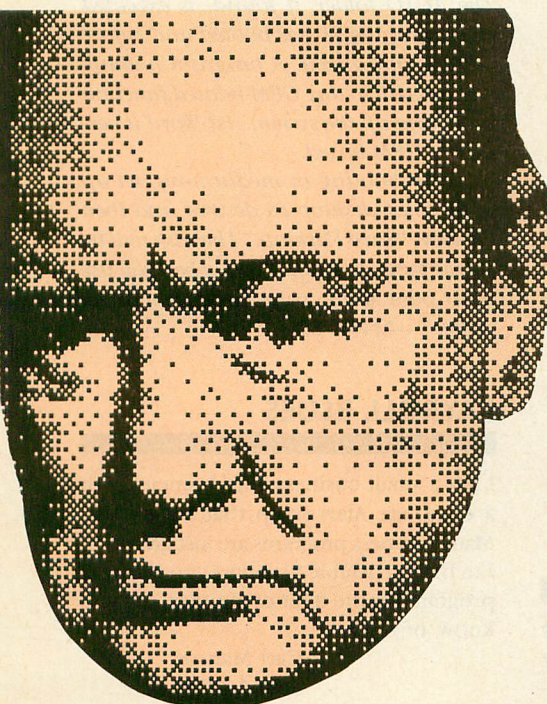
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I/O Board

CASE OF THE MISSING RAM

Why do I get only about 20K of available memory with my Atari Microsoft BASIC II cartridge whether I have 32K or 48K of RAM installed in my 800?

David Ferguson
Pontotoc, MS

The reason for this is that the 16K cartridge "overrides" any RAM that would otherwise use the same address space. If the RAM is not there to begin with, it isn't missed. Standard Atari BASIC gives only 8K of address space, so a 48K machine will give you only 8K more available memory than a 32K machine. If you own an XL or XE and press the [OPTION] key while booting up, you are telling the computer to use its RAM instead of the "built-in" BASIC.—ANTIC ED.

WRONG POKES

In September's Tech Tips, the POKES necessary for controlling the cassette motor were given in reverse order. POKE 54018,52 to turn it on and POKE 54018,60 to turn it off.

Richard Brewer
Princeton Junction,
New Jersey

WEFAX LED

When building the WEFAX Interface Board (**Antic**, September 1986) I recommend using a very low power consumption LED. Otherwise you may not "see the light." It is always good practice to use the lowest power consumption components available in any project.

Michael Angier
Seabrook, Texas

THANKS, CHARLIE

Many thanks to **Antic** Technical Editor Charlie Jackson for donating his survey compiler program, without which I probably would still be laboring over the figures from our club survey.

Paul Wheeler
MACE Membership Chairman
Detroit, MI

ODD CHARACTERS

When I list my program on paper, Atari's special characters come out wrong. Can you suggest a software package that can print any Atari character in my program list?

Brian LaChance
Wolcott, CT

Try Lister Plus (\$19.95, Antic Catalog, AP0170). This program by Chet Walters, author of Antic's Card Shuffler (July, 1986) and SSSnake! (October, 1986) dumps any listed file to the printer using any character set you choose.—ANTIC ED

COLOR AUTOBOOT

How can I run 1st Word from inside an AUTO folder? This is the only program I have been unable to autorun on my ST by putting it into the AUTO folder with a .PRG extender. Also, is it possible to autoboot programs (e.g. dBMAN) in medium resolution on a color monitor? I have tried this without success.

Raymond Norris
Waterloo, Ontario,
Canada

The AUTO folder, if found, is executed right after the ST has booted and before GEM is initialized. A program making a single call to any GEM-related function will hang up the system. 1st Word is certainly GEM-based.

As for booting in medium-res, set up your color desktop as desired and then click on "Save Desktop." The disk will be active for a short time, and when you use it to boot with, your desktop will reappear.—ANTIC ED

PAYROLL BLUES

I am a small business entrepreneur with a complete Atari setup that I use daily. Many business programs are just great, but I'm having trouble finding a good payroll program for the 8-bit computers. Do you know of one?

Carl Manson
Seaside, CA

See the Miles Payroll System from Miles Computing in this issue's Shoppers Guide. A review of this product is scheduled to appear in a forthcoming issue.—ANTIC ED

Rats



A GUIDE TO YOUR RAT SYSTEM

Finally, a mouse for your Atari 400, 800, XL or XE! It's like getting a new computer!

Sure your Atari has super resolution. But no mouse. The March issue of *Analog* said that a mouse would make the 8-bit Atari "the toughest competitor on the 8-bit market" . . . that it would be great if these computers had a mouse. Now they do! Because we just developed the RAT. It's not merely a mouse, but an entire graphics system capable of generating high resolution drawings, graphs, charts and decorations.

And right now you save \$55 to \$85 over mice made for other 8-bit computers.

Already such software as *Super 3-D Plotter*®, *Master Disk DirectoryII*®, *Writer80*®, *Ram-brandt*® and *AtariArtist*® have RAT-compatible versions.

Other software companies are scrambling to make their products RAT-compatible. They love the RAT. They should, the thousands of Atari 400, 800, XL and XE owners represent a huge new customer base for their mouse-only programs. Look for the RAT-compatible seal on the package.

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It's a package of software that will let us do a variety of exciting graphics. Draw. Make diagrams. Use for creative sketching.

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PA residents add 6% sales tax.

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enhanced!

Look for this logo for official RAT-enhanced software!

ANY 1020 PENS?

After I bought my Atari 1020 color plotter, I used it often. Now I can't use it at all because the pens have run out of ink. Where can I find another set of pens?

Russ Novotny
Orland Park, IL

At this writing, Atari Corp. is out of 1020 plotter pens, but plans to restock. Meanwhile, they suggest trying local dealers. If that doesn't work, maybe by the time you read this, the pens will be again be available from Atari Customer Service, 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.—ANTIC ED

PRL LICENSES

This was Prospero Software's answer to my query about a distribution license for compiled Pro Fortran-77 programs using the company's PRL program:

"The position with run-time licenses is that it free—you may distribute the PRL with your software when you sell it."

This is the icing on the cake. There isn't a better deal around. Prospero has done the ST world a great service.

Jay Thaddeus
Houston, TX

FAIR SHAKE

Steve Roquemore's review of Micromod 2.4 (*Antic*, July 1986) was fair and greatly beneficial. I thank the Editorial Department for adding the updated information at the end of the review. This has saved much confusion on the part of those we've talked to.

Steve Bolduc
MicroMiser Software,
Orlando, FL

Antic welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.

Send letters to: Antic I/O Board, 524 Second Street, San Francisco, CA 94107.

800 SPACEBAR

The spacebar on my Atari 800 has gone bad, and apparently only another keyboard will remedy it. The repair people can't find one, however, which means that all the hardware and software I've bought is useless.

I'm a teacher who uses a word processor during the school year, but I've been without the computer for several months because of this "parts" problem. Please tell me where I can find a keyboard or another 800, either new or to use for parts.

Laurie Pate
Monticello, GA

We can see that you have a strong attachment to your immobilized Atari 800, but consider that the current 65XE model can be bought for under \$100—probably not much more than your keyboard repair would cost. Virtually all your existing software should run on the 65XE with no problems, and any isolated compatibility problems can be solved with the public domain program FIX XL (\$10.95, Antic Catalog, PD0026.) If any readers have other ideas, please let us know.—ANTIC ED

MINER SETBACK

Atari game fans, Help! When playing Zone 10 of *Miner 2049er* by Big Five Software, I can't complete Quadrant 5. There are two areas in the lower corners that my miner can't reach. Is there a mathematical flaw in the screen layout making it impossible for the miner to jump or fall to these areas? I've killed more miners than any cave-in trying to find out. I would ask Big Five Software, but they don't seem to have a phone number anymore.

Curt Saylor
Bismarck, ND

MPP HANGUPS

Neither the MPP (Supra) 1000-C and 1000-E modems hang up the phone if they answered it. The modem only hangs up if it originated the call. MPP owners can get modification instructions from Supra Corp, 1133, Commercial Way, Albany, OR 97321.

Keith Ledbetter
CompuServe ID
76703,4061

UPWARD COMPATIBILITY

As my wife enters law school, I'd like to add an second inexpensive Atari to the household as a word processor. Will my older 800 software run on an 800XL as is? Will newer 8-bit software run on my older 8-bit? I sure don't want to build another software library from scratch.

Gerry Leone
Minneapolis, MN

Most Atari 8-bit software is "upwardly" compatible. That is, a program which runs on a 800 with 16K will also run on a 800XL with 64K or a 130XE with 128K. Incompatibility problems are rare today and can almost always be taken care of by the Atari Translator disk or FIX-XL, a public domain program (Antic Catalog, \$10, PD0026.)—ANTIC ED

XM301 PRO*TERM

Is Mathew Arrington's modem program PRO*TERM (*Antic*, August 1985) compatible with the new Atari XM301 modem?

Gary D. Reed
Santa Ana, CA 92704

Yes, and it works without modification. Just plug it in.—ANTIC ED

Help!

SSSNAKE!!!

Ssssnake!!! (October, 1986) tends to crash after about 10 minutes under certain conditions of play. If you're one of the people

who has gotten the message "Error 13 at 571," you can fix the listing by substituting the following two lines.

```
MX 570 F51=F51-N*(F51>N):IF F51<>N THEN 5
75
MY 571 POKE UUD,PUR:FOR I=N TO 200:POKE U
F,I:POKE UF,I+TN:POKE BLF,I:NEXT I:GOT
0 2000
```


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| Atari 850 Interface..... | \$124.90 |
| Data Casset XM11..... | \$ 39.77 |

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| Templates..... | \$ 14.77 |
| Synchron..... | \$ 32.77 |
| Syntrend..... | \$ 32.77 |

ATARI ST SYSTEMS

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| 520 ST Computer | |
| SF 354 Disk Drive | |
| SC 1224 Monitor | |
| Basic Logo First Word..... | \$747.77 |
| w/SF 314 Disk Drive add \$112.00 | |

SONY

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| Winner's 3 1/2" DSDD..... | \$ 21.50 |
| SSDD 3 1/2"..... | \$ 17.90 |
| DSDD 3 1/2"..... | \$ 23.50 |
| DSDD 3 1/2" w/ free case..... | \$ 9.90 |

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| KXP 1091..... | \$249.00 |
| KXP 3131 Daisy Wheel..... | \$279.00 |
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| Parallel Printer Cable..... | \$ 18.70 |

ST HARDWARE

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| Atari 20 MB Hard Drive..... | CALL |
| SF 354 Drive..... | \$139.90 |
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SOFTWARE CLOSEOUTS

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| Ski Writer..... | \$ 5.77 | | |

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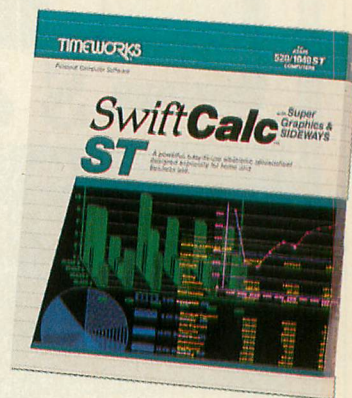
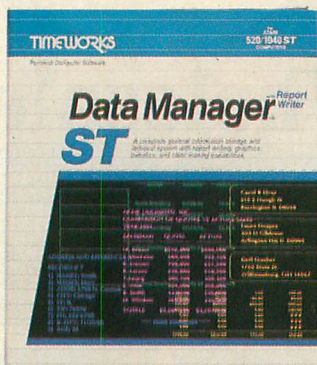
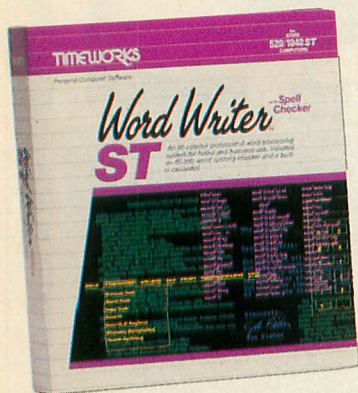
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FIFTH ANNUAL QUALITY PRODUCTS SHOPPERS GUIDE FOR YOUR ATARI ANTIC 1986

THE FIFTH ANNUAL ANTIC SHOPPERS GUIDE is this magazine's selection of 100 best products—software, hardware and peripherals—available for *8-bit* Atari computers during the 1986 Holiday Season.

Because this has truly been a year of renaissance for the entire Atari community, we Atarians currently have many outstanding products on the market to choose from. In order to provide sufficient coverage of all these 1986 products, this year's Antic Shoppers Guide will report only on products for the *8-bit* Atari Computers. A full-scale ST Shoppers Guide is currently featured in the Winter issue of Antic's sister publication, **STart: The ST Quarterly**.

In certain major categories such as printers, modems and video monitors, so many makes and models are Atari-compatible that we cannot possibly test every product on the market. For these categories, Antic picks the best products with which we have had first-hand experience.

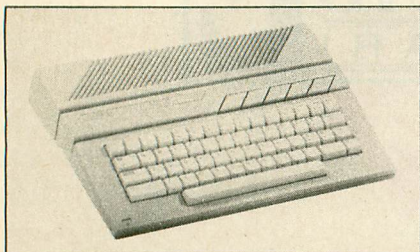


BY GREGG PEARLMAN, ANTIC JUNIOR EDITOR

8-BIT COMPUTERS

ATARI 130XE

The Atari 130XE is a 128K-memory computer that's capable of running "serious" productivity software without any



compromise—word processors with built-in spelling checkers, large spreadsheets and databases, etc. Yet it also has Atari's traditionally excellent graphics and ease of programming. The 130XE runs all the software written for any previous 8-bit Atari model, and the keyboard action is

nothing short of outstanding. Overall, the 130XE is the best value in 128K personal computers today.

\$149.95

CIRCLE 150 ON READER SERVICE CARD

ATARI 65XE

The 65XE is essentially the Atari 800XL repackaged in sturdy gray plastic to match the rest of the new Atari computer line. It is a worthy successor to 800 and 800XL, continuing in the tradition of the best 64K personal computers ever brought to market. Available for considerably less than the low list price at mass merchandisers, the 65XE is a fine choice for first-time computer buyers with its solid base of good software and self-teaching books.

\$99.95

CIRCLE 150 ON READER SERVICE CARD

Atari Corporation 1196 Borregas Ave. Sunnyvale, CA 94086 (408) 745-2000

16-BIT COMPUTERS

ATARI 1040ST

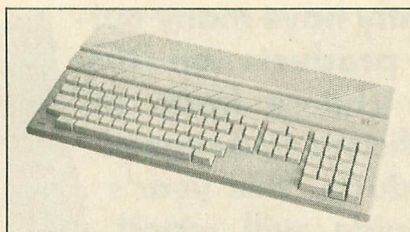
The 1040ST has a full megabyte of memory along with all the sterling features of the 520ST. It is also a bit more self-contained than its little brother, with a built-in double-sided disk drive that stores 720K and a built-in power supply to help cut down on the number of outside cables. The 1040ST is sold primarily at specialty computer stores, unlike the more mass-merchandised 520ST.

\$999.95 with monochrome monitor
\$1,199.95 with color monitor

CIRCLE 150 ON READER SERVICE CARD

ATARI 520ST

In only 18 months, the Atari 520ST has established itself as a major winner, with an impressive and fast-growing software base. This state-of-the-art personal computer boasts a fast, powerful Motorola 68000 microchip with 512K memory. (Independent upgrades to 1Mb are widely available for about \$150.) The ST comes fully equipped with a 360K, 3 1/2-inch disk drive, a two-button mouse and the easy-handling GEM operating software with its icons and drop-down menu win-



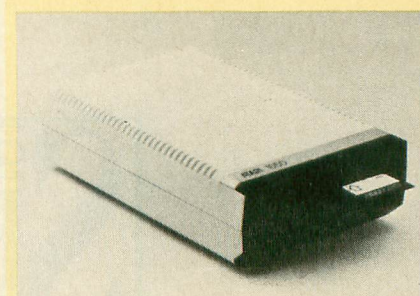
dows. You also get a choice between a 512-color RGB monitor and a 640 x 400 high-resolution monochrome monitor.

The ST's built-in connector ports include parallel and serial interfaces, MIDI for professional music-making and three types of video output. The keyboard includes a 10-key pad, one-touch cursor section and 10 programmable function keys.

\$799.95 with monochrome monitor
\$999.95 with color monitor

CIRCLE 150 ON READER SERVICE CARD

See the December-January issue of **Start: The ST Quarterly** for an in-depth ST Shoppers Guide with a full listing of software and peripherals.



ATARI 1050

The straightforward, reliable 1050 disk drive is the proven workhorse of Atari data storage. Just pop in your floppy disk and click down the latch. The busy light starts flashing and your software goes to work. The 1050 holds 86K of disk data in standard density. Using the enhanced density option of Atari DOS 2.5, the 1050's disk storage capacity goes up to 122K. Planned for debut at the November, 1986 COMDEX trade show is a new 3 1/2-inch disk drive for 8-bit Atari computers, with a new DOS and dramatically greater storage capacity.

\$199.95. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE 150 ON READER SERVICE CARD

ASTRA ONE

Astra's The One (\$299) is a double-sided, double-density drive with direct-drive motors. The **Astra 1001** (\$250) disk drive is single-sided, double density, and the **2001** (\$395) is a single-sided twin disk drive. The **Big D** (\$495) is the double-sided version of the 2001. All prices are approximate.

Astra Systems, 2500 South Fairview, Unit L, Santa Ana, CA 92704. (704) 549-2141.

CIRCLE 151 ON READER SERVICE CARD

SUPRADRIVE HARD DISK

With 10 million bytes of data available virtually instantly at the touch of a key, the SupraDrive will dramatically change the way you use your computer. The first hard disk made for Atari 8-bit computers has proven itself a dependable performer and operates many Atari bulletin boards today. The SupraDrive stores the equivalent of more than 100 floppy disks. Our **Antic Supradrive** contains every 8-bit program ever published in the magazine—and we have seven megabytes left.

\$799. Supra Corp., 1133 Commercial Way, Albany, OR 97321. (503) 967-9075

CIRCLE 163 ON READER SERVICE CARD

PRINTERS

ATARI XMM801

The **XMM801** dot-matrix printer prints bi-directionally, has graphics capabilities and is easy to operate. Our Atari Planetarium printouts on the XMM801 were every bit as good as those on the Star Micronics SG-10. The printer is easy to set up and has a well-indexed 73-page manual. (See review elsewhere in this issue.)

\$219.95 Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE 150 ON READER SERVICE CARD

STAR NL-10

The NL-10 is Star Micronics' latest in the ultra-popular line of full-featured printers that included the discontinued Gemini 10X and Star SG-10, as well as the current NX-10 (\$349) which is compatible with the Epson FX-80. An outstanding new near-letter-quality font and an expanded set of control buttons on the top panel are among the additions to the fast, sturdy, easy-operating NL-10 that provides every standard feature at a most affordable price. The NL-10 requires Star's \$60 interface cartridges, which are also available for the IBM PC and Apple.

\$319 plus \$60 parallel interface. Star Micronics, Inc., 200 Park Avenue, New York, NY 10166. (212) 986-6770.

CIRCLE 155 ON READER SERVICE CARD

MONITORS

COMMODORE 1802

It's unexpected for **Antic** to publicize a monitor by Atari's arch-rival. But the Commodore 1702, predecessor of the new 1802, was the most widely-used color monitor reported in our recent ANTIC ONLINE survey. Commodore monitors are an outstanding price value and boast excellent color with separate chrominance and luminance input. Someday Jack Tramiel will probably get around to bringing out a fine Atari color monitor for 8-bit computers the way he did at Commodore. Until then, check out the 1802.

\$249. Commodore Computer, 1200 Wilson Drive, West Chester, PA 19380. (215) 436-4200.

CIRCLE 157 ON READER SERVICE CARD



AMDEK 300A

This amber monochrome monitor is ideal for word processing and database or spreadsheet entry because it's so easy on the eyes. Amdeks were the most popular monochrome monitors with Atari owners responding to our ANTIC ONLINE survey.

\$199. Amdek, 2201 Lively Blvd., Elk Grove Village, IL 60007. (312) 364-1180.

CIRCLE 158 ON READER SERVICE CARD

COLOR PRINTER



OKIMATE 10

Color printing is what you get from the small, quiet and inexpensive Okimate 10 thermal printer. The Oki prints 8"x5 1/4" color images on single-sheet or tractor-feed paper. Its color printouts can be bright and crisp, if you use coated ink-jet paper plus the RAMbrandt graphics software described in the Shoppers Guide software section.

\$238 including Atari interface. Okidata Corp., 532 Fellowship Road, Mt. Laurel, NJ 08054. (609) 235-2600, (800) OKIDATA.

CIRCLE 156 ON READER SERVICE CARD

ENHANCEMENTS

ATARI XEP80

The long-awaited plug-in 80-column card is here at last. It boasts a razor-sharp text display, plugs into either joystick port and carries its own built-in Centronics parallel printer interface. It works with both monochrome and color monitors to produce bit-mapped graphics, international and graphics characters, inverse video or blinking text, underlining, double-high or double-wide text. Just keep in mind that it may be a little while before your favor-

ite software is made compatible with this smart little 80-column box.

\$79.95. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE 150 ON READER SERVICE CARD

ICD MULTI I/O BOARD

This important new I/O peripheral adds five functional devices to your 800XL (or 130XE with \$19.95 adaptor) via the parallel bus. A 256K or 1Mb RAMdisk can partition its memory into multiple disks and

be used as a print spooler. A parallel printer interface can be used with standard cables. An RS-232 port will work with serial modems or printers and includes a built-in 850 handler. A hard disk interface supports multiple drives in a variety of formats. An optional monochrome 80-column board (\$99.95) is due for the holidays.

\$199—256K, \$349—1Mb. ICD Inc., 1220 Rock Street, Rockford, IL 61101. (815) 968-2228.

CIRCLE 159 ON READER SERVICE CARD

America's
Bestselling
Naval Simulation!

Captain's Log ... War Date 10.01.44



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



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



"0400 Hours. Lookouts on the bridge. Target identification party reports one cargo ship, 4,000 tons, troopship of 10,250 tons, with two *Kaitakan*-type escorts. Moving into attack position."

Tandy 1000/IBM PC Jr. screens shown



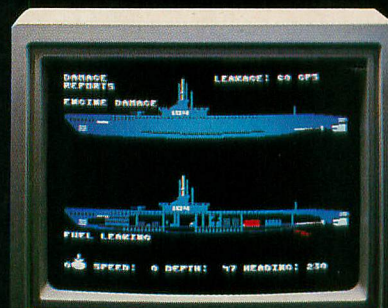
"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."



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



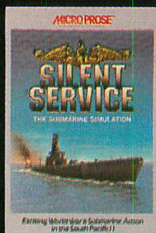
"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly... Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



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



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



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

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

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

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

MICRO PROSE
SIMULATION • SOFTWARE

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



RAMBO XL

Make your 800XL or 1200XL twice as powerful as a 130XE with the RAMBO XL, a 256K hardware modification for XL computers. It makes your computer compatible with the 130XEs RAMdisk in "CPU mode" for extended memory, meaning that the Atari DOS 2.5 RAMdisk and BASIC XE can run on your XL after installation of RAMBO XL.

\$49.95, \$30 installation, \$28 for 256 RAM chip set. ICD Inc., 1220 Rock Street, Rockford, IL 61101. (815) 968-2228.

CIRCLE 159 ON READER SERVICE CARD

RAMCHARGER

Enhance your 8-bit computer's memory with RAMcharger RAMboards (256K, 512K or 1Mb memory). Installation is simple. Just plug in the board—and get 288K available with Synapse Software's SynCalc and SynFile+, up to 8,000 sectors of RAM-disk, and included MYDOS software.

\$149.95—256K; \$199.95—512K; \$299.95—1Mb. Magna Systems, 147-05 Sandford Avenue, Suite 4E, New York, NY 11355. (718) 939-0084.

CIRCLE 160 ON READER SERVICE CARD

THE RAT

If you're clicking on icons and getting things done on your Atari without touching the keyboard, chances are you're using an ST. Now you can have that same convenience on your 8-bit computer with The Rat from Zobian Controls. Software such as Super 3-D Plotter, RAMbrandt and AtariArtist are Rat-compatible, and more is on the way.

\$69.95. Zobian Controls, P.O. Box 6406, Wyomissing, PA 19610. (215) 374-5478.

CIRCLE 161 ON READER SERVICE CARD

MICROFLYTE JOYSTICK

Instead of renting a real airplane for an hour, why not pick up the MicroFlyte ATC Joystick and take control of Sublogic's Flight Simulator II with a minimum of keystrokes? This self-centering analog joystick uses two potentiometers to recognize the direction and magnitude of a turn—it helps you fine-tune your flying. However, it works only with Flight Simulator II or the programs you write yourself.

\$59.95. MicroCube Corp., P.O. Box 488, Leesburg, VA 22075. (703) 777-7157.

CIRCLE 164 ON READER SERVICE CARD

EPYX 500XJ JOYSTICK

It's curved to fit your hand. The fire button is angled for your trigger finger. Shaft switches allow you to hear each move of the stick. And you might have to run it over in the car to break it. The 500XJ joystick has been a real joy to the Antic staff and saved us a lot of cramped hands. Our game scores seem to be better too.

\$16.95-\$19.95. Epyx Inc., 600 Galveston Drive, Redwood City, CA 94063. (415) 366-0606.

CIRCLE 165 ON READER SERVICE CARD

U. S. DOUBLER

The U.S. Doubler adds 128 bytes of RAM and a new ROM chip to your Atari 1050 disk drive, allowing true double density with 256-byte sectors. The drive can still be used in its normal single or enhanced density modes. When packaged together with SpartaDOS the price rises to \$69.95. Version 1-4 allows your drive to be configured as drive 1 to drive 4. Version 5-8 allows you to configure the drive as 5 to 8, which is useful if you have a RAMdisk.

\$39.95. ICD Inc., 1220 Rock Street, Rockford, IL 61101. (815) 968-2228.

CIRCLE 159 ON READER SERVICE CARD

INTERFACE

P:R: CONNECTION

The Atari 850-compatible P:R: Connection is a better mousetrap. Connections, software and applications remain the same. But the P:R: Connection gets its power from the host computer, eliminating need for an external power supply. The P:R: connects your Atari to a printer, a modem and one other device, such as a serial EPROM programmer. The outstanding documentation contains the complete R: driver source listing.

\$69.95, 48K disk. ICD Inc., 1220 Rock Street, Suite 310, Rockford, IL 61101-1437. (815) 968-2228.

CIRCLE 159 ON READER SERVICE CARD

SPEECH/SOUND

VOICE MASTER

The Covox Voice Master is to sound what Computereyes is to pictures: it is a sound digitizer. This hardware-software system grabs sounds, converts them into digital code (in any of three speeds) and stores them for manipulation in various interesting ways. The Voice Master lets you compose digital music by humming or singing into the Covox headset/microphone. It also features surprisingly good speech recognition. Included BASIC demonstration programs are a talking alarm clock, a voice-recognizing calculator and a blackjack game that listens and talks back.

\$89.95, 48K disk. Covox Inc., 675-D Conger Street, Eugene, OR 97402. (503) 342-1271.

CIRCLE 167 ON READER SERVICE CARD



SOUNDMOUSE

It works like a mouse, but it isn't. It's a sound-activated controller that plugs into the joystick port and listens for sounds, particularly low-pitched tones. It continuously translates the sound volume into a value for the paddle register. The SoundMouse responds to the sounds—perhaps your program can be activated with a shout or hand clap. You could use the SoundMouse as a joystick trigger with some games, steering with the stick and shooting by yelling "Fire!"

\$29.95, 48K disk. Soundsoft Inc., P.O. Box 740, 10 Maple Avenue, Andover, NJ 07821. (201) 786-6060.

CIRCLE 168 ON READER SERVICE CARD

MODEMS

ATARI SX212

Brand-new from Atari is this speedy 1200 baud, Hayes-compatible modem that plugs directly into Atari computers or daisy-

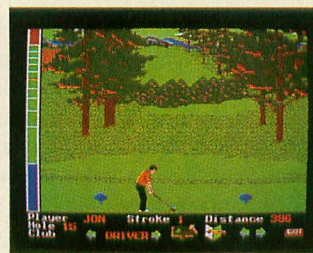
Now, nothing can keep you from your appointed rounds.



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

MEAN 18 delivers the kind of realism and playability you've come to expect from Accolade. This is golf the way it was meant to be enjoyed...

without spending your day decoding the instruction manual. You can hit a bucket of balls at the driving range, play from the pro or regulation tees, even ask your caddy to suggest your clubs.



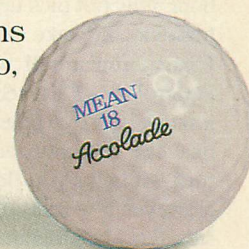
Once you've mastered MEAN 18, there's the challenge of playing on three of the world's legendary golf courses, all capable of bringing any touring pro to

his knees. With The Course Architect, you can even design your own grueling course complete with menacing bunkers and greens on the edge of an ocean.

Available for IBM, Atari ST and Amiga systems.

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

Mean 18.



Atari ST heats up with "Strip Poker..." and more.



Examine Artworx' expanding list of ST software:

STRIP POKER is the classic computer program. Play against Suzi and Melissa; the more you win, the more they take off! **Only \$39.95**

THAI BOXING brings oriental kick boxing to the ST with stunning 3-D graphics and fast action. **Only \$19.95**

HOLE IN ONE GOLF plays like the real thing and includes an easy-to-use Editor for designing your own golf course. **Only \$29.95**

BRIDGE 4.0 has full graphic display of all hands, allows the user to be dealt good cards all the time and is completely mouse-driven. **Only \$29.95**

COMPUBRIDGE is Artworx' bridge tutorial, utilizing 10 chapters covering all aspects of the game. **Only \$29.95**

PEGGAMMON is a new and innovative approach to backgammon. Play against the computer or with a friend in the two-player mode. **Only \$17.95**

MAILLIST handles medium to large sized lists. It zip code sorts, alphabetizes, selects by keyword, prints labels, and more. **Only \$17.95**

BAKER STREET DETECTIVE brings you back to 1893 London with mysteries to solve just like Sherlock Holmes. **Only \$17.95**

Artworx®

Artworx Software Co., Inc., 1844 Penfield Road, Penfield, N.Y. 14526 (716) 385-6120 • (800) 828-6573

CIRCLE 003 ON READER SERVICE CARD

Now you can **RAMCHARGE** Your Atari® 800

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- Enhanced memory capabilities
- Simple one-minute plug-in installation
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- 288K available with Synfile+™/Synalc™
- Up to 1 million bytes on a single board
- Up to 8000 sectors available as a Ramdisk
- MYDOS™ Ramdisk software included
- XL/XE/ST upgrades available also — call

RAMCHARGER 256K — \$149.95

RAMCHARGER 512K — \$199.95

RAMCHARGER 1MEG — \$299.95

Ramchargers use custom printed circuit boards. We do not rewire your "old" Atari 16K boards as others do.

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Flushing, N.Y. 11355**

Phone: 718-939-0908

Bulletin Board 24 hrs. — 212-828-7658

CARINA - THE BETTER BBS

Presenting the most powerful bulletin board ever written for the Atari 8-bit computer. The Carina BBS is absolutely the most expandable bulletin board for your Atari. It has features that you will find on most bulletin boards plus many other features that make telecommunications easier, more fun, and a lot less monotonous.

WHY IS THIS BBS SO MUCH BETTER?

The power of this system is mostly attributed to the Modem Operating Environment. It makes possible the ability to run BASIC programs WITH LITTLE OR NO MODIFICATION on your bulletin board. It also allows you as the Systems Operator (SysOp) of the Carina BBS to drop into BASIC ON-LINE at any time and make modifications to your program from across the country if need be. No other Atari bulletin board has this feature.

YOU MEAN I CAN CHANGE THE PROGRAMS?

Yes, the Modem Operating Environment eliminates the need to perform modem operations. The bulletin board is written in understandable BASIC and is, in fact, designed with modification in mind. The Carina BBS is also module based. This means you are no longer restricted by the memory of your computer, but rather by the amount of on-line storage on your disk drives and your ramdisk. The Carina BBS itself is not 1 but 7 separate programs. It is a massive system that can be expanded beyond your imagination.

WHAT PROGRAMS COME WITH IT?

The modules included are: The waitcall module which performs user logon/logoff functions, the bulletin board itself which controls all message bases and databases, the file-transfer module with X-Modem upload/download transfer protocol, the message editor (with extensive word processor-like functions), the SysOp commands with the most powerful functions available for any bulletin board on-line, the sub-commands module which contains miscellaneous extra functions, and an on-line trivia game. The Carina BBS has a total of 44 commands including 17 SysOp functions. It is easy to add any other modules of your own, plus there is plenty of room to add any other functions in different modules.

WHAT ELSE CAN IT DO?

- Runs at 300, 1200, or 2400 baud in ASCII and/or ATASCII modes
- Works with Hayes (or compatible) modems, all Supra (MPP) modems including Supra 1200 with interface, Avatex 1200, Q-MODEM, and now the XM301 and 1030 (with ring detector)
- Works with the 850 interface, ATR8000, or P/R:Connection
- Supports the R-Time 8 cartridge
- Also works on hard drives or slave drives of any size, in any density
- Works with most DOS's and most BASIC languages (Atari, XL, or XE)
- Run BASIC programs with little or no modification, program in BASIC, or even go to a ram-resident DOS (Like SpartaDOS) on-line!
- Electronic mail system
- Uses macros or full-word commands
- Allows editing of messages already posted
- Virtually an unlimited number of message bases, and databases
- Can work with subdirectories
- Read new mail function
- On-Line games (you can convert your own games to work easily too)
- A day calculating clock plus a 5 line status window at the top of the screen holding 16 items of user information
- Message editor with many editing commands and word-wrap
- Self-Compacting message bases eliminating the need for constant maintenance.
- Automatic validation and access control configuration.

For an indepth on-line demonstration, call 305-793-2975

Price Reduction:

Now, get the Carina BBS at the reduced price of only \$55.00 (this includes shipping and tax where applicable).

Supra (MPP) 300 baud modem owners include an extra \$10.00 for the Bitwise System's MPP-Hayes emulator. And now, XM301/1030 (with ring detector) owners, also add \$10.00 for the Bitwise System's XM301-Hayes emulator. Please specify Modem type when ordering.

**Carina Software Systems
12390 57th Road North
Royal Palm Beach, FL 33411**

CIRCLE 086 ON READER SERVICE CARD



chains with your peripherals. Comes complete with built-in speaker, signal lights and software.

\$99.95. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

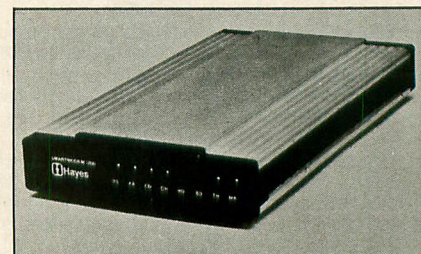
CIRCLE 150 ON READER SERVICE CARD



directly into the Atari's joystick port 2. Not to be confused with the Hayes-compatible 1200-baud Volksmodem 12 that requires an 850-compatible interface.

\$79.95. Anchor Automation, 6913 Valjean Avenue, Van Nuys, CA 91406. (818) 997-7758.

CIRCLE 170 ON READER SERVICE CARD

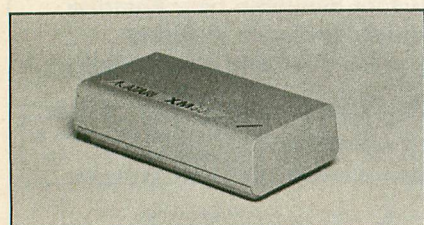


HAYES SMARTMODEM 1200

The Smartmodem 1200 is the industry standard that all other modems are judged by. The Hayes offers solid construction, automatically adjusted baud rate, internal speaker, auto-answering and outstanding documentation. Most commercial modem software is written to be compatible with the standard set of Hayes commands. It requires an 850 or P:R: interface and can also be used with an ST.

\$599. Hayes Microcomputer Products, 5835 Peachtree Corners East, Norcross, GA 30092. (404) 449-8791.

CIRCLE 171 ON READER SERVICE CARD



ATARI XM301

This worthy successor to the Atari 1030 builds several advanced features directly into an inexpensive 300 baud modem that plugs directly into your Atari computer. It has auto-dial and auto-answer and doesn't need a separate power supply. Included in the package are a fine 49-page manual and the powerful XE-Term software.

\$49.95, 32K disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE 150 ON READER SERVICE CARD

Hayes commands that gives you virtually all the important functions. The Avatex usually can be found between \$79 and \$129 at dealers. It requires an 850 or P:R: interface and can also be used with an ST.

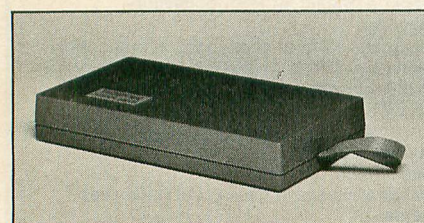
\$199. E+E Datacom, 1230 Oakmead Parkway #310, Sunnyvale, CA 94086. (408) 732-1181.

CIRCLE 169 ON READER SERVICE CARD



VOLKSMODEM 10

This inexpensive 300 baud modem plugs



SUPRA 300-AT

Formerly the MPP 1000-E, the 300 baud Supra 300-AT comes with Smart Term software that allows uploading, downloading, auto-dialing, auto-answer and XMODEM protocol. It plugs directly into your Atari computer.

\$49.95. Supra Corp., 1133 Commercial Way, Albany, OR 97321. (503) 967-9075.

CIRCLE 163 ON READER SERVICE CARD

AVATEX 1200-BAUD MODEM

The new Avatex modem gives you inexpensive Hayes compatibility and reliable operation. It operates with a subset of the

ONLINE SERVICES

COMPUSERVE

CompuServe is the leading online information service, and with good reason. You can get stock quotes, news, and weather reports; make airline reservations, buy merchandise, play games; enter special interest groups (SIGs) on dozens of topics. CompuServe is where you'll find the ANTIC ONLINE edition and three bustling Atari SIGs (8-bit, 16-bit and Atari Developers) with hundreds of 8-bit and ST

Hourly rates and membership fees for commercial online services are subject to change. Contact individual companies for latest information. You'll need a modem to hook up.

programs to download. And upload time is free. Hourly rates are \$6 evenings-weekends and \$12.50 prime time for 300 baud, \$12.50/\$15 for 1200 baud, \$15/\$19 for 2400 baud. \$39.95 entry fee.

500 Arlington Center, Box 20212, Columbus, OH 43220. (800) 848-8199; in Ohio, (614) 457-8600.

CIRCLE 174 ON READER SERVICE CARD

GAMES COMPUTERS PLAY

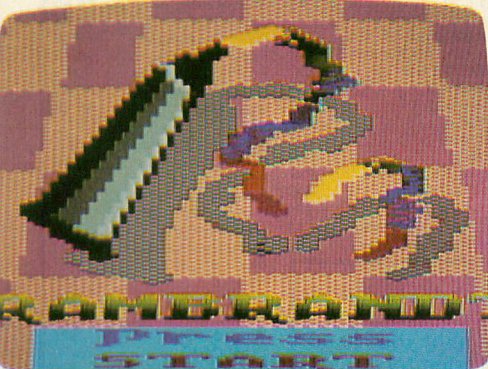
Let your Atari play games with a 300Mb minicomputer that offers spectacular interactive games in color, real-time conferencing, electronic mail and public domain downloading. Evening and weekend rate is \$6 per hour, and prime time rate is \$15 per hour. A \$29.95 sign-up fee includes disks, documentation and \$18 free

SOFTWARE GRAPHICS



RAMBRANDT

RAMbrandt paint software produces color images with KoalaPad or Atari Touch Tablet in five graphics modes and multiple text fonts. You can load pictures from Movie-maker, Micro Illustrator, Micro-Painter and Computereyes. The window mode lets you vertically or horizontally rotate, flip (for T-shirts), animate your picture, or scale



and-white image in less than six seconds. The image can then be modified with standard graphics software. The Computereyes package includes an interface module, software and an owner's manual. For \$399.95, you also get a black-and-white video camera.

\$129.95, 48K disk. Digital Vision, Inc., 14 Oak Street, Suite 2, Needham, MA 02192. (617) 444-0940.

CIRCLE 178 ON READER SERVICE CARD

SUPER 3-D PLOTTER

With this 3-D design and animation program, all you need to do is draw straight-line images from point to point. The program remembers the points of your line drawing, adjusts, redraws and page-flips the completed new image, resulting in a smooth, impressive animation display.

\$39.95, 48K Disk. Elfin Magic Company, 23 Brook Place, East Islip, NY 11730. (516) 581-7657.

CIRCLE 179 ON READER SERVICE CARD

ENVISION

Envision is "the RAMbrandt of character graphics," giving you multi-screen, eight-way scrolling pictures and letting you build animations of up to 128 frames at 10 speeds. Envision's 50-plus commands give you total control over the Atari's text modes. And the program supports GTIA modes 9 and 11. It can create standalone pictures from pictures created by any popular paint program, or produce BASIC and Assembler source code.

\$19.95, 48K disk. The Catalog, AP0185.

VIRTUOSO

Create full-color graphics with the keyboard, joystick or touch tablet, move them in any direction at different speeds, instantly make them larger or smaller—while they're moving—and turn them 360 degrees with Virtuoso Software. If that's not enough, put music in motion. The graphics you create and the movements

you choose, simultaneously produce and control music. Text can be inserted too.

\$49.95. Virtusonics Corp., 125 Duke Ellington Blvd., New York, NY 10025. (800) 528-6060.

CIRCLE 180 ON READER SERVICE CARD

ARTIST UNLEASHED

Using a joystick, KoalaPad or the Rat to control the onscreen painting dot, you can create high-resolution Graphics 8 pictures for saving to disk, inserting in BASIC programs or printing on an Epson-compatible. Enhance or alter the pictures by stretching, inverting, displaying in inverse video, changing colors and rotating in 90-degree increments. The picture editor breaks down a picture into grids for detail work. Used with MTS's *Layout* (\$39.95), you can compose newsletters, posters and advertising materials.

\$49.95, 48K disk. MTS Software, P.O. Box 623, Williamsville, NY 14221. (716) 634-0578.

CIRCLE 181 ON READER SERVICE CARD

GAMES



STAR RAIDERS II

More of a sequel than an update to the original Star Raiders, this game has you jumping between two star systems in your ship, the Liberty Star, and wiping out hordes of Zylons in an attempt to save the Celos IV system. Just fire away at the bad guys, but don't run out of fuel.

\$19.95, 48K disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

CIRCLE 182 ON READER SERVICE CARD

KARATEKA

Rescue your loved one from the evil

connect time.

112 E. Market Street, York, PA 17401. (717) 848-2660.

CIRCLE 175 ON READER SERVICE CARD

GENIE

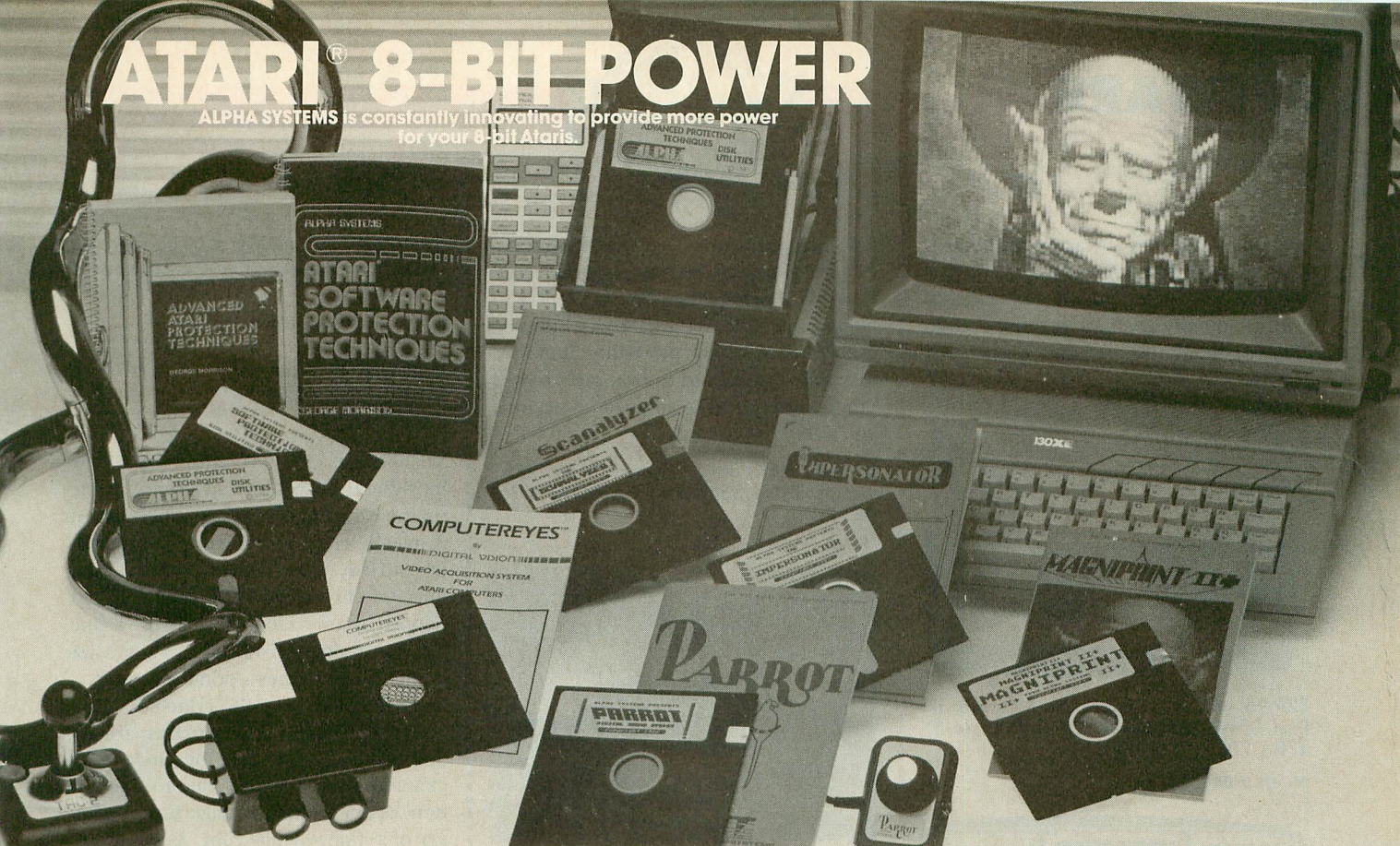
GENie, the General Electric Information Service, is the newest and least expensive online service, costing \$5 an hour on evenings-weekends, even for 1200-baud modems (\$10 for 2400-baud). Weekday rates are more business-oriented, \$25 per hour for 300/1200 baud and \$45 for 2400 baud. Upload time is free. The SIG-like Atari RoundTable software library has 11 categories and is growing fast.

401 N. Washington Street, Rockville, MD 20850. (800) 638-9636.

CIRCLE 176 ON READER SERVICE CARD

ATARI® 8-BIT POWER

ALPHA SYSTEMS is constantly innovating to provide more power
for your 8-bit Ataris.



You don't need an ST to run high-powered software. Your Atari 400, 800, 800XL, 1200XL or 130XE can compute circles around others with these quality packages. — Don't let our low prices fool you — Super Quality doesn't have to be over priced.

DIGITIZE YOUR WORLD Now you can connect your Atari to a wide range of external interfaces that you can build. This how-to book (over 150 pages) includes all the instructions needed to build a light pen, household appliance controllers, alarm systems, light and motion detectors, voice recognition, and much, much more. The book **Your Atari Comes Alive** includes detailed schematics and instructions for each device. The disk includes the BASIC and Assembler programs to run them. Create your own exciting devices and save money!

Your Atari Comes Alive — Introductory Price **\$24.95**

DIGITIZING POWER

PARROT The hardware & software you need to digitize real world sounds and play them on your computer. Make your Atari speak in your own voice record and play sounds from a complete orchestra. Play the digitized instruments and sounds from your keyboard, or put them in your own BASIC programs. PARROT is now being used for special effects by professional musicians. Turn your Atari into a digital sound sampler and keyboard. Everything you need to record and play digital sounds **\$39.95**

Additional pre-recorded sound tracks **\$4.95**/with purchase of PARROT.

COMPUTEREYES™

Feed the pictures from your video camera or VCR into your computer and save the images as a graphics screen. Put your picture in your own programs, or digitize your favorite movie star. Our **COMPUTEREYES** and **MAGNIPRINT II+** combination special lets you print your pictures in 16 shades of grey with incredible detail. Combine the features of **MAGNIPRINT II+** and **COMPUTEREYES** for digitizing power that can't be beat. Koala Pad, Touch Tablet compatible.

COMPUTEREYES and MAGNIPRINT II+ **\$119.95**
COMPUTEREYES only **\$99.95**
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GRAPHICS 9 CAPTURE SOFTWARE **\$12.00**

MAGNIPRINT II+

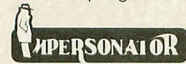
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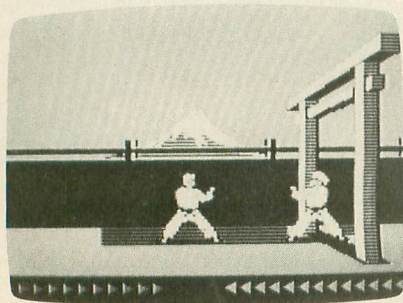
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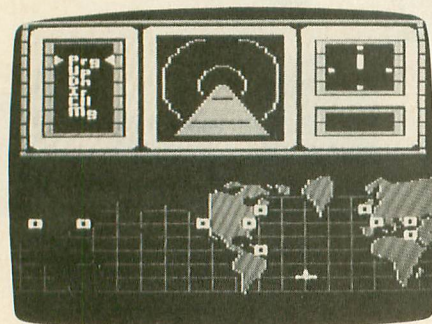
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warlord's castle by thwarting his guards with your karate know-how, using the joystick to kick and punch. Karateka has cartoon-quality graphics, realistic even to the swishing robes as you make your moves.



\$29.95, 48K disk. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. (415) 479-1170.

CIRCLE 183 ON READER SERVICE CARD



HACKER

Not unlike the film "War Games," you've broken into the computer of a large multinational corporation, where you discover dirty deeds. Make deals with foreign spies and pick up clues, all very hush-hush and all from the comfort of your chair.

\$34.95, 48K disk. Activision, P.O. Box 7286, Mountain View, CA 94039. (415) 960-0410.

CIRCLE 184 ON READER SERVICE CARD



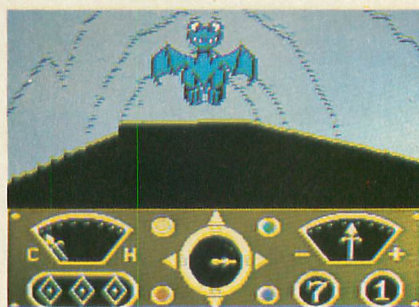
ULTIMA IV

The latest entry in Lord British's popular

graphic fantasy role-playing adventure series lets you carry on complete conversations with other characters as you try to attain perfection in the values of honesty, compassion, valor, spirituality, humility, sacrifice, justice and honor, after which you go to the final challenge: to become an Avatar.

\$59.95, 48K disk. Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. (415) 571-7171.

CIRCLE 185 ON READER SERVICE CARD



THE EIDOLON

One of the latest Lucasfilm computer games, The Eidolon sends you through a maze of caverns generated by fractal mathematics. Your goal in Epyx's point-of-view fantasy role-playing game is to find and vanquish a dragon on each of 10 levels.

\$29.95-\$39.95, 48K disk. Epyx Inc., 600 Galveston Drive, Redwood City, CA 94063. (415) 366-0606.

CIRCLE 184 ON READER SERVICE CARD



KORONIS RIFT

It's 2049, and you're exploring the Koronis Rift for super weapons left by the Ancients. If you can get by the saucer people and figure out how to use the weapons, you're in great shape. If not, you're Saucer People Chow. In this Lucasfilm game, you'll get plenty of help from your science and retriever droids as you travel the fractal landscape of the planet in your surface rover.

\$29.95-\$39.95, 48K disk. Epyx Inc., 600 Galveston Drive, Redwood City, CA 94063. (415) 366-0606.

CIRCLE 184 ON READER SERVICE CARD

WISHBRINGER, SPELLBREAKER, BALLYHOO

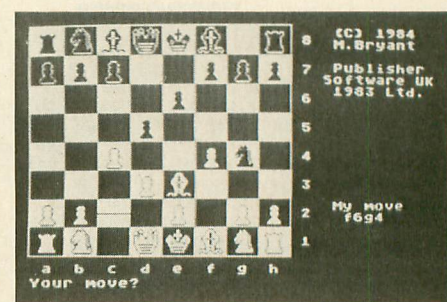
Wishbringer (\$34.95), Infocom's second introductory-level text adventure, opens on the New England coast, where you're dispatched to deliver a letter to an eccentric old lady. Upon delivery, you are thrust into Witchville to rescue her cat, kidnapped by a sorceress called The Evil One. Your only aid is Wishbringer, a stone that grants seven wishes—don't misuse it.

Spellbreaker (\$49.95) concludes Infocom's Enchanter and Sorcerer trilogy. You're now a member of the Circle of Enchanters and your only clue to the ominous disappearance of magic is the discovery of a strange white cube. As you go on, further cubes provide invaluable hints.

In Ballyhoo (\$39.95) you're loitering under the big top after a performance of the Traveling Circus That Time forgot. You overhear a plot to kidnap the ringmaster's daughter. You've got to find her, but you must be stealthy and willing to slip into any disguise.

Infocom, 125 CambridgePark Drive, Cambridge, MA 02140. (617) 492-6000.

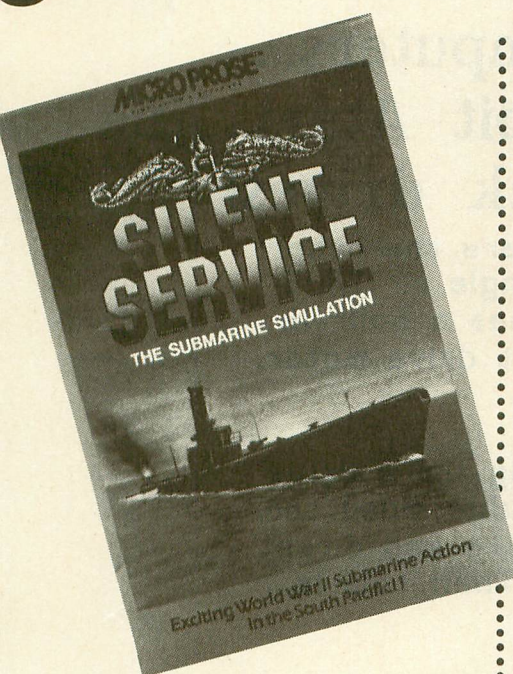
CIRCLE 186 ON READER SERVICE CARD



COLOSSUS CHESS

Colossus Chess is for any chess-lover, whether you're a beginner or a master. The space bar toggles between two screens—one showing the board and the other showing Colossus' "brain" considering thousands of moves. Onscreen elapsed-playing-time clocks add realism, and a game can be saved to disk to be picked up later.

\$15.95, 48K disk. The Catalog, AP0161.

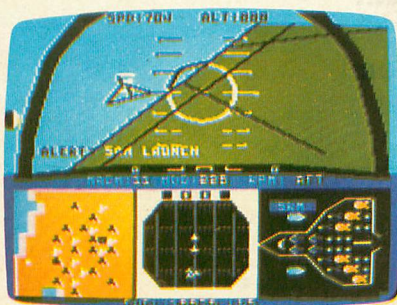


SILENT SERVICE

This impressive simulation of World War II submarine operations in the Pacific takes you right to the bridge of a sub as your periscope searches the ocean for enemy vessels.

\$34.95, 48K disk. MicroProse Software, 120 Lakefront Road, Hunt Valley, MD 21030. (301) 667-1151.

CIRCLE 188 ON READER SERVICE CARD

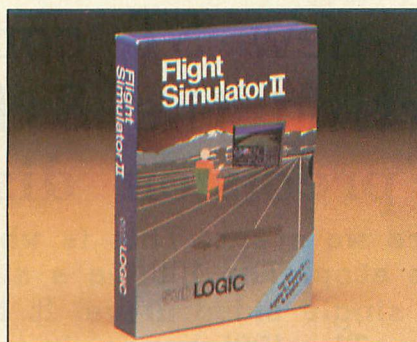


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Launch into aerial combat with this realistic, joystick-controlled computerization of seven sky battle-zones over the Middle East and Vietnam. You'll get state-of-the-art weapons systems, computerized radar, eight supersonic guided missiles, 18 bombs and a 20mm cannon.

\$34.95, 48K disk. MicroProse Software, 120 Lakefront Road, Hunt Valley, MD 21030. (301) 667-1151.

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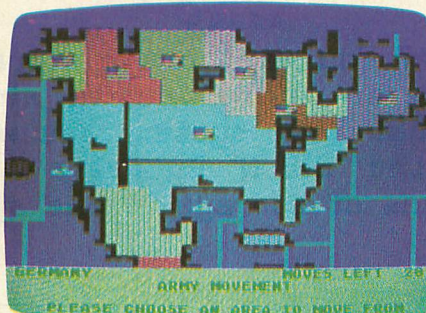


FLIGHT SIMULATOR II

Zoom your Piper Cherokee Archer around Chicago, New York, Seattle, Los Angeles or any of 80 realistic airports in this advanced flight simulation program. This sophisticated pilot training software provides believable flying practice after you learn the precise and detailed operating instructions. New this year are additional **Scenery Disks** including San Francisco and Tokyo-Osaka (\$19.95 each) and a six-disk Western U.S. set for \$99.95.

\$49.95, 48K disk. Sublogic Corporation, 713 Edgebrook Drive, Champaign, IL 61820. (217) 359-8482.

CIRCLE 187 ON READER SERVICE CARD



NAM, COLONIAL CONQUEST, BATTALION COMMANDER

Along the same lines as Conflict in Vietnam, SSI's Nam pits one player against a computer as tough as the Viet Cong and North Vietnam army units it simulates in six basic scenarios.

Battalion Commander, another solitaire game, lets players explore the strategy and tactics of the fictional battlefields of the 1990s and essentially design their own battle. Select a battlefield from 40 different terrain maps.

Colonial Conquest immerses as many as six players in the turbulence of the birth of the modern world. Besides being en-

tertaining, the historic scenarios provide some interesting insights into the dynamics of imperialism as it grew from the strengths and weaknesses of the major nations.

\$39.95 each, 48K disk. Strategic Simulations Inc., 1046 N. Rengstorff Avenue, Mountain View, CA 94043. (415) 964-1353.

CIRCLE 189 ON READER SERVICE CARD



RACING DESTRUCTION SET

Build your own racetracks and race nine different kinds of vehicles—even choose the gravity conditions. You'll have an endless variety of races in this digital slot-car set. Racing Destruction Set also has 50 built-in tracks, and you can save 58 tracks per disk.

\$14.95, 48K Disk. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. (415) 571-7171.

CIRCLE 185 ON READER SERVICE CARD

CROSSWORD MAGIC

Designing your own crosswords can be just as challenging as solving them, and with crossword puzzles being so popular, Crossword Magic could be an income-producing tool as well as a fun challenge. Crossword Magic takes the drudgery out of trial-and-error testing of up and down word patterns—it's a word processor dedicated to the connection of words sharing one or more letters. You start with a 3-by-3 grid, which adjusts and increases in size to fit your words.

\$39.95, 48K disk. Mindscape Inc., 3444 Dundee Road, Northbrook, IL 60062. (800) 221-9884.

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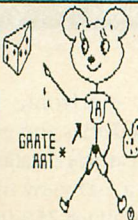
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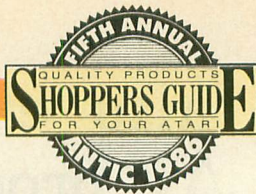
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\$39.95, 48K disk. MicroLeague Sports Association, 2201 Drummond Plaza, Newark, DE 19711. (302) 368-9990, (800) PLAYBAL.

CIRCLE 193 ON READER SERVICE CARD

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This arcade-style baseball game features enticing graphics and 3-D perspective from three views. The joystick is used to choose lineups, select pitches and move fielders.

\$29.95, \$48K disk. Accolade, 20833 Stevens Creek Blvd., Cupertino, CA 95014. (408) 446-5757.

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HOMEPAK

This package incorporates HomeTerm, a simple but powerful telecommunications program that accesses online services and bulletin boards; HomeFind, which stores information and instantly retrieves it; and HomeText, an easy word processor. All three programs can pass information to each other.

\$49.95, 48K disk. Batteries Included, 30 Mural Street, Richmond Hill, Ontario, L4B 1B5, Canada. (416) 881-9941.

CIRCLE 198 ON READER SERVICE CARD

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\$19.95, 48K disk. The Catalog, AP0154.

PLATO LEARNING PHONE

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\$24.95, 16K cartridge. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

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Younger children will love the company of Ted Bear on Baudville's Rainy Day Games. Ted always plays fair and he shows little ones how to have fun playing such favorites as Concentration, Old Maid and Go Fish.

\$29.95, 48K disk. Baudville, 1001 Medical Park Drive, S.E., Grand Rapids, MI 45906. (616) 957-3036.

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\$9.95, 48K disk. Ezuse Software, 2850 Enea Way, Antioch, CA 94509. (415) 754-6026.

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This user-friendly, menu-driven program helps a teacher track students, classes and grades. Among its options are Examine Averages, Examine Class Averages, Correct or Revise Records, and Print Reports.

\$24.95, 48K disk, requires BASIC. C. Robert Blum, 1722 Golden Court, Crofton, MD 21114. (301) 261-3177.

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Earth Views is an electronic world globe—a computerized atlas and exciting adventure game that features detailed high resolution maps and a 3-D view of earth rotating on any axis. Call up 250,000 different views at the touch of a button.

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\$39.95, 48K disk. Orion Micro Systems, 2919 Ennismore Court, Richmond, VA 23224. Specify 850 or 835/1030/XM301 version.

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LANGUAGES & TOOLS

BASIC XE

BASIC XE from O.S.S. runs programs at least twice as fast as Atari BASIC. BASIC XE has powerful new statements, automated editing features and extra utilities. This language harnesses the full 128K memory of the 130XE computer.

\$79, cartridge plus 48K disk. Optimized Systems Software, 1221B Kentwood Avenue, San Jose, CA, 95129. (408) 446-3099.

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PaperClip word processor. Particularly outstanding for speedy graphics and game programs.

\$79, 16K cartridge. Optimized Systems Software, 1221B Kentwood Avenue, San Jose, CA 95129. (408) 446-3099.

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MAC/65 ASSEMBLER EDITOR

MAC/65 is the assembler for programmers who are serious about assembly language. MAC/65 is compatible with the Atari Assembler Editor, as long as you don't use MAC/65's powerful extra commands. It contains a speedy compiler and an excellent debugger.

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DEEP BLUE C

This C compiler code runs on other computers with only minor complications, making it one of the most transportable languages around. Faster than BASIC, Deep Blue C features pointers, recursive functions and high-level control functions. **Mathlib** (\$19.95, AP0132) is a library of math functions designed to enable your Deep Blue C Compiler to do floating-point calculations.

\$19.95. The Catalog, AP0114.

KYAN PASCAL

Kyan Pascal has all of the features of standard Pascal, the teaching and programming language widely used in colleges. Many of the Kyan Pascal programs you write on your Atari can run on the mainframe computers at your school or office. It comes with a built-in editor, native code compiler, macro assembler and a 300-page tutorial manual.

\$69.95, 48K disk. Kyan Software, 1850 Union Street, Suite 183, San Francisco, CA 94123. (415) 626-2080.

CIRCLE 201 ON READER SERVICE CARD

ADVAN BASIC

Never has a BASIC given the programmer such effortless command of the special sound and graphics capabilities of the Atari. Advan BASIC is a speedy compiled BASIC with powerful new commands and built-in Player/Missile graphics.

\$39.95, 48K disk. Advan Language Designs, P.O. Box 159, Baldwin, KS 66006. (913) 594-3420.

CIRCLE 202 ON READER SERVICE CARD

| LOC | VAL | INSTRUCTION | ST | VAR | U | VAL |
|---------|------|-------------|------|--------|----------|-------|
| F306 | 6F | | 24 | RANISZ | | C0 |
| F307 | A9 | | 24 | MEMLO | | AC6C |
| F308 | 80 | | 30 | MENTOP | | BC1F |
| F309 | A6 | LDX BRKKEY | 80 | SDLST | | BF08 |
| F30A | 11 | | 30 | SAVMSC | | BC40 |
| F30B | F0 | BEQ +F372 | 70 | TXTHSC | | BF60 |
| F30C | F0 | | E5 | CHACT | | 00 |
| F30D | A0 | LDA CH | D2 | CHBAS | | 00 |
| F30E | FC | | EE | COLOR1 | | 00 |
| F30F | 02 | | FE | COLOR2 | | 00 |
| F310 | C9 | CMP #5FF | F2 | COLOR3 | | 46 |
| F311 | FF | | SE | COLOR4 | | 00 |
| F312 | F0 | BEQ +F372 | | POKMSK | | C0 |
| F313 | E9 | | | CH | | FF |
| F314 | 85 | STA \$7C | | SHFLOK | | 40 |
| BKP1 | BKP2 | BKP3 | BKP4 | BKP5 | BKP6 | TRP1 |
| 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 |
| PC | A | X | Y | S | NV | BDIZC |
| 309 | 80 | 80 | 01 | F3 | 10110000 | |
| COMMAND | | | | | | |

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An outstanding assembly language debugger made better with a built-in mini-assembler, over 150 system symbols for more understandable disassembly, and the ability to deposit to graphic control areas without affecting the screen.

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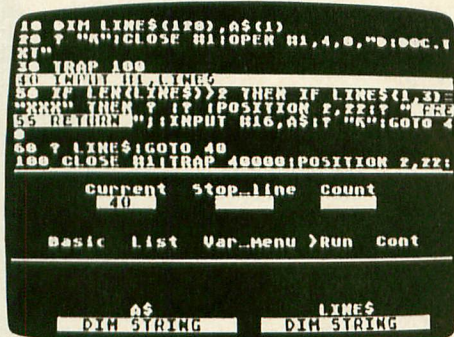
The new Floating Point Package works with the MAC/65 assembler from Optimized Systems Software. Ambitious assembly language programmers can now use the precision of floating point mathematics to create more powerful and accurate software.

\$19.95, The Catalog, AP0186.

PRINTING

GRAPHIC SHOP

Graphic Shop lets you use images from most standard Atari graphics software with



BASIC VIEW

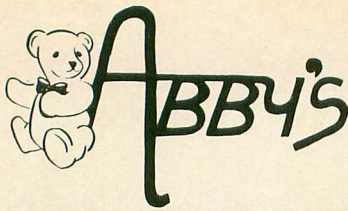
Lighten your debugging load with Basic View, a machine language programming utility that traces BASIC programs as they run. As each line of your code is executed, the BASIC tracer highlights it in a screen window, enabling you to find bugs right away.

\$20, 48K disk. Softview Concepts, P.O. Box 1325, Lisle, IL 60532. (312) 968-0605.

CIRCLE 204 ON READER SERVICE CARD

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Fast and powerful, ACTION! blends elements of Pascal and C, but is much easier to program on the Atari. The ACTION! screen editor makes programming a joy and was the basis of Batteries Included's



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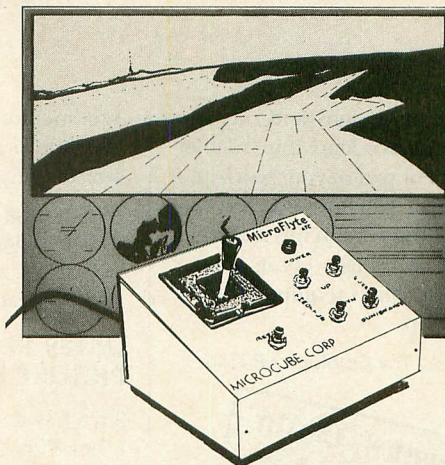
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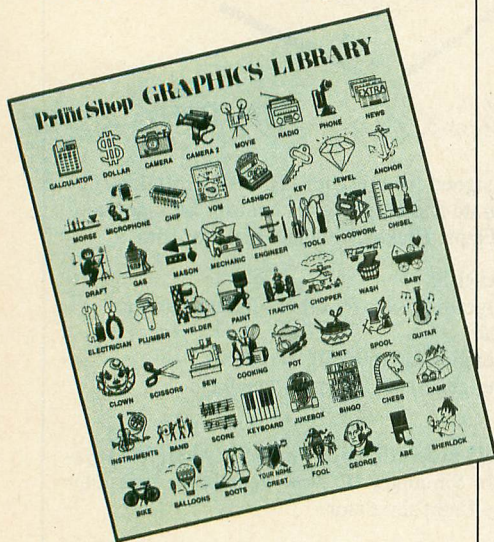
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48K disk. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. (415) 479-1170.

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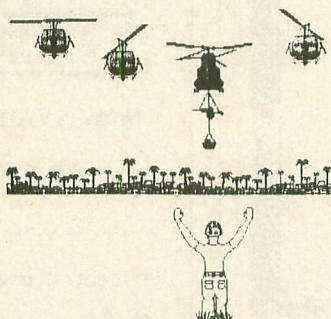
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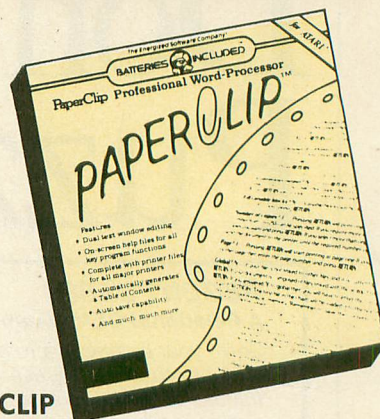


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\$49.95, 48K disk. Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000.

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\$39.95, 48K disk. Batteries Included, 30 Mural Street, Richmond Hill, Ontario L4B 1B5, Canada. (416) 881-9941.

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\$99.95, 32K disk, requires two disk drives. Miles Computing, 21018 Osborne Street, Building 5, Canoga Park, CA 91304. (818) 341-1411

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\$34.95. Activision Inc., P.O. Box 7287, Mountain View, CA 94039. (415) 960-0410.

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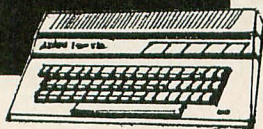
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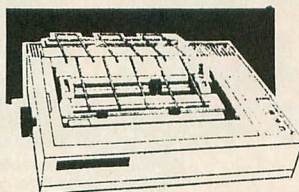
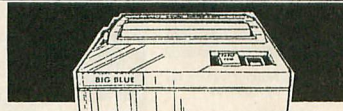
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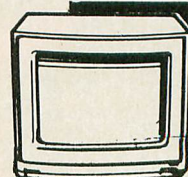
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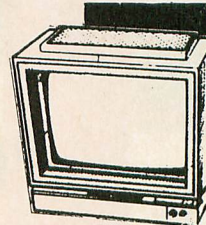
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Uncle Henry's Nuclear Waste Dump

Be careful with those toxic cans

"I hope you've got insurance," says Uncle Henry as you don your yellow rubber suit. Dump the nuclear waste and make that old cuss rich. Be very careful and you may live through it. This BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.



That falling can of nuclear waste may land safely this time, but don't count on safe landings for long. Better get used to bombastic explosions.

Uncle Henry is always trying to make a fast buck, so when he discovered that thousands of corporations desperately needed a place to dispose of their nuclear waste, he started thinking. When Uncle Henry starts thinking, something bizarre usually follows.

And it did! After six months of brainstorming, Uncle Henry celebrated the grand opening of his Nuclear Waste Dump. Hidden behind the local Sloppy Joe Hut, the waste dump was designed to handle vast quantities of discarded radioactive material.

Soon Uncle Henry was rolling in dough, but there was too much waste for one man to handle. So he put an ad in the local paper—which of course you answered.

DUMPING IT

Your first task is to type in Listing 1, NUCWASTE.BAS, checking each line with TYPO II. If you have trouble typing the special characters in lines 9040, 9050 and 9085, don't type them in. Listing 2 will create those lines for you, and store them in a file called LINES.LST. SAVE a copy, plug a joystick into port 1 and RUN the program. When the title screen appears, press [SELECT] to choose your speed—1 for easy, 5 for hard. Then press either [START] or the fire button to begin.

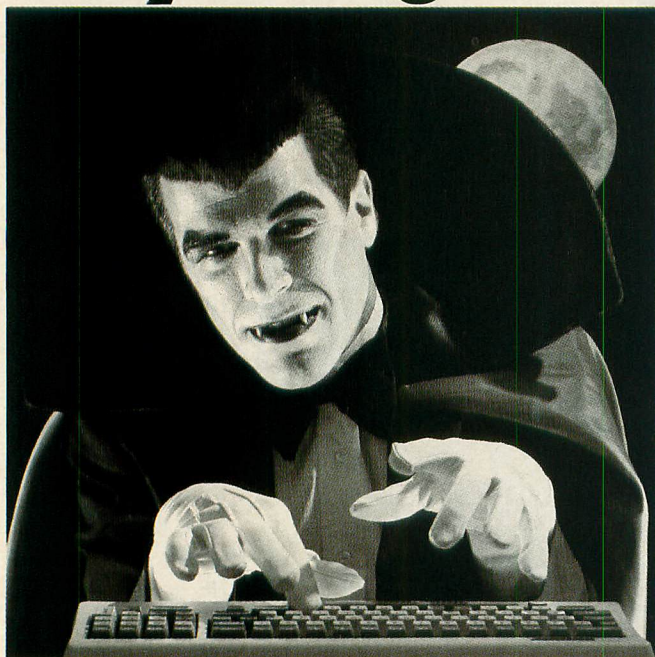
The Nuclear Waste Dump employs the most advanced method of waste disposal known to man—dumping the stuff in a pit. You stand on the edge of the pit. Uncle Henry hands you a container of nuclear waste, which you maneuver above the pit with the joystick. Press the button to drop it. The can falls into the pit and bounces along the pile of waste until it comes to rest. Simple, right? Well, almost...

There are three types of waste containers, each having its own distinct shape and color. The catch is that a container may not end up on or next to a container of the same type. If it does, POW—the end of your little corner of the world!

Momentary contact between containers of similar waste is allowed. For example, a container of Type 1 waste

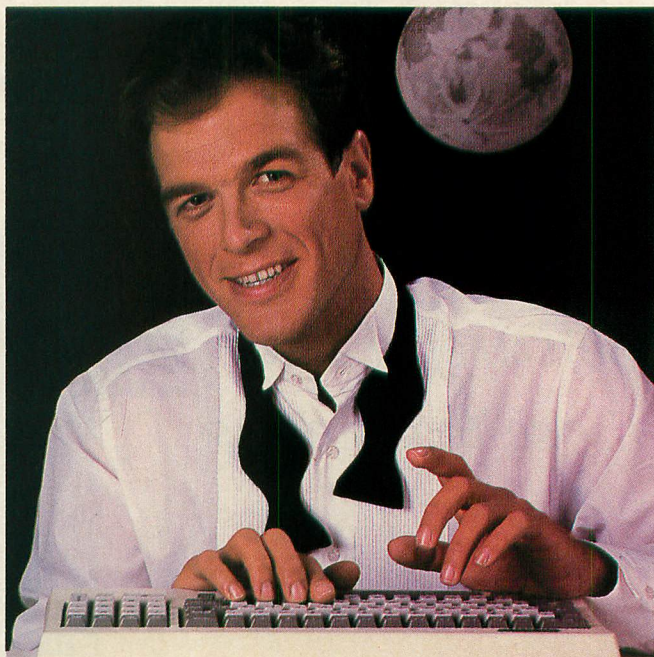
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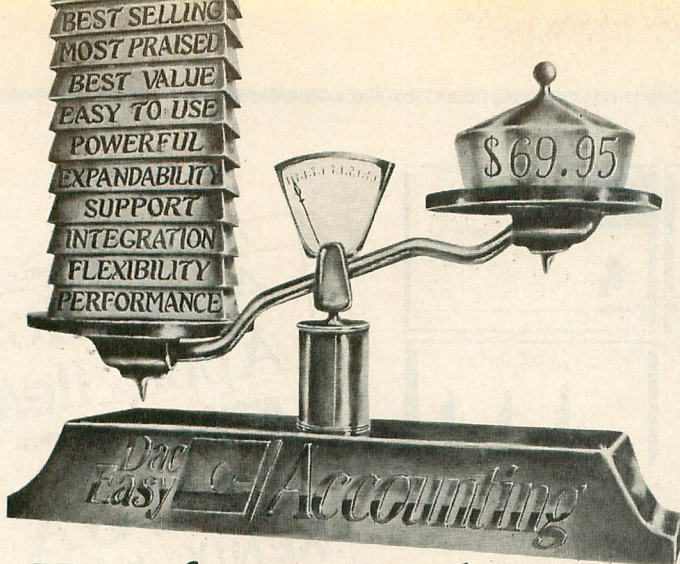
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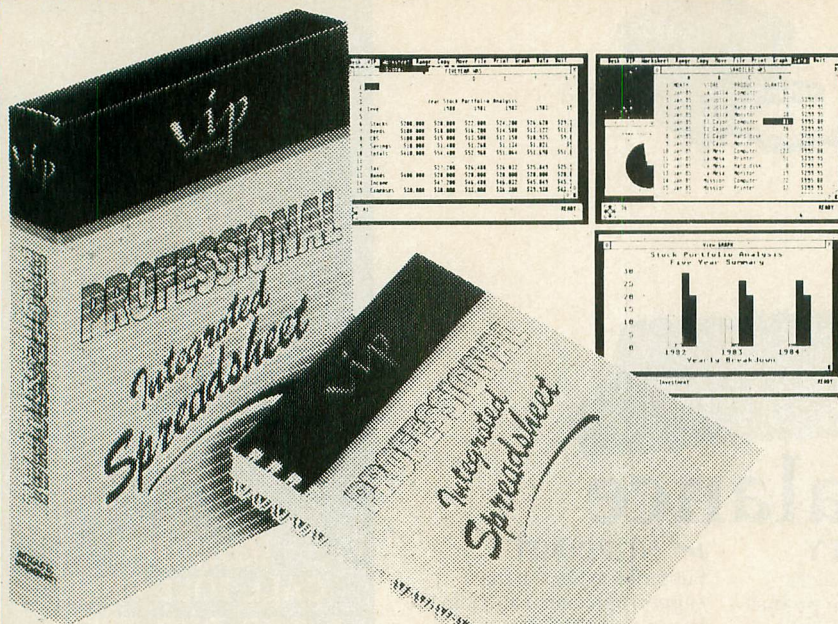
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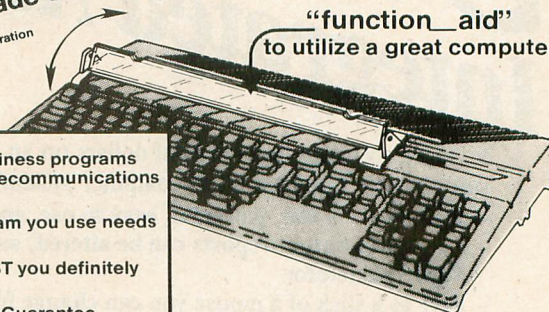
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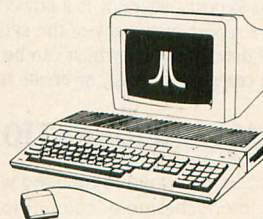
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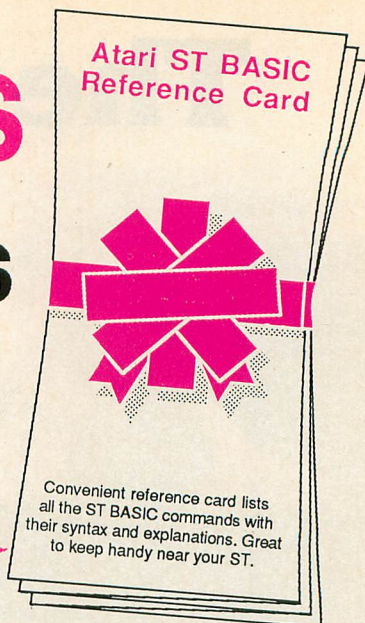
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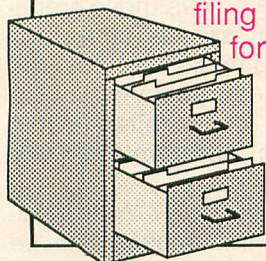
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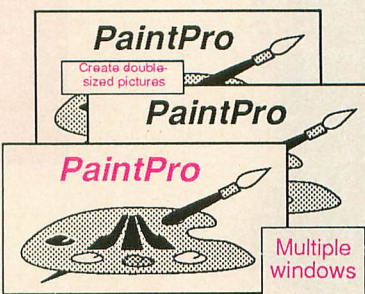
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Create double-sized pictures

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PaintPro

Multiple windows

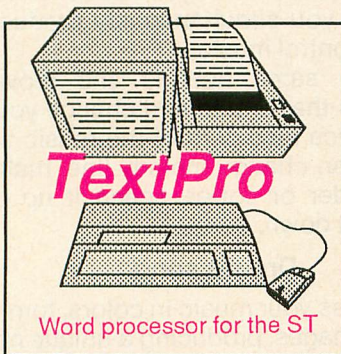


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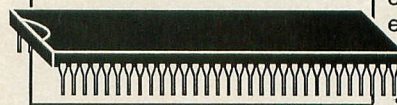
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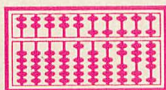
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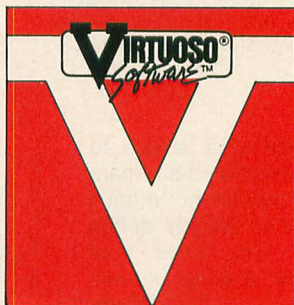
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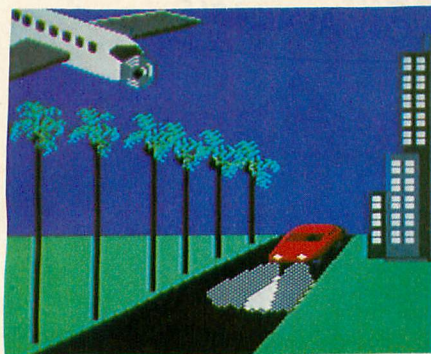
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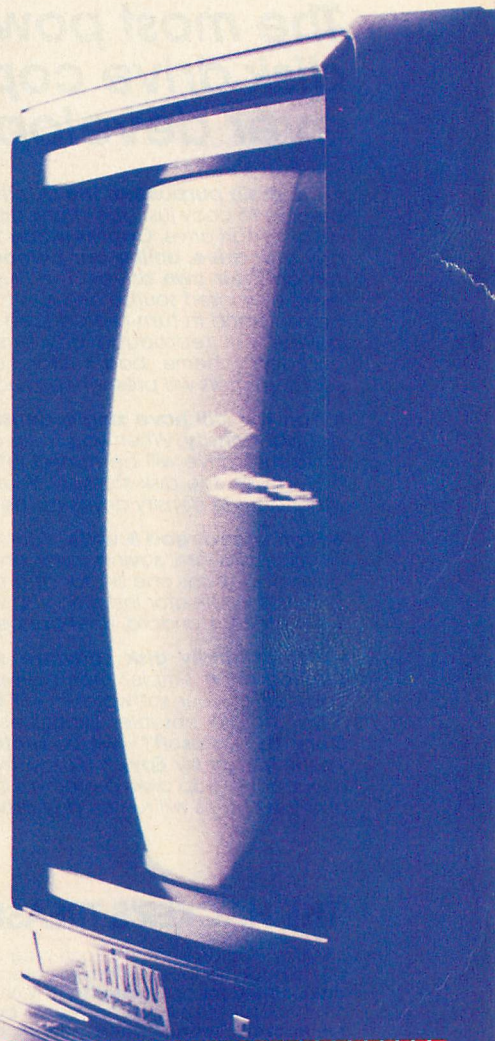
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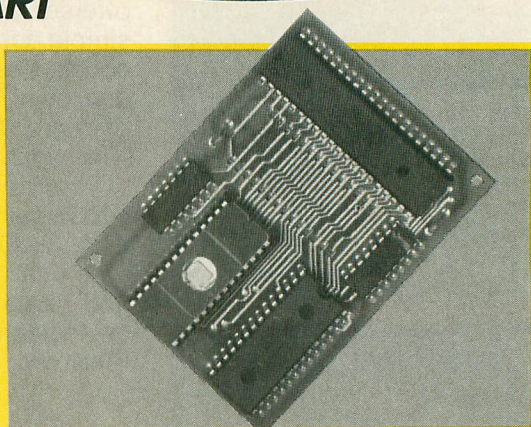
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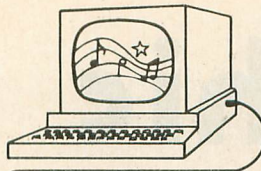
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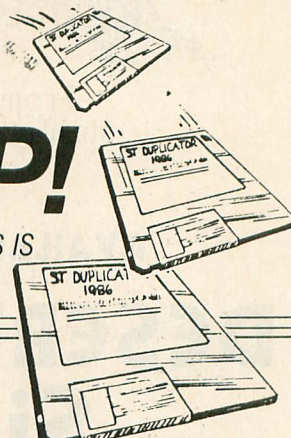
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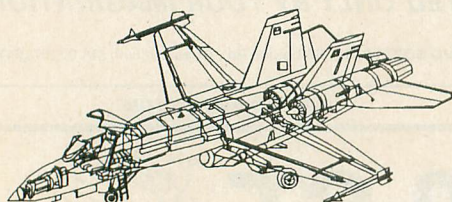
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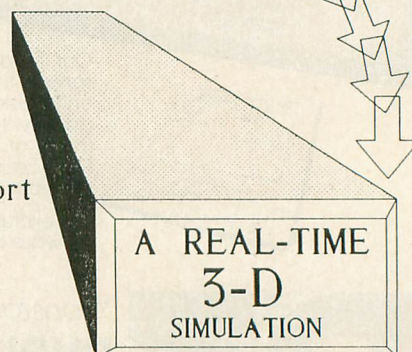


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BY JAMES PIERSON-PERRY

[illegible]
$$Z = \text{SQR}(X * X + Y * Y)$$

One of the more useful ways to study mathematical relationships is through graphics. Plotting a function usually gives a greater intuitive grasp of how the variables interact with each other. For example, a drawing of a sphere is much easier to comprehend than the function $Z = \text{SOR}(\text{R} * \text{R} - \text{X} * \text{X} - \text{Y} * \text{Y})$.

Response surface mapping is another way of representing 3-D functions and is widely used for scientific applications. These maps are also called “contour plots” because they resemble the contour lines on topographic land maps. RSMAP generates response surface maps for BASIC functions having one or two variables (X and Y). Analytical uses aside, many such graphs are interesting simply for their visual appeal.

In view of this, it is not surprising that 3-D graphics plotting is a popular software application. Examples of these include Paul Chabot's *GRAPH 3-D* (**Antic**, October 1985) for 8-bit Ataris, and Tom Hudson's *CAD 3-D* for the ST (\$49.95. The Catalog, ST0214). Programs like these let you

continued on next page

create, manipulate and print 3-D images of functions.

Response surface maps use colors or symbols to represent the Z (response) value, rather than plotting the third dimension in perspective. A weather map is a good example of a response surface map. Here, one type of symbol represents low pressure areas, while another symbol represents high pressure areas.

BACKGROUND

Most 3-D plotting programs give the illusion of three dimensions on a flat surface. The resulting image is greatly dependent on the viewing angle and may hide important parts of the function. Response surface mapping programs always look "down" at the function, along the Z-axis. This gives the entire X,Y grid as the viewing field.

The computer evaluates the function at each point on the grid and prints a letter corresponding to the resulting response value. We can extend this technique to examine functions having more than two variables. For example, consider the function $Z = X * X + Y * Y + W * W$. We can make a separate map at various fixed values

of W (called "slices") which, when viewed in sequence, give a good picture of what the overall function looks like.

THE PROGRAM

Type in Listing 1, RSMAP.BAS, check it with TYPO II and SAVE a copy before RUNning it.

When RUN, RSMAP displays a title screen, then pauses and waits for you to type in your function. All standard BASIC arithmetic operators and transcendental functions are allowed. Constants such as PI and E also may be used. You may define any of your own constants in line 1270. (NOTE: Embedded logic operators for discontinuous functions are not allowed.)

Here are some sample functions:

$$Z = X * X + Y * Y * PI$$

$$Z = \text{LOG}(\text{ABS}(X)) + \text{LOG}(\text{ABS}(Y)) / E$$

$$Z = \text{ABS}(\text{COS}(X) + \text{COS}(Y))$$

If BASIC detects any errors, you'll be asked to re-enter the function.

Next, enter the boundaries for the X and Y axes (even if only one variable is used) and the response limits. Estimates of the response minimum and maximum values are automatically generated to guide you in selecting the response limits. These limits

will determine the resolution of the map.

Your Atari will now print the response map, along with a key to the response symbols. A typical map takes from two to five minutes to print. Press the [OPTION] key to abort the printout and enter new parameters.

Here are some additional interesting functions to get you started:

1. $Z = \text{LOG}(\text{ABS}(X)) + \text{LOG}(\text{ABS}(Y))$
X,Y Ranges = -3 to 3
Z Range = -6.5 to 2.5
2. $Z = \text{SQR}(5 - X * X * Y * Y)$
X,Y Ranges = -1.5 to 1.5
Z Range = 0 to 2.5
3. $Z = \text{COS}(X) + \text{COS}(Y)$
X,Y Range = -3.14 to 3.14
Z Range = -180 to 180

PROGRAM TAKE-APART

The heart of the map processing is the short subroutine located at the very start of the program to speed execution time.

Lines 1090-1190: Subroutine to evaluate the function over the X,Y grid and translate response values into map symbols. The symbols are stored

```
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HHH.,II,J.K.,M.NO.P.Q.RS.,TT.,TT.SR.QP.ON,M.,K.,J,I.H.HH*
IIII.JJ.K.L.,N.O.P.Q.,S.TT.UU.,UU.TT.S.,Q.P.O.N.,L.K.JJ,IIII*
JJJJ.,K.L.M.NO,P.,R.ST.,U.UUU.,UUU.TS.R.,P.ON,M.L.K.,JJJJ*
, .KKK.L.,N.O.,Q.RS,T,U.,U.UUUUUU.,U.U.TS.R.,Q.,O.N.,L.KKK*
, .L.,M.N.O.,Q.,S.TU,U.,W.,XXXXX.,W.U.U.TS.,Q.,O.N.M.L.,
LLL.,M.,N.O.P.Q.,S.TU,U.,W.,X.,X.,W.U.U.TS.,Q.P.O.N.,M.LLL*
MM.,NN.O.,Q.RS,TU,U.,W.XX.YYYYYYYY.XX,W.U.U.TS.R.,Q.O.NN.MM.,
MM.,N.O.O.,Q.RS,T,U.,W.X.YY.,YY.X.W.U.TS.R.,P.O.NN.,MM*
, .NN.O.,Q.P.RS,TU,U.,W.X.YY.,Z.,YY.X.W.U.U.TS.R.,Q.P.O.NN.,
MM.,N.O.O.,Q.RS,T,U.,W.X.YY.,YY.X.W.U.TS.R.,Q.O.NN.,MM*
MM.,NN.O.,P.R.ST.U.,W.X.YY.,YY.X.W.U.TS.R.,P.O.NN.,MM*
, .MM.NN.O.,Q.RS,TU,U.,W.XX.YYYYYYYY.XX,W.U.U.TS.R.,Q.O.NN.MM.,
LLL.,M.,N.O.P.Q.,S.TU,U.,W.,XXXXX.,W.U.U.TS.,Q.,O.N.M.L.,
, .KKK.L.,N.O.,Q.RS,T,U.,U.UUUUUU.,U.U.TS.R.,Q.,O.N.,L.KKK*
JJJJ.,K.L.M.NO,P.,R.ST.,U.UUU.,UUU.TS.R.,P.ON,M.L.K.,JJJJ*
IIII.JJ.K.L.,N.O.P.Q.,S.TT.UU.,UU.TT.S.,Q.P.O.N.,L.K.JJ,IIII*
HHH.,II,J.K.,M.NO,P.Q.RS.,TT.,TT.SR.QP.ON,M.,K.,J,I.H.HH*
GGG.,HH.I,J.,L.N.O.P.Q.RS.,SS.,SS.R.Q.P.O.N.,L.,J,I.H.HH*
FFF.GG.H.I.,K.,M.NO.P.Q.,RR.,Q.P.ON,M.,K.,I.H.GG.,FFF*
EEE.,F.G.HI,J.,L.N.O.P.Q.,QQ.,Q.P.O.N.,L.,J,I.H.G.,F.,EEE*
DD.,E.F.F.,H.IJ.K.,M.N.O.PP.,PP.O.N.M.,K.JI.H.,FF.E.DD*
, .DD.E.F.G.,I,J,K.L.,NN.O.,PPP.,O.NN.,L,KJ,I.,G.F.E.DD.,
, .CC.DD.E.,G.HI,J.K.L.M.NN.OOOOOO.NN.M.L.KJ,I.H.G.,E.DD.CC.*
BBBB.CC.D.E.,G.HI,J.L.M.,NN.,M.L.,J,I.H.G.,E.D.C.C.BBBB*
, .B.C.D.E.,G.,I,J,K.L.,M.,NNNNN.,M.L.KJ,I.,G.,E.D.C.B.,
AAA, .BB.C.DE.F.,H.IJ.K.L.M.,M.L.L.KJ.I.H.,F,ED.C.BB.,AAA*
AAAA, .B.C.D.E.F.G.,I,J,K.,L.MMM.,MMM.L.,KJ,I.,G.FE.D.C.B.,AAAA*
*AAAA, .B.C.D.E.,G.,I,J,K.L.,MMM,MMM.,L,K,J,I.,G.,E.D.C.B.,AAAA*
```

$$Z = \text{COS}(X) + \text{COS}(Y)$$

```
*YY....XXXX.,UUUU.,UU.T.,A.,T.UU,UU.,UUUU.,XXXX....YY*
Y....XXXX.,UUUU.,UU.TS.Q,A,Q,ST.,U.,UU.,UUUU.,XXXX....Y*
....XXXX.,UUUU.,UU.TS.RQQAQORS,I.UU.,UU.,UUUU.,XXXXXX*
....XXXX.,UUUU.,UU.TS.RQQAQORS,I.UU.,UU.,UUUU.,XXXXXX*
XXXXX.,UUUU.,UU.TT.,RQQAQOR,TT.UU.,UU.,UUUU.,XXXXXX*
XXXXX.,UUUU.,UU.TS.,A.,S.T.UU.,UU.,UUUU.,XXXXXX*
XX.,UUUU.,UU.TT.S.,A.,S.TT.UU.,UU.,UUUU.,XXXXXX*
UUUU.,UU.TT.SR.P.A.P.R.S.T.UU.,UU.,UUUU.,XXXXXX*
UUUU.,UU.TT.SR.QP.NANQ.R.SS,TT.UU.,UU.,UUUU.,XXXXXX*
UUUU.,UU.TT.SR.,Q.,O.NA.MO.P.Q.R.S,TT.UU.,UUUU.,XXXXXX*
UUUU.,UU.TT.SR.QP.NA.MO.P.Q.R.S,TT.UU.,UUUU.,XXXXXX*
UUUU.,UU.TT.SS.R.Q.,A.,Q.R.SS,TT.UU.,UUUU.,XXXXXX*
UUUU.,UU.TT.SS.RR.Q.PONLALNOP.Q.RR.SS,TT.UU.,UUUU.,XXXXXX*
UUUU.,TTTT.,SS.,R.,Q.P.,A.,P.Q.,R.,SS,TTTT.,UUUU*
TTTT.,SSS.,RR.,Q.P.,Q.NM.KAKHNO,P.QQ.,RR.,SSS.,TTTT*
SSSSS.,RRR.,QQ.,P.O.NM.KAJLMN.O.P.QQ.,RRR.,SSSSS*
RRRRR.,QQQQ.,PP.,QO.N.MLKIAIKL,N.OO.,PP.,QQQQ.,RRRR*
PPPP.,OOO.,NN.MM.L.KJIGAGIJK,L.MM.NN.,OOO.,PPPP*
*AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA*
PPPP.,OOO.,NN.MM.L.KJIGAGIJK,L.MM.NN.,OOO.,PPPP*
RRRRR.,QQQQ.,PP.,QO.N.MLKIAIKL,N.OO.,PP.,QQQQ.,RRRR*
SSSSS.,RRR.,QQ.,P.O.NM.KAJLMN.O.P.QQ.,RRR.,SSSSS*
TTTT.,SSS.,RR.,Q.P.,Q.NM.KAKHNO,P.QQ.,RR.,SSS.,TTTT*
UUUU.,TTTT.,SS.,R.,Q.P.,A.,P.Q.,R.,SS,TTTT.,UUUU*
UUUU.,TTTT.,SSS.RR.Q.PONLALNOP.Q.RR.SS,TT.UU.,UUUU*
UUU.,UUU.,TTT.,SS.,R.Q.,A.,Q.R.SS,TTT.,UUU.,UUU*
UUUU.,UUUU.,UUU.TT.SR.QP.NA.MO.P.Q.R.S,TT.UU.,UUUU*
UUUU.,UUU.,UUU.TT.SR.,Q.,O.NA.MO.P.Q.R.S,TT.UU.,UUUU*
UUUU.,UUU.,UUU.TT.SR.,A.,R.SS,TT.UU.,UUUU*
UUUU.,UUU.,UUU.TT.SS.,Q.NAN,Q.,SS,TT.UU.,UUUU*
UUUU.,UUU.,UUU.TT.SR.QP.NANQ.R.SS,TT.UU.,UUUU*
UUUU.,UUU.,UUU.TT.SS.,A.,S.TT.UU.,UUUU*
XXXXX.,UUUU.,UU.TS.,A.,S.T.UU.,UU.,UUUU.,XXXXXX*
XXXXX.,UUUU.,UU.TT.,RQQAQOR,TT.UU.,UU.,UUUU.,XXXXXX*
XXXXX.,UUUU.,UU.TS.RQQAQORS,I.UU.,UU.,UUUU.,XXXXXX*
Y....XXXX.,UUUU.,UU.TS.Q,A,Q,ST.,U.,UU.,UUUU.,XXXX....Y*
*YY....XXXX.,UUUU.,UU.T.,A.,T.UU,UU.,UUUU.,XXXX....YY*
```

$$Z = \text{LOG}(\text{ABS}(X)) + \text{LOG}(\text{ABS}(Y))$$

in a buffer (B\$) and printed one line at a time.

Lines 1240-1290: Initialize variables and strings. Current color register values are saved and restored at the end of the program.

Lines 1630-1800: Entry of the plotting function. We use the Atari's "forced-read" mode to install the function into the program.

*Analytical uses
aside, many such
graphs are
interesting simply
for their visual
appeal.*

Lines 1830-1890: Input X,Y boundaries and ensure the minimum value is less than the maximum value.

Lines 1910-2030: Routine to estimate minimum and maximum values of Z. A TRAP here prevents errors from illegal BASIC math operation, such as LOG(0).

Lines 2260-2410: Generate the response surface map.

Lines 2430-2510: Allow you to generate a new map using the same function but different plotting parameters.

NEXT STEP

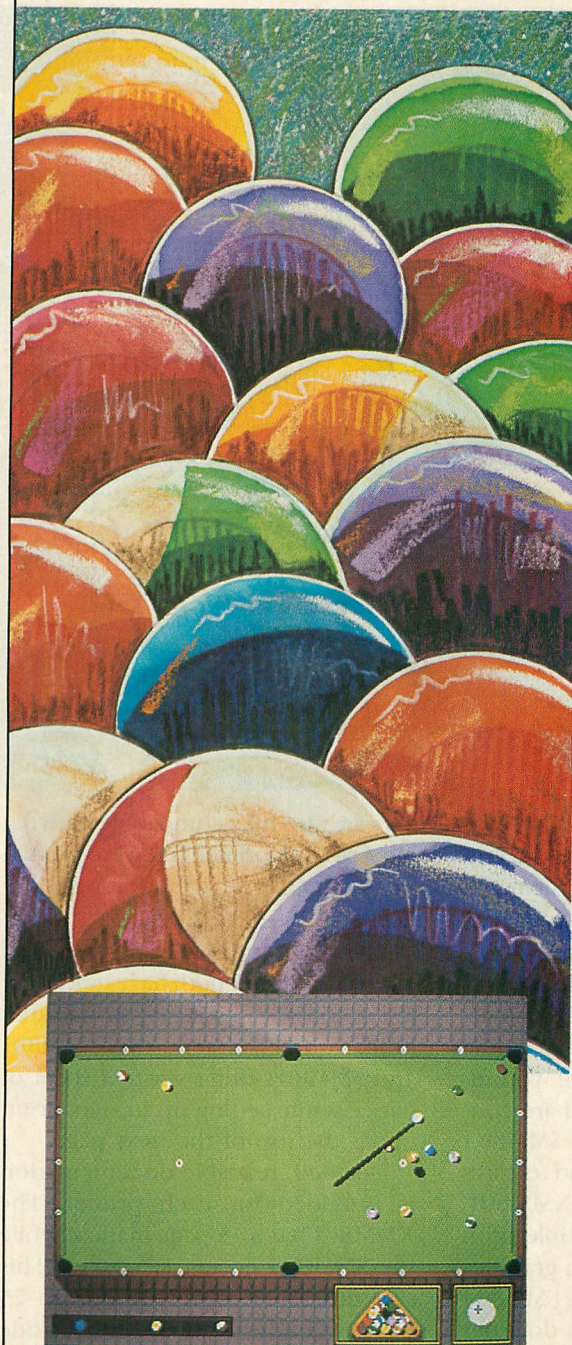
Ambitious readers may want to modify this program to plot functions on a graphics screen instead of a printer. **Antic** would be glad to see a short, elegant enhancement which would support Graphics 15 (ANTIC Mode E), Graphics 7 or any of the GTIA modes.

*James Pierson-Perry of Elkton, Maryland is a research chemist with DuPont. His Molecular Weight Calculator program appeared in **Antic**, May 1986. Pierson-Perry was introduced to Atari computers in 1982 when his daughter's school began using them.*

Listing on page 110



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CIRCLE 059 ON READER SERVICE CARD

Two New Atari Printers

Good deal at \$219.95

Atari's long-awaited XMM801 and

SMM804 dot-matrix printers are solidly in the tradition of previous Atari printers. They offer many (but not all) of the features currently considered standard in the marketplace. And they are priced attractively less than the competition—available as low as \$199.97 as we go to press.

In most respects, both new printers are identical. The XMM801 has a serial interface that plugs directly into 8-bit Atari computers or their disk drives. The SMM804 has a faster parallel interface and is intended for direct hookup to STs. But it can be connected to 8-bit models via the Atari 850 Interface Module or ICD's new P:R: Connection. In fact, if you already own an interface and are considering buying an ST, the SMM804 will give you more speed and features than the identically-priced XMM801.

The XMM801 is compatible with Epson's medium-resolution graphics mode, 960 dots per line. The SMM804 supports as many as 1,280 dots per line. Both were designed to be as Epson-compatible as possible, but

they are also fully compatible with the old Atari 825 printer and were primarily designed primarily as a new, improved 825.

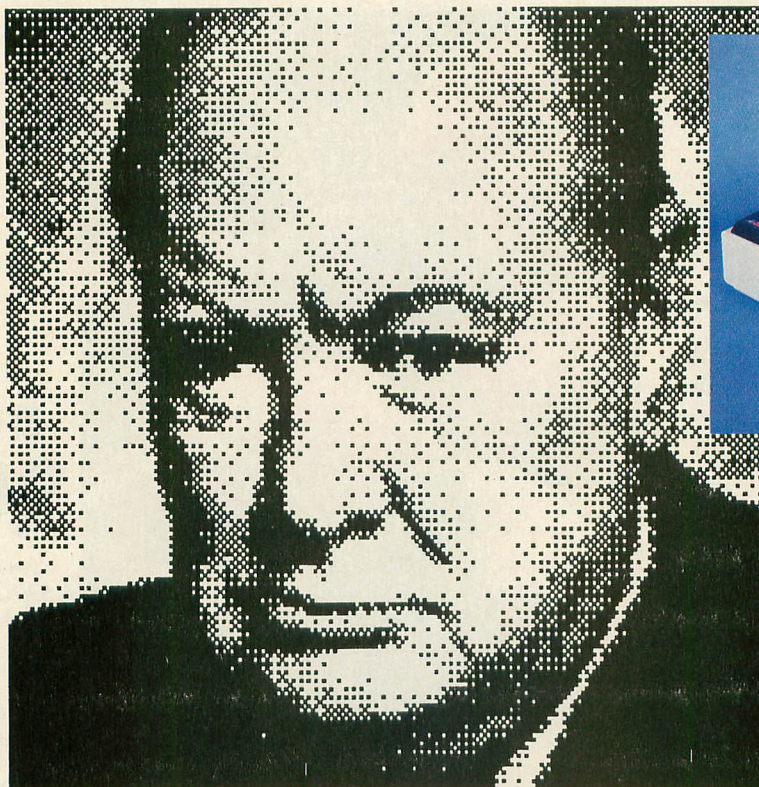
The printers are easy to set up and operate, and they both have quick self-test routines. Paper is easy to load and, unlike other printers, the XMM801 and SMM804 don't waste a sheet of paper while setting up to start printing at the top of the next page.

Detailed, readable documentation is provided for each printer. The XMM801 has a 73-page manual while the SMM804 covers 117 pages. This size difference is mostly due to 25 pages of multi-national control code tables for the ST printer.

Both printers use the same type of

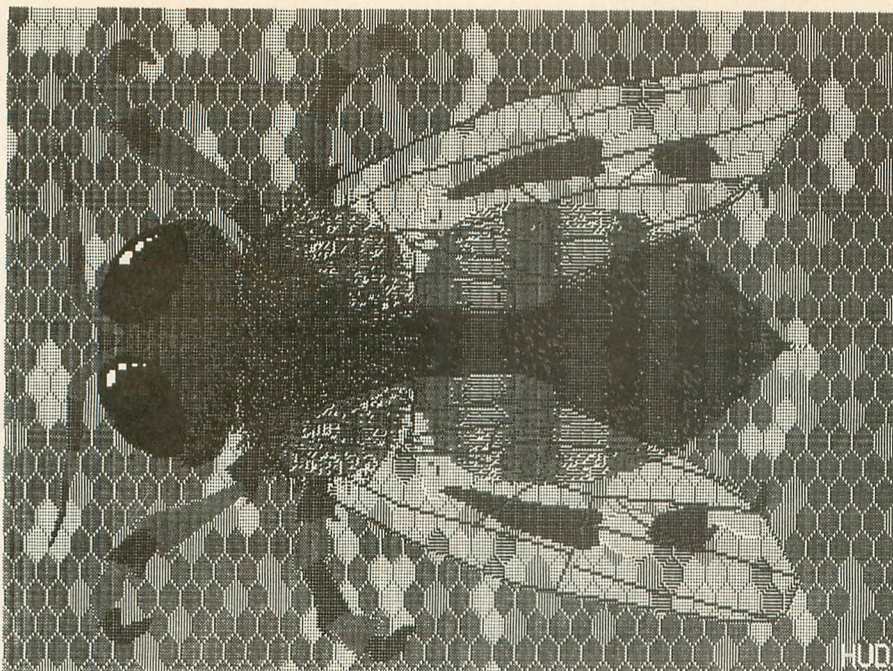


Left: a digitized Churchill printed by Atari's new XMM801 (above). Opposite from top: the ST hi-res bee printed by the SMM804. Atari Planetary world map printed by the XMM801. Text sample from SMM804.



ribbon cartridge, and it's easy to change—just pull straight up and out, and snap in a new one. Atari's own ribbons should be available from dealers who sell the printers, or directly by mail from Atari at approximately \$12.95 each.

However, when **Antic** checked for additional ribbon sources, we discovered that the XMM/SMM ribbon is compatible with easily-found ribbons used by the Commodore 1526 and the Mannesman-Tally Spirit 80. The sample printouts accompanying this article were made on a Pelikan P-116 ribbon we purchased for \$8.95. The P-116 was a bit tricky to load properly, but it seemed to print darker and more evenly than the Atari ribbons.



GRAPHICS COMPATIBILITY

Text printouts look virtually the same on both printers, except that the 8-bit model does not produce italics. Neither model has a near-letter-quality mode, but their regular text printing is not bad at all.

Both printers are capable of producing detailed graphics, under standard Epson printer drivers. However, software compatibility varies *widely*. Here are our first results:

On the XMM801, our Atari Planetarium world map and star chart printouts were every bit as good as those from our Star Micronics SG-10.

The XMM801 did a respectable job on a digitized photo of Winston Churchill. However, we could *not* get the XMM801 to work with Lister Plus from the The Catalog—or with Broderbund's Print Shop. (According to Broderbund Software, Print Shop has never worked with Atari printers, but they had not yet tested the XMM801 as we went to press.)

The SMM804 generally did justice to the graphics capabilities of ST computers. In a sort of "blind taste test," everyone we questioned at *Antic* preferred the SMM804 rendering of "Stoneage," Darrel Anderson's DEGAS Art Competition winner (*Antic*, July 1986) over that from our in-house Ep-

son FX-85. The SMM804 also turned out accurate dumps of game screens from Epyx's Winter Games and Rogue and Activision's Hacker II.

On the other hand, Tom Hudson's well-known ST Bee screen showed more black-and-white detail on the Epson printout. And in ST desktop screen dumps, white lines were slightly more noticeable on the Atari printouts than on the Epson copies.

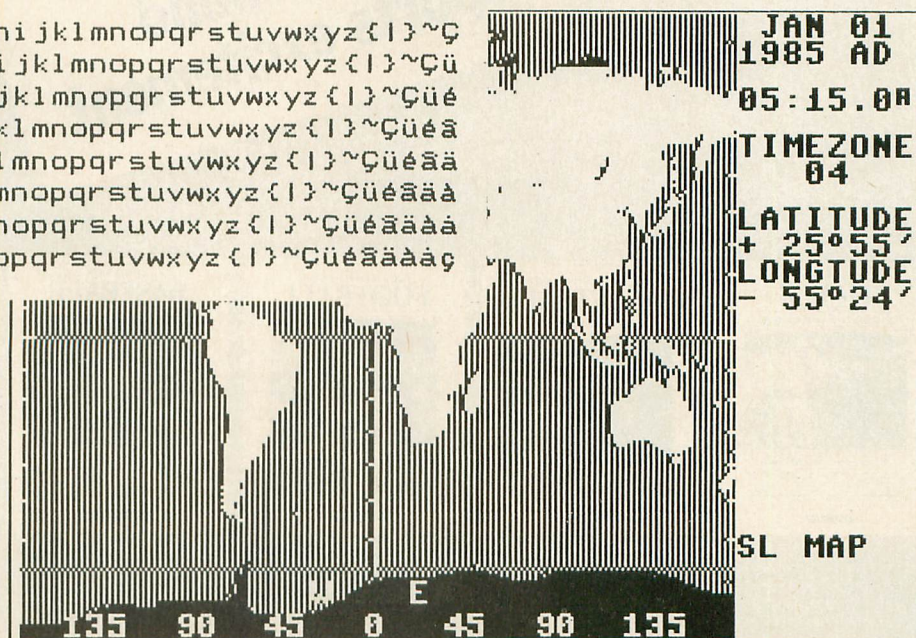
Two other Activision ST screen dumps gave different results. When printing a fill pattern from Audio Light's Paintworks, our results were accurate but inconsistent in density. When we tried to print a musical staff from Music Studio, the SMM804 added an extra line-feed after each line. However, Activision said that a fix for Music Studio was in the works. PCBoard Designer from Abacus Software also gave extra line feeds.

SPEED TEST

Both printers are bi-directional, but neither is incredibly fast. On an 800XL with an 850 interface, we compared the print speeds of six printers: the Atari XMM801 and SMM804, Epson FX-85, the Star SG-10 and new NL-10 and the Axiom (Seikosha) GP-550AT. The XMM801 and Seikosha both had serial hookups, while the other four used parallel connections.

We printed a 20,000-character
continued on next page

cdefghi jklmnopqrstuvwxyz{|}~Ç
defghi jklmnopqrstuvwxyz{|}~Çü
efghi jklmnopqrstuvwxyz{|}~Çüé
fghi jklmnopqrstuvwxyz{|}~Çüéä
ghi jklmnopqrstuvwxyz{|}~Çüéää
hijklmnopqrstuvwxyz{|}~Çüéäää
ijklmnopqrstuvwxyz{|}~Çüéäääa
jklmnopqrstuvwxyz{|}~Çüéäääaä



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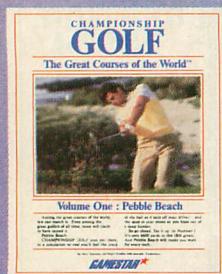
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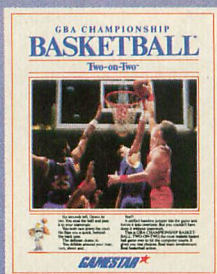


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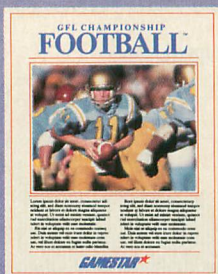
GAMESTAR



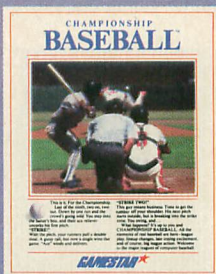
Available for IBM PC, PCjr and Tandy 1000, Commodore Amiga, and compatible computer systems. Coming soon for Apple II, Atari ST and compatible computer systems.



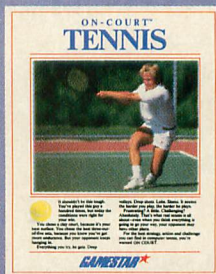
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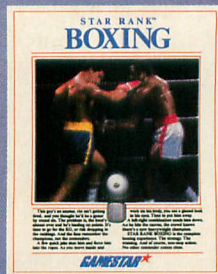
Available for Apple II, IBM PC, PCjr, and Tandy 1000, Commodore 64, 128, and Amiga, Atari ST, and compatible computer systems.



Available for Apple II, IBM PC, PCjr, and Tandy 1000, Commodore 64, 128, and Amiga, Atari ST, and compatible computer systems.



Available for Commodore 64 and 128 computer systems.



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CIRCLE 081 ON READER SERVICE CARD

NUCLEAR WASTE

continued from page 35

may be dropped onto another Type 1 container as long as it bounces to a different location and does not come to rest in contact with Type 1 waste.

Also, you can only hold a can for a short time (depending on which speed you selected). When you are handed a can, a timer in the upper right-hand corner of the screen counts down. When it reaches zero, a buzzer sounds and you must drop the waste in your tracks. Needless to say, this could be disastrous.

You get 10 points for every container successfully dumped. If you manage to fill the pit by placing just

one container of waste as high as the pit's rim, you get a 1,000-point bonus, some neat special effects and an early retirement. If only it were that easy. . .

DESIGNER'S NOTES

Surviving Uncle Henry's Nuclear Waste Dump does not depend solely on your reflexes, but also on quick, logical decisions. Speed 1 allows quite a bit of time to decide where to drop the waste, while Speed 5 only gives you a split second. Plan ahead, because each move may drastically affect subsequent moves.

The game may seem simple at first, but as the pit fills up, you must consider the physics of how each con-

tainer will react when it hits the pile, which makes things extremely tricky. Only by playing can you learn. But here's a tip: if a container has the choice of falling left or right, it will always go left. And as you play, you will be treated periodically to words of wisdom from Uncle Henry himself.

Now get back to work. Uncle Henry is counting on you. Good help is hard to find.

James Hague lives in Richardson, Texas and has worked in assembly language and BASIC for four years. His game Rockslide, appeared in the May, 1986 issue of Antic.

Listing on page 114 **A**

ATARI PRINTERS

continued from page 51

document created with a simple BASIC program that read a text file character by character and copied it to another file (substituting periods for special characters). Then we had DOS 2.5 copy the file from the disk to each printer in turn.

| Printer | Time | Characters Per Second (cps) |
|--------------|------|--------------------------------|
| Epson FX-85 | 3:06 | 108 |
| Star SG-10 | 3:45 | 89 |
| Star NL-10 | 3:45 | 89 |
| Atari SMM804 | 5:28 | 61 |
| Atari XMM801 | 6:32 | 51 |
| GP-550AT | 9:41 | 34 |

(60 words per minute is about 5 cps.)

The speed differences in our ST graphics tests were even more dramatic. The Epson printed the Bee in two minutes, 28 seconds and the SMM801 took five minutes, 30 seconds (2.2 times as long). But the GEM desktop, which the Epson zipped through in 42 seconds, took the Atari four minutes, 55 seconds—seven times as long.

Also, both Atari printers are fairly loud. On a scale of 1-to-10, with 10 the loudest, the XMM801 and SMM804 would be closer to the GP-550AT (about 9) than to the Star SG-10 (about 2).

You'll get quality printouts from Atari's two new 9-pin dot-matrix units. The \$219.95 suggested retail price is their most attractive feature. You won't get all the features, speed, quietness and software compatibility that you'll find in the market leaders, but you'll definitely get your money's worth.

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MARK 4:22

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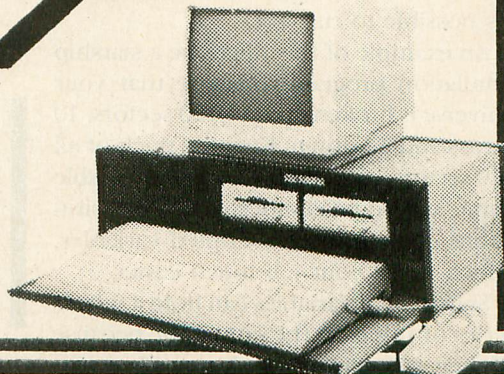
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CIRCLE 015 ON READER SERVICE CARD

BY DAVID PLOTKIN, ANTIC CONTRIBUTING EDITOR

New Owners Column

Lesson 9: Subscripted Variables

This series, which started in the March, 1986 Antic, teaches beginners how to program in BASIC on all Atari 8-bit computers such as the 800XL and the 130XE.

Contributing Editor David Plotkin is a chemical engineer and longtime Atari programmer.

Subscripted variables are very useful for storing and manipulating

information. As you gain more programming experience, you'll learn that sometimes it can be limiting to hold values in standard variables (as explained in *Antic*, May 1986, page 107). Each variable must have a unique name, which must be kept track of. Also, Atari BASIC limits you to 128 different variables. Normally this is enough, but it's possible to run out.

An example of this might be a starship simulation program. Imagine that your universe is broken up into 120 sectors, 10 across and 12 down. Keeping track of all 120 sectors, each with a different variable name, would be cumbersome. Such situations cry out for subscripted variables, which make your job much easier.

Subscripted variables can hold a whole series of values at the same time because of their subscripts, which provide an in-

dex to each value. Each **element** of the subscripted variable has a different subscript and can hold a different value. An example of a subscripted variable is: `EXAMPLE(2)=3.5`, where

`EXAMPLE` is the name of the variable, 2 is the subscript, and the value 3.5 is the second element of `EXAMPLE`.

Subscripted variables are given names just like regular variables. However, they are different from regular variables in two important ways. First, you must tell your Atari how much room to save for the values in each set of subscripted variables. This is done with the **DIM** statement.

**PLACING VALUES IN STANDARD
VARIABLES IS LIMITED.
SUBSCRIPTS PICK UP THE SLACK**

Second, values stored in the subscripted variable are accessed by use of the appropriate subscript.

DIM STATEMENT

After you decide on a name for a subscripted variable, you must allocate memory to hold its values. The DIM statement DIMensions the subscripted variable. For example, if the variable UNIVERSE is to hold 100 values, then you would use the following:

```
10 DIM UNIVERSE(100)
```

You can DIMension more than one subscripted variable on each line:

```
10 DIM UNIVERSE(100),STAR(50),HIT(10)
```

Subscripted variables may also have two subscripts, in which case the DIM statement might look like this:

```
20 DIM DOUBLE(20,20),DOUBLE2(10,20)
```

Note that you can DIM more than one doubly-subscripted variable on a line, just as with singly-subscripted variables. You may also DIM both singly-subscripted and doubly-subscripted variables in the same DIM statement. You may *not* use variables with more than two subscripts. And it is important to know that DIMensioning a subscripted variable more than once in a program generates an error.

SINGLE SUBSCRIPTS

Singly-subscripted variables have one subscript that must be an integer, and each element can hold a different value:

```
10 DIM EXAMPLE(10)
```

```
20 FOR J=0 TO 10:EXAMPLE(J)=J*2.2
```

```
30 PRINT "EXAMPLE(";"J;")=";EXAMPLE(J)
```

```
40 NEXT J
```

Thus, the subscripted variable EXAMPLE can hold 11 different values, one for each value of the integer subscript which was DIMensioned to 10. Although the subscript must be an integer, the value held by EXAMPLE(J) can be any number, including a calculated number. You can also simply assign a value to a subscripted variable:

```
50 EXAMPLE(0)=100.345
```

Another oddity about subscripted variables is that the subscripts start from *zero*. Thus, for example, when you DIMension a variable subscript for 10, you will actually have space for 11 values.

Singly-subscripted variables have many uses. This month's program Listing 1 demonstrates how they can be used to record test scores for a full classroom of students. Subscripted variables are quite commonly used with READ/DATA statements. Notice that you *cannot* READ the value contained in the DATA statement directly into the subscripted variable. The following will *not* work:

```
10 READ SCORE(J)
```

Instead, you must READ the value into a regular variable, then transfer it into the subscripted variable:

```
10 DIM SCORE(1)
```

```
20 READ SCORE:SCORE(0)=SCORE
```

The above is perfectly valid, because your Atari sees SCORE and the subscripted variable SCORE(J) as two *different*

A SUBSCRIPT CAN HOLD OVER 5,000 VALUES— A STANDARD VARIABLE, ONLY ONE

variables. The same principle applies when you use INPUT and GET to obtain a value for a subscripted variable—you must INPUT or GET a regular variable, then equate the subscripted variable to the regular variable:

```
10 DIM SCORE(1)
```

```
20 PRINT "What Score";INPUT SCORE
```

```
30 SCORE(0)=SCORE
```

DOUBLE-SUBSCRIPT ARRAYS

Each subscript of a doubly-subscripted variable must be DIMensioned:

```
10 DIM UNIVERSE(10,12)
```

Doubly-subscripted variables are often thought of as being represented by rows and columns. Thus, UNIVERSE would have 10 rows and 12 columns, holding 10×12 , or 120 values. Because of the analogy to rows and columns, doubly-subscripted variables are often referred to as **arrays**. To access the values held in an array, you must specify *both* subscripts:

```
10 DIM UNIVERSE(5,6):UNIVERSE(1,4)=2.1
```

```
20 PRINT UNIVERSE(1,4)
```

Again, the subscripts must be integers. The same rules for singly-subscripted variables apply to arrays.

As you can see, it is now quite easy to solve the problem of keeping track of 120 sectors in your starship simulation. Just DIMension a 10×12 array and store a number into each element of the array. This month's Listing 2 is an example of how you might carry this out. Notice how the nested FOR/NEXT loops are used to access each element of the array UNIVERSE by stepping through the subscripts. Using the RND (random number) function assures that there will be a different number of enemy ships in the sectors each time we play the simulation.

CALCULATED SUBSCRIPTS

I have stated that the subscripts must be integers. In fact, if you do specify a subscript which is not an integer, your Atari will round it to the nearest integer anyway.

You can also calculate a particular subscript by using the mathematical rules explained in *Antic's* July, 1986 New Owners Column. This option gives you considerable flexibility. For example, while you are limited to having two subscripts in an array, you can represent three-dimensional space with a singly-subscripted variable by doing some calculations on the chosen 3-D coordinates:

```
10 DIM SPACE(1000)
```

```
20 FOR J=0 TO 999:SPACE(J)=RND(0):REM PUT SOME  
VALUES IN SPACE
```

continued on next page


```

30 PRINT "INPUT X,Y,Z COORDINATES (0-9)":INPUT
X,Y,Z
40 IF (X<0 OR X>9 OR Y<0 OR Y>9 OR Z<0 OR Z>9)
THEN PRINT "COORDINATE OUT OF RANGE!":
GOTO 30
50 PRINT "VALUE IS ";SPACE(X+Y*10+Z*100):REM
CALC. THE SUBSCRIPT.
60 GOTO 30:REM AROUND AGAIN


```

Both singly-subscripted and doubly-subscripted variables can be used like regular variables in mathematical equations and in GOTO/GOSUB statements. In fact, subscripted variables can be used just about anywhere that regular variables are used—except, as stated above, in READ, INPUT, and GET statements.

FRACTAL LISTING

Listing 3 makes extensive use of arrays to store values for later use. The program generates a shape on your screen which looks like a different 3-D landscape every time. The program uses a form of fractal arithmetic, which generates shapes that imitate nature. Memory requirements for Listing 3 are 32K disk and 24K cassette.

When the program starts, it will ask you how many levels you want. The higher the number of levels, the finer the resolution of the picture and the more lifelike the result. But the higher-numbered levels also take longer to draw on the screen. Level 6, the highest resolution, takes several hours, so be sure you want your computer tied up that long.

Listing on page 112 

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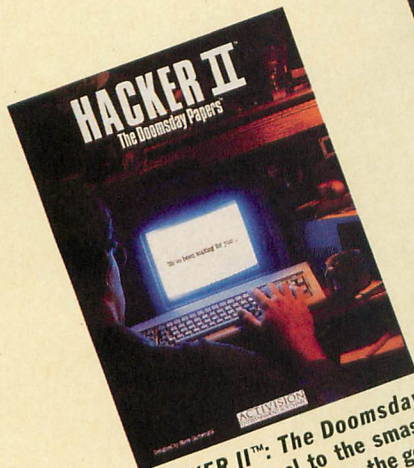
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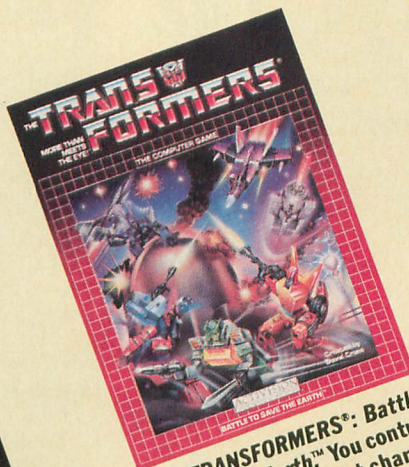
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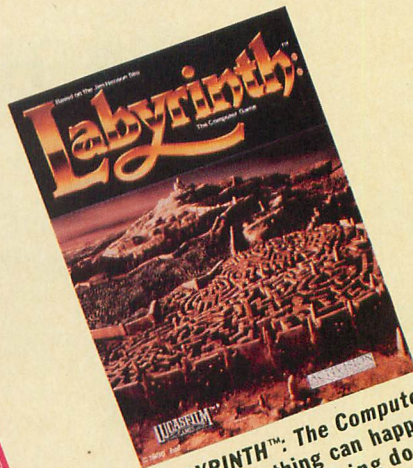
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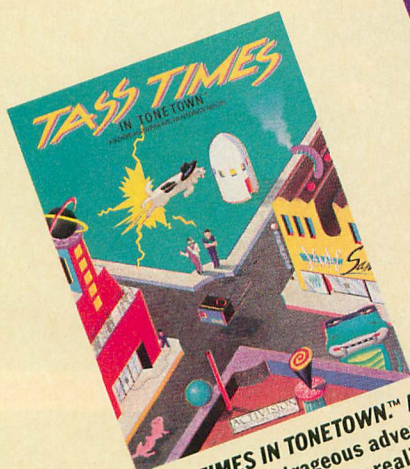
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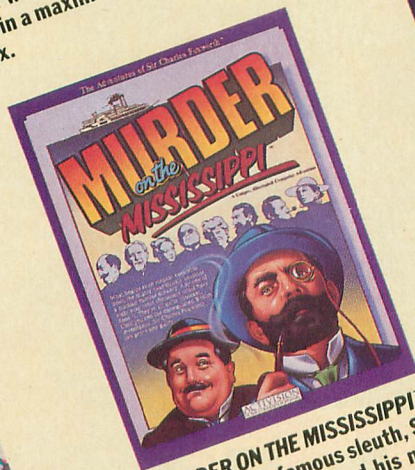
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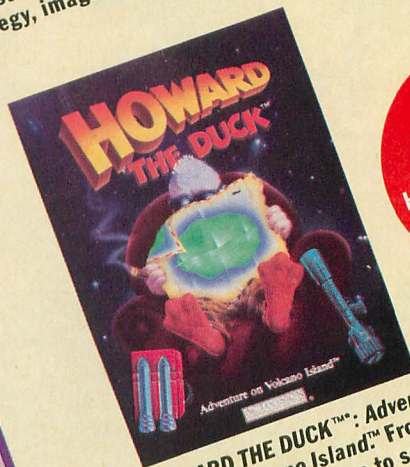
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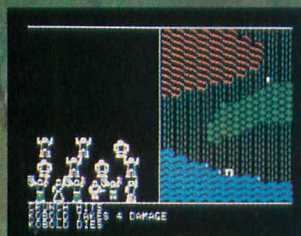
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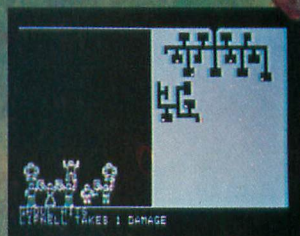
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BY MATTHEW RATCLIFF

Spellblast

Space-action spelling action

Spellblast combines rapid-fire arcade action with the time-honored Hangman format to bring children a fun way to learn spelling. The BASIC program works on all 8-bit Atari computers with a minimum of 24K memory, with disk or cassette.

Many children automatically seem to dislike things that are supposed to be good for them. Well, just leave out the word "educational" when you introduce your children to Spellblast, a

space-action version of Hangman. The kids will soon be spelling better than ever, and they'll be having too much fun to realize that Spellblast is supposed to be "good for them."

The game can also be easily customized to help children—and adults—practice spelling the exact words they need more work on.

PLAYING SPELLBLAST

After the title page is displayed, pressing the joystick button calls up the instruction screen. Press the joystick button a second time to arrive at the topics menu. Move the joystick left and right to choose the total words to be spelled per game. The default value is 10, with a maximum of 50. Move the stick up and down to pick one of the desired topics from the display. Press the joystick button to begin game play. This published listing has three topics for spelling practice:

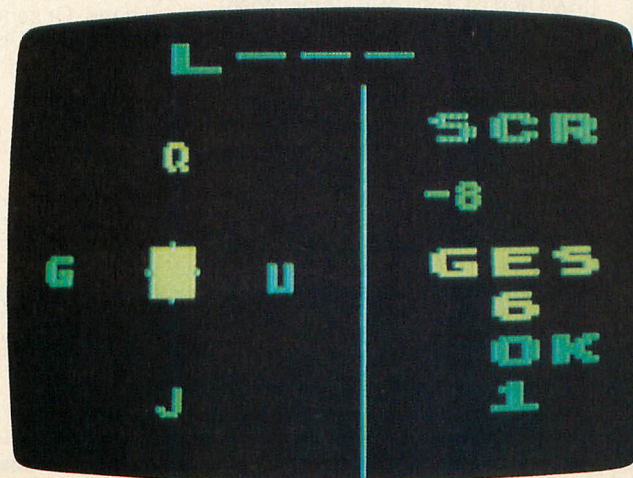
1. Animals, Fish & Fowl
2. Musical Instruments
3. Computer Terminology

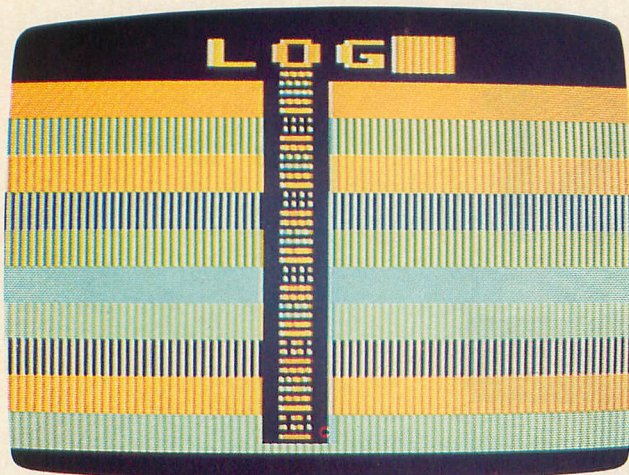
A series of blanks for letters appears across the top of the screen. On the right is a display of the current score (SCR), total guesses for a given word (GES) and the number of correctly chosen letters in the word (OK). On the left is the play area, where your "spellbase" appears in the center of a wave of attacking letters.

Four letters approach your base from above, below, left and right. At least one of these letters *might* fill a blank. Just point the joystick handle

continued on next page

In this fast-action spelling game, zap the correct letter before it reaches the starbase at the bottom of your screen.





Guess the whole word by pressing the [SPACEBAR]. Typing a correct letter zooms it into the correct space and gives you 10 points.

toward your guess—don't press the trigger button. If you guessed right, the letter you blasted will fill each blank where it belongs in the word. Each correct letter scores two points, but a wrong guess deducts two points. If you think that none of the four letters in a turn are correct, press the joystick button to pass without a wrong-guess penalty. Holding down the joystick button also lets you pause the action and think a bit, before the next quartet of letters descends upon you.

As soon as you think you know the whole word, press the [SPACE BAR]. A large flashing cursor appears at the first blank space remaining in the word. Typing a correct letter zaps it into the blank and adds 10 points to your score. An incorrect guess sends you back to the play screen with a new wave of letters.

Correct completion of a word gives you a 10-point bonus. If you allow a wave of letters to reach your spellbase and destroy it, you lose 10 times the number of points earned in the current word—after which the correct spelling is shown. After you spell all the words for the game, the total, high score and best guess ratio are displayed. Press [Q] whenever you want to quit.

TYPING IT IN

Type in Listing 1, SPELLB.BAS, check it with TYPO II and SAVE a copy before you RUN it.

If you have trouble typing the special characters in lines 5000-5068, don't bother typing them in. Listing 2 will create these lines for you and write them to cassette, or to a disk file called SLINE.LST. Now type NEW and LOAD Listing 1, then ENTER the file created by Listing 2. Make sure you SAVE a copy of the combined program before you RUN it.

CUSTOMIZING SPELLBLAST

Adding new topics or words to Spellblast is easy. First, change the value of TOPICS in line 2820. Next, add an appropriate menu bar to the number of topics available. Follow the example menu in lines 2850-2870, when adding a new menu line. For example, suppose we are going to add European Countries. TOPICS would then have to equal four in line 2820. We would then add a line to the menu as follows:

2880 POSITION 6,8:?

"4. EUROPEAN COUNTRIES"

Once these steps are complete, just add DATA to the program. There must be five words per line, but if you're a few words short, just repeat some of those already listed in the topic. The beginning line number and the total number of lines in the new topic,

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must also be added following the data in line 20000. In our example, you could add line 20010 as follows:

20010 DATA 10040,5

You would then be able to select from four topics for the game.

You are limited only by the size of the screen for topics, which will allow 17 with the current display layout. The words are limited in length to 10 characters. Any more than this causes wrap-around and confuses the display (but does not crash the program).

Memory limitations can be remedied by keeping each topic in separate text files on disk or cassette. Spellblast could then be modified to ENTER new DATA lines in place of the old ones, along with a new set of topics.

PROGRAM TAKE-APART

200-290: Select a wave of four letters for the game-play loop.

300-595: Draw a wave of characters, get joystick input and set flags.

600-650: Clear the game-play area of the screen.

1000-1430: Display the game title screen.

1500-1610: Select a new word at random from the current topic.

1620-1740: Letters-hit-spellbase routine. Deduct points and continue with a new word.

1750-2020: Spell out the word from keyboard input.

2030-2230: Process selected letter from joystick input and see if word is complete.

2300-2780: End-of-game routine. Print out totals and wait for keypress.

10000-10037: Word DATA for three topics (exactly five words per line.)

20000: DATA indicating beginning line number and total lines of word DATA under each topic.

In May, 1986 Matthew Ratcliff of St. Louis, Missouri won the Antic Award for Outstanding Contributor to this magazine.

Listing on page 107



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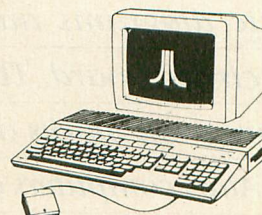
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Stepper Motor Robot-Controller

Moving real things with your Atari

Have you ever wanted to use your Atari to move things? Perhaps to roll a robot around, direct a photocell scanner from across a room, or move a manipulator arm? Stepper motors can do it—with the interface board and software described in this article. Note: To complete this project successfully, you must be enough of an electronics hobbyist to read schematic diagrams and solder a circuit board. The BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.



Stepper motors move the print head and the paper feed on dot matrix printers. They move the head assembly on your disk drive in and out with great precision, accessing different disk tracks. In fact, steppers are very versatile and would be used for even more purposes except that you can't just connect them to a power source and switch them on and off. They must be controlled with sophisticated hardware—such as your Atari computer.

(Antic successfully tested the stepper motor interface board and software provided by the authors. But because we wanted to get this important (and thoroughly detailed) material into print as quickly as possible, we did not take time to rebuild the hookup from scratch, as is our usual procedure when publishing hardware-software projects.—ANTIC ED)

HOW STEPPERS WORK

Stepper motors rotate only a little bit when pulsed, typically 1.8 to 3.75 degrees. But they do it with precise accuracy and powerful torque. These motors move something into position and lock it there firmly. Unlike most other tools for moving things, stepper motors can tell you exactly how far and how fast they have moved, and which way they are pointing.

All electric motors have two basic parts—the armature, which turns, and the stator, which doesn't. Magnetism pushes and pulls the armature with the stator. In a conventional motor, when the armature almost gets to where magnetism is moving it, brushes contact new areas and the magnetic polarity is switched. The armature suddenly has a long way to go again—rather like coaxing a horse forward with a carrot on a stick.

Most conventional motors have only one stator coil, but stepper motors usually have four. Steppers also use a permanent armature magnet instead of armature coils, commutators and brushes. Stepper motors let the armature catch the carrot, and they magnetically lock the armature into each position. Turning on another coil of the stator and turning off the previous coil moves the armature another step and locks it into a new position.

The stepper motor controller rapidly distributes precisely timed bursts of electricity to the different coils of the stepper motor and provides the timing to control the speed. It can also count the number of steps traveled—that is, how far the armature has been turned—with computer-like accuracy. And this is where your Atari comes in. The software and hardware explained in this article will let you use your Atari as a stepper motor controller for many robotics-type projects of your own choosing.

HOOKING UP

An Atari 8-bit computer has excellent Input/Output capabilities that include two joystick ports, each containing four digital I/O pins, two analog (pad-

| Step # | Q1 | Q2 | Q3 | Q4 |
|--------|-----|-----|-----|-----|
| 1 | ON | OFF | ON | OFF |
| 1½ | ON | OFF | OFF | OFF |
| 2 | ON | OFF | OFF | ON |
| 2½ | OFF | OFF | OFF | ON |
| 3 | OFF | ON | OFF | ON |
| 3½ | OFF | ON | OFF | OFF |
| 4 | OFF | ON | ON | OFF |
| 4½ | OFF | OFF | ON | OFF |
| 1 | ON | OFF | ON | OFF |

Figure 1

dle) inputs, a trigger input, a five-volt direct-current source (+5VDC) and a ground. These items meet the needs of most stepper motors. The digital I/O lines can be used in a joystick port to turn the stepper motor coils on and off, while the +5VDC and ground can power the interface circuit. The source of the current to power the motor depends on the stepper motor used.

In our sample interface, we'll use an Airpax 86402, a +12VDC four-phase stepper. This is a good choice because +12V is easy to get and the motor is

strong and precise—only 1.8 degrees per step—but mostly because it's cheap. In fact, we can buy the whole controller and motor with power supply for less than \$25. Steppers are usually fairly expensive, but if you buy from surplus stores the prices get ridiculously low (\$3.95 for the one we used).

To turn the stepper motor, we apply +12V to different phases (combinations) of stator coils in turn. The stepper can be turned in half steps by using another set of combinations. But the half steps don't have the same powerful torque as the full steps and your project will probably not need to use them.

Some stepper motors need different arrangements for coils and phases. These can be obtained from the stepper manufacturer. Figure 1 shows which coils to send power to for different amounts of clockwise and counter-clockwise rotation, on an Airpax and similar motors.

We will assign one digital I/O pin in the joystick port to each coil, and use that pin to turn the power on and off for that coil. The Atari software will regulate the combination of coils to power during each phase, take care of the timing and keep track of the stepper position.

We must build a circuit to tell the coils when the joystick lines go high or low. We'll use a 2N3055 transistor to turn the power on and off. A 7404 integrated circuit will turn the transistor on and off with the digital line, and costs as little as 15 cents. A diode keeps the motor noise out of the computer, a pull-down resistor keeps false signals away and a power resistor cools the motor.

HIGH-LOW

When the joystick line for a coil goes low, the 7404 sends +5V to the base of the transistor, turning that transistor on and allowing the current from the motor to flow through the transistor to ground, powering that coil. The current goes through a power resistor before reaching ground, however, limiting total current flow.

continued on next page

SOME SUPPLIERS

Below are three electronics sources where the authors found good deals on key parts for this project. This short list is clearly not meant to be a complete guide to all possible parts suppliers throughout the U.S.

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When the joystick line goes high, the 7404 output and the transistor are turned off, stopping the current flow in that coil. We invert the pin/power relationship because the Atari normally puts all four pins high after a system reset. That would simultaneously power all four phases of the stepper before the program takes over and heat up the motor unnecessarily.

A diode between the 7404 and the transistor allows current to flow from the chip to the transistor, but not vice versa. This prevents motor noise from backing up through the system. The pull-down resistor keeps the transistor off until the computer supplies a signal. This is repeated once for each coil. The 7404 handles all four digital signals, triggers each transistor, and is powered and grounded by the joystick port.

The power and ground for the stepper motor come from a +12VDC power supply. A power supply from an Atari 5200 video cartridge system is rated at +11.5 VDC, which is close enough. There are ample 5200 power supplies on the surplus market for \$7-\$8 each.

Assembly of the interface board is comparatively easy, but beginning hardware hobbyists should work carefully and use a low-wattage soldering iron. Follow the schematic diagram in Figure 2 if you are using perforated board, which works fine if you don't want to etch your own board. Or work from Figure 3 if you are making a printed circuit. Use a socket for the 7404, make sure your solder joints are good and don't short the IC's pins together. Watch out for correct wire connections to the 2N3055.

If you are using the Airpax 86402 stepper motor, connect the two red wires to the positive lead of the power supply. The other four wires are the individual phase wires and should be connected to the board as follows:

Yellow Q1
Orange Q2

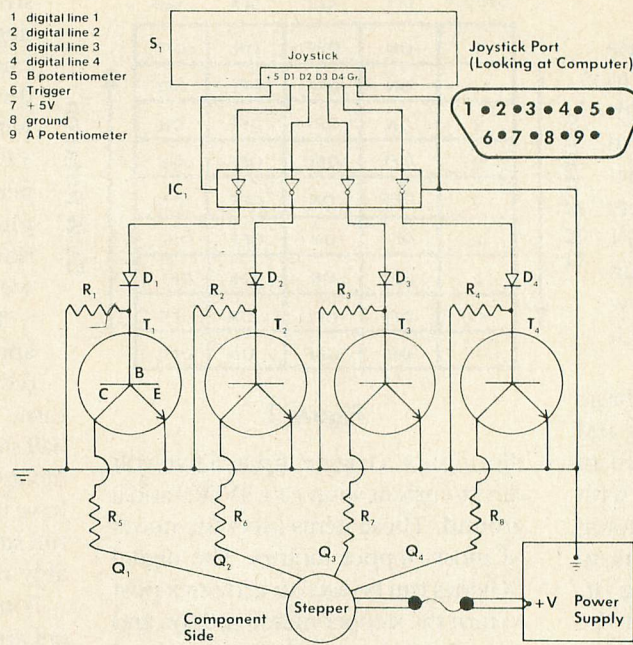


Figure 2

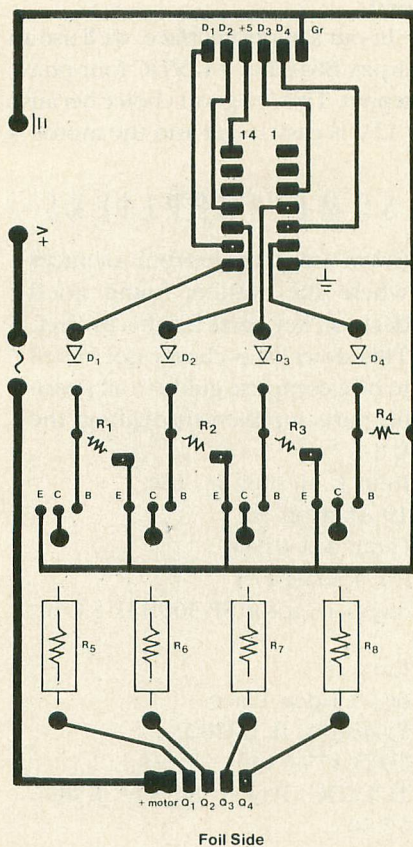


Figure 3

Brown Q3
Black Q4

The stepper motor plugs into the interface board via a polarized con-

necter. Plug the power supply to the board, following the correct polarity. Plug the DB-9 socket into the first joystick port, plug in the power supply and RUN the software.

Our stepper program was written to control various different motors. And different brands of stepper motor have different maximum stepping speeds. When performing a full-speed movement, the program may sequence the steps a little too quickly for your particular model of stepper motor, which would cause erratic movement. If necessary, insert a FOR/NEXT delay loop between steps, to smooth out the motion.

THE PROGRAM

Type in Listing 1, STEPPER.BAS, check it with TYPO II and SAVE a copy before you RUN it.

This program was originally written to raise and lower a camera platform in precise increments. (See adjoining story, *Steppers In Microphotography*). But the modifications to move almost anything else are simple. The program includes routines for quickly moving the motor in either direction, moving it to a given point, keeping track of the stage position, adjusting speeds, signalling when a move is complete and moving from point to point.

Each time a phase is powered, some I/O pins must be turned on and some off. This corresponds to putting ones and zeros into PORTA (location 54018, \$D300). PORTA is the memory location of joystick port 1 when it is being used as a data register. POKE that location with the decimal equivalent of the proper binary number (5 for 0101, 9 for 1001, etc.) to push the four joystick pins high or low. Labeling each phase number with a variable makes it clearer. Then we just POKE PORTA,A:POKE PORTA,B:POKE PORTA,C etc., to turn the motor.

By noting how many times we've POKEd the stepper, we can record its

motion and then turn it to selected positions with precision. Inserting a FOR/NEXT timing loop creates a variable delay to control the speed. POKE PORTA with A,B,C,D,A,B etc. in order, to turn the motor turns in one direction. If you POKE in the reverse order, it turns in the opposite direction. POKE PORTA with A,E,B,E,C,G, D,H,A,E,B etc. to turn it in half steps.

PROGRAM TAKE-APART

The program's REM statements explain various sections. Line 310 sets up joystick port 1 for output. Memory location 54016 (\$D302) is the PORTA control register (PACTL), and these POKES set up PORTA for output to the joystick port.

I should mention a few other programming tricks used in the display routines. One trick is to DIMENSION BL\$ in line 270 and PRINT it in line 490 (every time the menu is rewritten). BL\$ is a character string filled with blanks, and here it clears the command line.

Second, although the menu and commands are in Graphics 1, the display settings are in Graphics 0. Lines 110-120 print the display and the initial settings. Note that PRINT #6; prints to the Graphics 1 screen, while PRINT is used to print in the text window.

The statistics are updated by POKES to TXTROW and TXTCOL (memory locations 656 and 657) throughout the program. These locations hold the row and column, respectively, for the current cursor location in the text window. In line 890, for example, each time the program moves the stage and updates P (the present location variable), the cursor goes to row 2, column 28 where P is PRINTed. You must also PRINT a trailing space to clear the old number.

Finally, the ticking noise in the keyboard speaker as the program moves the stage up and down is produced by POKES to CONSOL, memory location 53279 (\$D01F). This is the same location used for reading the console keys. By using FOR/NEXT loops and experimentation, you can create a "fifth voice" for your Atari.

Using stepper motors with your

INTERFACE PARTS LIST

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Atari can open a world of computer-controlled precision movement. You can control a robot on wheels powered by stepper motors, using arms controlled by stepper motors, seeing with a scanner positioned by a stepper motor. And who knows what else?

In my own case, I've found that making the robot open the refrigerator door is easy, but how do I get it to take the tops off the bottles?

Scott Kilbourne is the Chief of Medical Photography at Southern Illinois University and president of the Lincolnland Atari Users' Group. Jon Holcomb is a Radiation Safety Technician at the Southern Illinois University School of Medicine. William Hall is Deputy Director of the Illinois Dept. of Children and Family Services. Bill Andrea provided some of the illustrations.





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Landscape Illusion

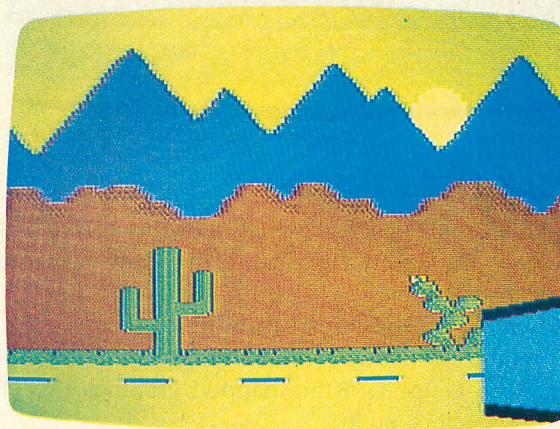
Take your Atari on a scrolling 3-D drive through the desert, complete with engine noises. The illusion of three-dimensional depth is surprisingly effective. This BASIC program works on all 8-bit Atari computers with at least 32K disk or 24K cassette.

This colorful optical illusion demonstrates parallax—the way objects appear to move when the viewer changes position. 3-D Landscape Illusion simulates driving through a desert where nearby objects seem to “move” faster than more distant objects. There are also engine sounds to help maintain the illusion.

Type in Listing 1, GOWEST.BAS, check it with TYPO II and SAVE a copy before you RUN it. If you have trouble typing the special characters in lines 210, 1010, 1030, 1100-1150, 1270-1280 and 1330-1350, don't bother typing them in. Listing 2 will create them for you and write them to a file called GWLINES.LST. Once you've created this file, type NEW and LOAD Listing 1. Next, ENTER the file created by Listing 2 to complete the program. Remember to SAVE a copy of the merged program before you RUN it.

When you RUN 3-D Landscape Illusion, it creates a desert scene divided into three independently scrolling horizontal strips. The mountains are drawn in the

Landscape Illusion simulates motion by scrolling the foreground and background scenes at different rates.



top strip, which moves slowest. The hills occupy the center strip, which scrolls a little faster than the mountains. The road is the bottom strip and scrolls fastest of all.

The Sun and the car bumper are players and remain stationary. The Player/Missile priority selection register (GPRIOR, memory location 623) is set to 2, allowing the Sun to apparently “slip behind” the taller mountain peaks. This instruction is in line 170.

continued on next page

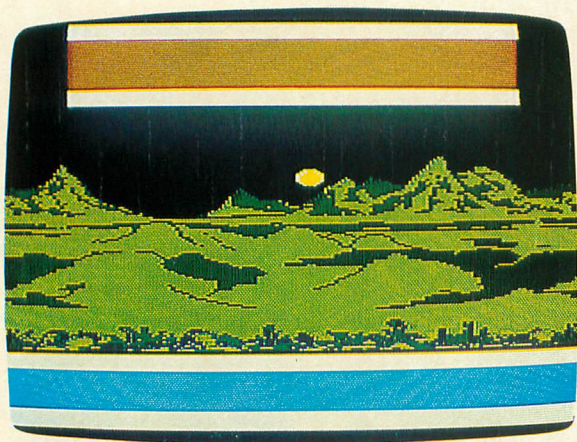
Scrolling scenery fools the eye

ANTIC MODE 4

The hills, mountains and the road are made of redefined *characters*, and displayed in ANTIC Mode 4 (Graphics 12 on XL and XE computers). This four-color character mode has the same horizontal resolution and twice the vertical resolution of Graphics 7—but requires less than a third as much memory.

Unlike other character modes, ANTIC Mode 4 characters were not meant to be formed into words and sentences. They're primarily used to generate detailed playfields which use a minimum of memory. To design original games or other graphics with your own ANTIC 4 characters, you need a special character set editor such as INSTEDIT (\$15.95, The Catalog, AP0117).

Sub, a joystick-controlled illusion, simultaneously scrolls four horizontal scenery "strips."



DISPLAY LIST BENDER

A Display List is a program which tells the ANTIC chip how to draw the screen. Display lists may only have three types of instructions:

1. Where to get the information to display.
2. How the information should be displayed (Graphics 0 characters, Graphics 8 bit-mapped graphics, ANTIC Mode 4 characters, etc.)
3. Are there any special options (such as vertical or horizontal scrolling, or interrupts) to consider?

3-D Landscape Illusion constructs a special display list which extensively uses all three types of instructions. The Graphics 23 call in line 40 establishes a Graphics 7 display list, without a text window.

Routines in lines 120-140 change this display list into the special ANTIC 4 display list which handles all three scrolling strips, plus the background.

A display list interrupt (DLI) at the start of each strip controls its horizontal scrolling, and changes color values at the bottom of the screen. A Vertical Blank Interrupt (VBI) routine controls the DLI's timing, and handles coarse scrolling. These routines are called in lines 210 and 220.

DISK BONUS

This month, Antic Disk owners are treated to a second optical illusion. SUB.EXE is a machine language joystick-controlled scrolling demo for all 8-bit Atari computers. This smoothly detailed, unearthly landscape was programmed by Patrick Bass, Antic's ST Program Editor. To see SUB in action, choose Main Menu selection 1 to get into DOS and then [L]oad SUB.EXE from DOS Menu selection L.

The following books will teach you more about these advanced graphics techniques:

Atari Graphics and Arcade Game Design

By Jeffrey Stanton with Dan Pinal

477 pages

\$19.95, Antic Catalog, MG0103

Your Atari Computer

By Lon Poole

Osborne/McGraw-Hill


465 pages

\$17.95

Pennsylvanian Joe Brzuszek sent us this impressive graphics demo along with a letter explaining why he believes the 1/60th-second television screen refresh rate is not fast enough to meet the Antic Lightstick Challenge (July 1986, page 29).

Listing on page 105





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HOW TO WIN We are looking for the most powerful, versatile, easy-to-operate programs that perform useful jobs in the real world. The more uses for your software, the better. For example, a stuffed-animal database for taxidermists would probably be considered too specialized by the magazine's judges—no matter how excellently it is programmed.

The winning software must be user-friendly, most likely menu-driven wherever possible. Users should not need programming knowledge in order to successfully operate the application programs.

Please note that some of the other popular Atari program categories—such as utility routines that add power when inserted into your own programs—cannot properly be considered applications. Practical application programs should be complete, stand-alone software that does an entire user-controlled job from start to finish. For example, a drawing or painting program would be a practical application—a colorful graphics demo would not!

TECHNICAL RULES Programs must run on the Atari 800, 800XL and 65XE models and require no

more than 48K memory. However, programs that *also* take advantage of the extra memory in the 130XE will be given preference.

Programs must be written in standard renumberable Atari BASIC or MAC/65 assembly language, under a disk operating system compatible with Atari DOS 2 or 2.5. Program listings cannot be larger than 150 sectors of a single-density disk.

Thorough error-trapping is very important. Your program should not crash every time a user accidentally presses the wrong key. And please do not include authors' copyright statements in your listing.

JUNE 15, 1987 All entries in the Antic 8-Bit Practical Applications Competition must be received by June 15, 1987. Winners will be announced in the November, 1987 issue of Antic. Judges' decisions are final.

Entries—programs and accompanying articles—should be submitted on disk *and* in printout. Entries will be returned only if the author provides a stamped, self-addressed envelope.

Send entries to:

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All 8-bit practical application programs accepted for publication by Antic between November 1, 1986 and June 15, 1987 will also be automatically evaluated as potential prizewinners in the contest.

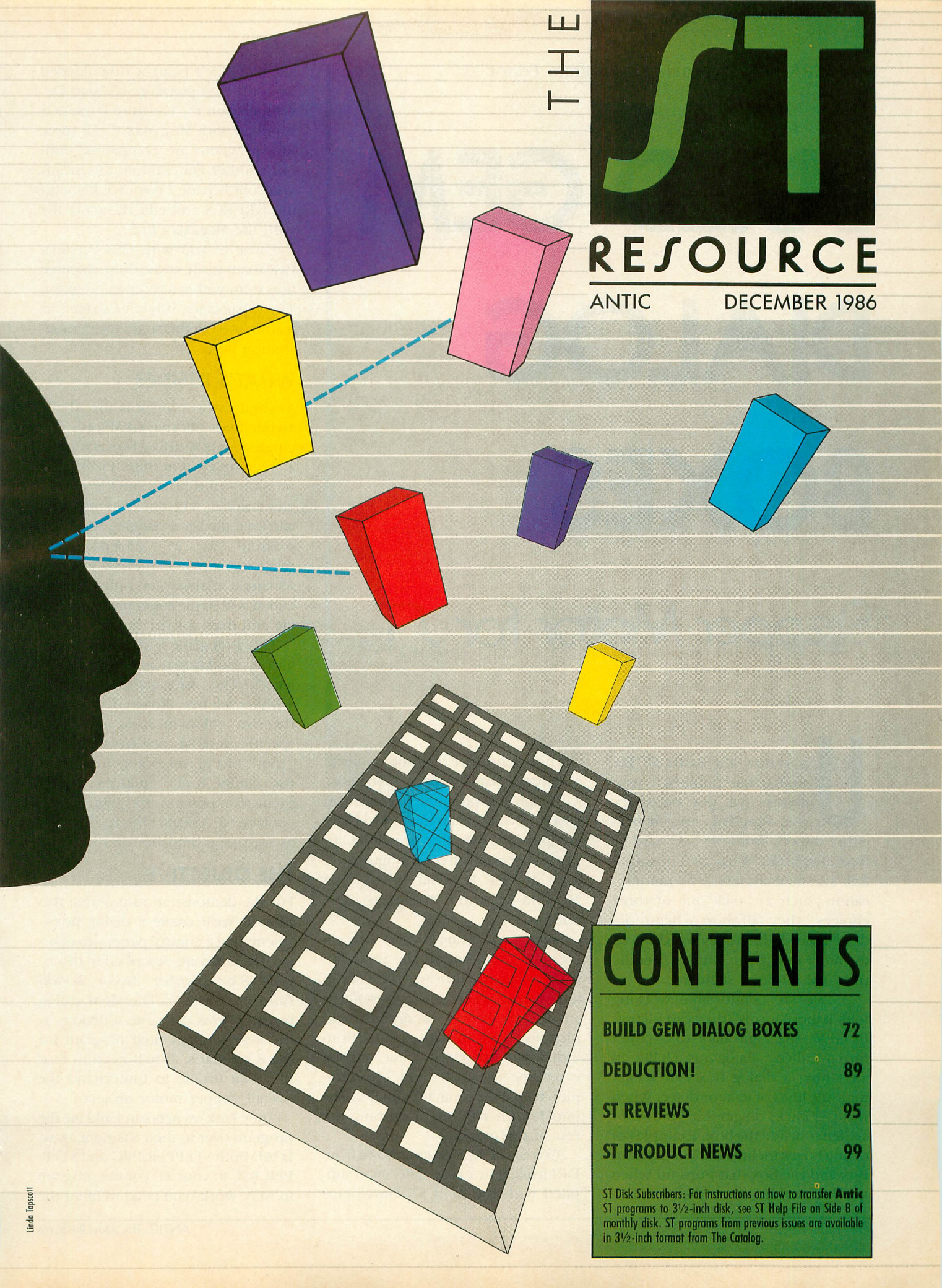
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ANTIC

DECEMBER 1986



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ST Disk Subscribers: For instructions on how to transfer **Antic** ST programs to 3 1/2-inch disk, see ST Help File on Side B of monthly disk. ST programs from previous issues are available in 3 1/2-inch format from The Catalog.

BUILD GEM DIALOG BOXES

Stepper Motor for ST

Up to now, the Antic ST Resource has published programs that got necessary user-supplied information either directly from the keyboard or from alert boxes. While alert boxes are fine for small amounts of communication, such as "pick one of three choices," they fall short when more detail is needed. The keyboard allows for more detail, but isn't as friendly the GEM interface standard.

People are comfortable working with paper "forms" they can fill out. In GEM, the equivalent of a paper form is called a dialog box. Unlike an alert box, a dialog box can accept multiple lines of text, or detect when the user clicks on graphic buttons or switches inside the box. Examples of dialog boxes include the File Selector Box and the box that pops up when you "show info" on a disk or file.

This month, we're going to create and manipulate our own dialog box. Although the program is written in DRI's Alcyon C from the Atari ST Developers Kit, the same principles apply for users of other ST languages—such as OSS Personal Pascal, TDI Modula-2 and Prospero Pro Fortran-77.

Since we're using Alcyon C, we'll create it using one of the three Resource Construction Sets (RCS) available. Resources are collections of text strings, rectangle descriptions and pictures which are kept separate from individual programs. Thus anyone can come along later and, for example, change the program's English text into French *without* disturbing the rest of the program.

Two of the RCS programs are from DRI itself. The original RCS was supplied with the Atari ST Developers

Kit, and RCS 2.1 can be downloaded from the CompuServe SIG*Atari Developers Forum. The third is the RCS supplied with MegaMax C. All three RCS programs are compatible with one another. For example, this means you could create a resource file with the DRI RCS and edit the same file with the MegaMax RCS.

Those of you with OSS Personal Pascal can easily create these resource files from within a running program. The C packages, however, make this feature too cumbersome for demonstration here.

WHAT'S INSIDE?

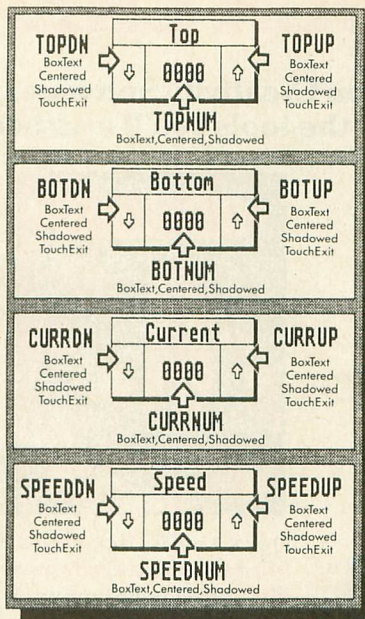
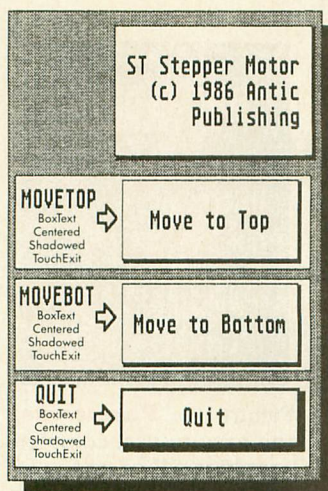
Anybody who programs the ST for awhile finds out that GEM loves rectangles. A GEM dialog box is *always* a rectangle—whether visible or invisible—and holds smaller rectangles inside it, which may in turn contain even smaller rectangles. This is explained as a "parent/child" relationship, where the smaller child rectangle is always completely contained within the larger parent rectangle and may not overlap.

This arrangement of nested rectangles is also known as a "tree of objects". The information structure within each tree allows GEM to track the size, color, location and other specifications of each rectangle. The "root" of the tree points to each of the parent root's children, which themselves point to any children they contain, etc. Visualize this relationship as spreading branches of a tree.

THE OBJECTIVE

For the demonstration program this month, we'll create a dialog box—resembling a control panel—to operate the hardware described in this issue's 8-bit *Stepper Motor Robot-Controller* article. The GEM dialog box performs the same functions as the keyboard-operated program for the 8-bit Ataris. (You'll need to read the 8-bit article to understand the overall stepper motor project.)

Antic Disk owners can LinkLine the program over to their STs right away. LOAD both STEPPER.PRg and STEPPER.RSC to your ST. For the program to fully work, you need to build the



cause it's only there as a title. The up arrow box is named **TOPUP**, the down arrow is named **TOPDN** and the number is named **TOPNUM**. Each object has its own unique number, so we can use these names just like declared constants when we later need to determine which object we are dealing with. When you're finished creating your new resource, save it to disk. The Resource Construction Set will automatically create a .h header file for inclusion with your C program, containing all the names for the parents and children, along with their object numbers.

For example, because the up arrow object is a **touchexit**, when the program runs and we interact with the dialog box we will receive the number of the up arrow object—**TOPUP**—whenever the user presses the left mouse button while pointing at that object. We can test for the number of the object which caused the exit from the dialog box and act accordingly. In this case, getting the object number **TOPUP** from the dialog box directs us to increment the **TOP** number by one.

SAVING A RESOURCE

Finish creating your new dialog box using your RCS and the example in *Figure 1*. Save it to disk using the name **STEPPER**. When you examine the directory for that disk, you'll find the RCS has created at least three files:

1. **.RSC** file—the resource itself.
2. **.H** file—contains the names and object numbers. This file is for C programs only, but the RCS from Digital Research can also create files compatible with Pascal or Fortran-77.
3. **.DEF** file—tracks how different trees in a single resource are classified. Categories are dialog boxes, menus, free strings, or unknown. This file is only needed when you reopen a resource file for editing. You can edit a resource *without* the **.DEF** file, but you must reclassify all trees inside the resource file itself. Incidentally, RCS 2.1 creates a **.DFN** file, which works the same way.

When the resource is created, you can run **STEPPER.PRg** by just double-clicking on its icon. The program will

produce the rectangle sizes exactly as shown is not important. The important thing is that you correctly *name* each of the objects and correctly set their individual *attributes*. For example, let's look closely at the four objects at the upper right of the dialog box—these objects combine to form a controller for the way we change and monitor the top location of the camera platform.

There are three smaller boxes below a full-width box that contains the word "Top" inside it. Of the lower three boxes, the center one has a four-digit number in it and the two flanking boxes contain a down and an up arrow. All four object boxes are of type **BoxText**, and are **shadowed** and **centered**. The two arrow objects are also **touchexits**. The main difference between them is their *names*.

The "Top" box has no name, be-

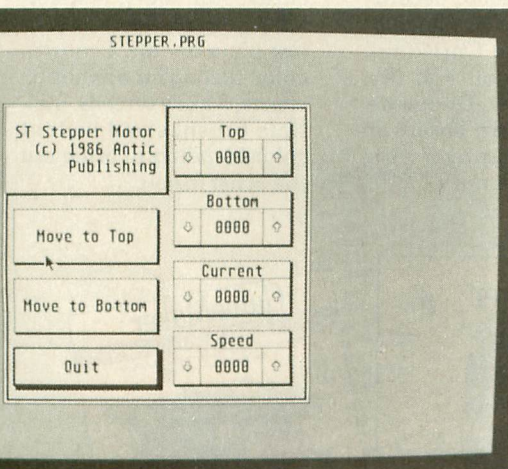
interface board described in the 8-bit stepper motor story. However, if you just want to study the programming of ST dialog boxes, this program will run only if you have your printer connected and online.

If you don't have this month's Antic Disk, carefully type in Listing 1 **STEPPER.C**, and **SAVE** a copy to disk. Compile and assemble this C source code down into a **.o** file, and then link it to **apstart**, with **aesbind**, **vdibind**, **osbind**, and **libf** trailing along behind. **Relmod** the resulting **.68K** file into a **.prg** file and you're half finished. We now need to create our resource file.

BUILDING A RESOURCE

Figure 1 is a picture (drawn with **DEGAS**) of the dialog box created for the ST Stepper Motor program. Using your Resource Construction Set to re-

Above: Diagram of ST Stepper Motor dialog box (drawn with **DEGAS**) showing the **GEM** names and attributes. Below: Completed onscreen dialog box.

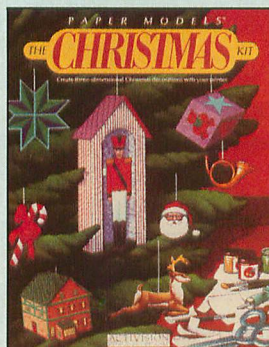


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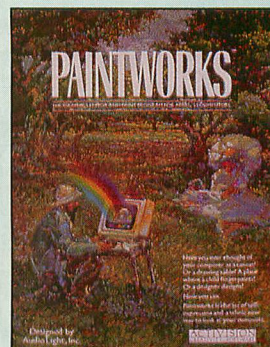
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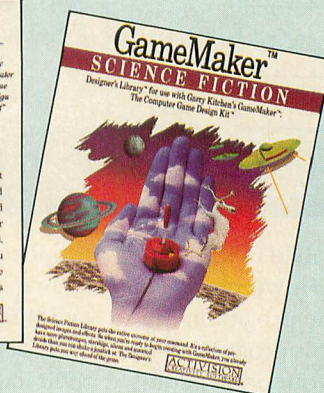


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search for, and load, the STEP-
PER.RSC file, presenting it for inter-
action. Let's examine the program in
detail.

PROGRAM TAKE-APART

This program is written in the origi-
nal Alcyon C contained in the De-
velopers kit. It is *not* the new Version
4.14. We'll switch when we learn that
enough readers have access to Version
4.14. Those of you with MegaMax C
should find little problem in convert-
ing this program—basically just sub-
stitute **sprintf()** for the published
program's **ftoa()**. Lattice C and Mark
Williams C owners are also en-
couraged to try.

The top few lines contain remarks
for the title and version date. Right be-
low, we **#include** the **stepper.h** file
constructed by the RCS and the stock
osbind.h that everybody knows and
loves.

Next come **#defines**, where we
redefine some funny C operators into
understandable words. The last three
lines construct **LWGET(x)**, which
functions like an inline **PEEK** state-
ment for words, and **OB_W / OB_H**,
which will allow us to get the
width and height of object rectangles
when we update them.

Below the **#defines** are definitions
for **OBJECT** and **TEDINFO** structures.
Structures are a convention in C to re-
late different sizes of data into an eas-
ily accessed form. They are similar to
Pascal **RECORDS**.

Below the structure definitions
come the global variable declarations
including the 16-bit **ints**, the 8-bit
chars, and the 32-bit **longs**.

Now we start our program logic. In
main(), which every C program *must*
have, we describe the program's oper-
ation briefly. Here, we **initialize()** the
application, then **move_the_**
stepper_motor(), and **repeat** this
action **while(not finished)**. When
we finally get **finished**—when **fin-**
ished sets **TRUE**—we'll **terminate()**
this application and return to the
desktop.

INITIALIZATION

Initialization here hooks our program
into GEM and gets our application

"handle." Then it opens a virtual
workstation that returns a world of in-
formation about the type of terminal
we're on, in the array **workout[]**.

The first of two new calls, **rsrc_**
load(), when given the path/filename
of the needed resource file, will de-
termine how big the resource is, re-
serve enough memory, and then load
the resource into the just-reserved
memory section. The second call,
rsrc_gaddr(), will return the long
address of the memory location hold-
ing the root of the desired tree.

From here we can search the tree
for any desired object within. Before
we leave the initialization function,
we set **a**, **b**, **c**, and **d** — which match
the function and value of **a**, **b**, **c**, and
d in the 8-bit Atari program—to their
proper port bit-pattern values. Then
we force the mouse pointer sprite
back to a pointing arrow, and set **fin-**
ished to **FALSE**, because we haven't
finished the program yet.

MOVING THE MOTOR

In **move_the_stepper_motor()**,
we have the major block of code for
interacting with our dialog box. The

forms library call: **form_center()**
will figure out the screen position to
center the dialog box (based on the
size of the dialog) and return them to
the variables **xdial**, **ydial**, **wdial**, and
hdial. The next call, **find_box_**
sizes(), computes the clipping rec-
tangle needed for each numeric dis-
play inside our dialog.

form_dial(0...) saves for later
redrawing a copy of the screen por-
tion covered up by the dialog box.
form_dial(1...) draws the "grow-
ing box" display from size **x**, **y**, **w**, **h**
to size **xdial**, **ydial**, **wdial**, **hdial**.

We draw our dialog box on the
screen with the **objc_draw()** call,
which needs to be told the location
of the **ROOT** of the tree to be drawn
(**box_address**), which object to draw
(**TREE1**), how many children deep to
draw (**2**), and the largest clipping rec-
tangle expected, (**x**, **y**, **w**, and **hdial**).

We now begin interaction with the
displayed dialog. The **form_do()**
call needs the **ROOT** of the tree to in-
teract with, and the number of the
editable text field (**TEDINFO**) on
which to place the cursor when the

continued on page 87

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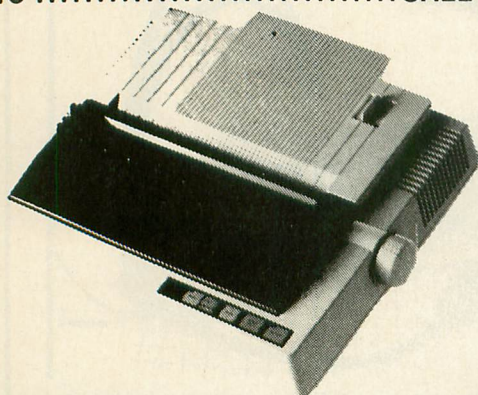
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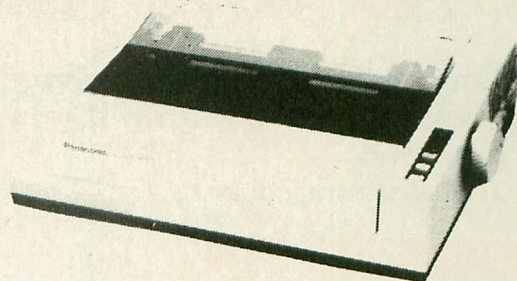
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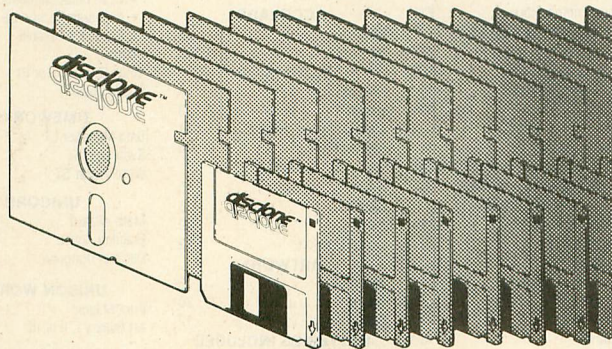
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| Fight Night | 20 |

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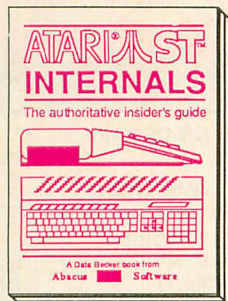
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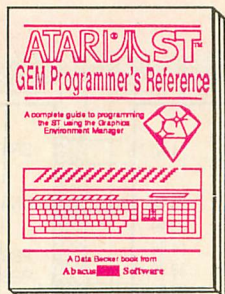
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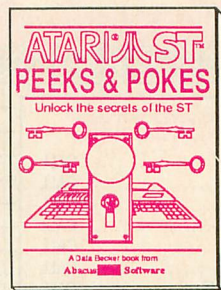
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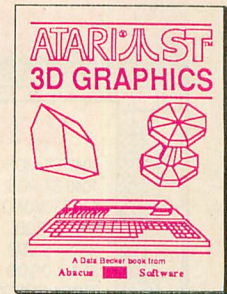
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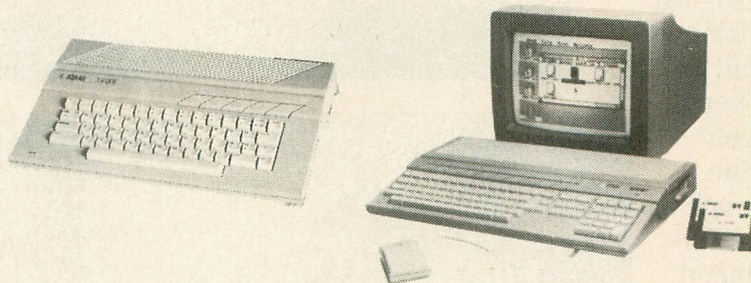
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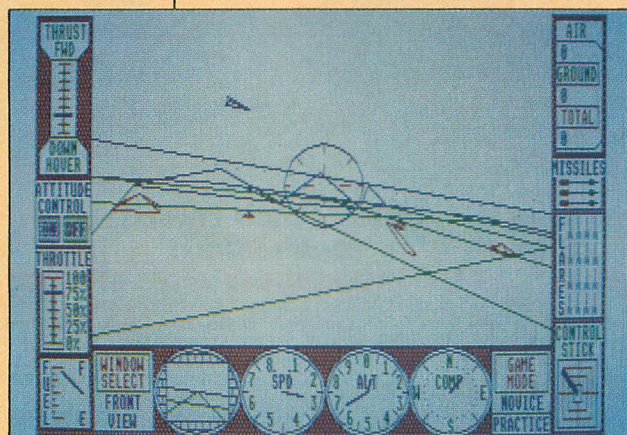
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GEM DIALOG

continued from page 75

dialog box is first displayed. We have no editable text in our box, so we pass in a zero. GEM will control and monitor all interaction with the displayed dialog box until the user clicks on one of the designated "exit" objects. GEM then returns the object's number to the program, which in our case gets

MegaMax C users should find little problem in converting this program from Alcyon C

placed into the variable called **button**.

When GEM passes control back to our program, we use the next 10 lines to test for exactly which object the user clicked on. Using our TOPUP button, the third line would detect when it was pressed for an exit and divert control to the function called **d_topup()**. The **do** loop construct will continue to activate the dialog box until the pressed exit button is the **quit** button.

form_dial(3...) forces a redraw of the screen that was covered by the dialog box. When we fall out of the loop, the next line is **form_dial(2...)**, which draws the "shrinking box" graphic onscreen, to show the utility closing. The screen is redrawn from the image which was saved in the **form_dial(0...)** call earlier. Now that we want to leave the application, we set **finished** to TRUE, and return to the outermost loop, which will **terminate()** and exit.

FIND SIZES

The next function is **find_box_sizes()**, which uses an AES object library call named **obj_offset()** to discover the x,y coordinates of the upper left corner of the object you ask it for. In our case, for each number

box we ask for, (TOPNUM, BOTNUM, CURRNUM, or SPEEDNUM), we also get the width and height of the box so we may use the described rectangle as a clipping window. If we did not, then every time we updated each number, GEM would redraw the entire dialog box, at a cost of 1-2 seconds.

UP AND DOWN

The next eight functions are called each time their function button is pressed. For example, **d_topup()** is called whenever the TOPUP button is pressed. The routine **d_topup()** simply increments the variable **top** and then calls **adjust()**, passing in the tree, object, string, and clipping rectangle wanted. All eight routines work the same, except for **d_curup()** and **d_curdn()**, which also have the responsibility of placing the control bytes out the PRINTER port.

ADJUSTABLE

The next function, **adjust()**, takes the value of the variable passed to it, changes the numeric value into an ASCII text string, then tells the dialog box where to find the just-created string of ASCII digits when it is needed for display.

The function **ftoa()** changes a numeric value into the ASCII string. MegaMax C users will want to substitute **sprintf()** for this call. Next, **set_text()** tells the dialog box where the newly created string is located, and **objc_draw()** redraws the number box object. Before we leave, **beep()** sounds a click from the speaker.

Right below is the **set_text()** function, for which I thank ANTIC ONLINE columnist Tim Oren for his help. This function needs the address of the ROOT of the dialog's tree, the number of the OBJECT you desire to change, and the address of the first byte of a null-terminated string of digits to show.

To begin, we declare **obj_specification** to be a pointer (*) to a TEDINFO structure. We then assign a value to this pointer by computing and retrieving the **ob_spec** value,

which in this case points to the TEDINFO structure itself. Using this pointer to a structure, we assign to the structure entries **te_ptext** and **te_txtlen** the values for the address of the new string and the length of the new string.

The next two functions, **move_top()** and **move_bottom()**, describe how to perform timed, programmed moves of the camera stage to the top of available travel, or to the bottom. We set up a **for** loop to cover the range of travel desired, and then call **d_curup()** or **d_curdn()** as desired. Next to last, **beep()** takes a LO, HI, and loop length value and uses these to perform simple tones through the monitor speaker.

Finally, **terminate()** does just that; the only difference from every other **terminate()** call we've published so far is inclusion of a **rsrsrc_free()** call, which will disengage and free the memory we reserved for the resource file when we first started the program.



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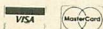
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| "Hello, world" | 63 | N/A | 4691 |

*Times in seconds. Sieve with register variables.

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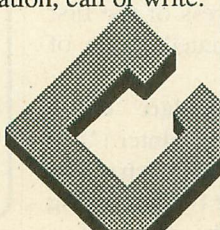
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520ST

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- CODE statement for assembly code
- 370-page manual
- Installs on Hard disk and RAM disk
- No royalties or copy protection
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Pascal and Modula-2 source code are nearly identical. Modula-2 should be thought of as an enhanced superset of Pascal. Professor Niklaus Wirth (the creator of Pascal) designed Modula-2 to replace Pascal.

Added features of Modula-2 not found in Pascal

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

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

```

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

```

MODULE Float;
FROM MathLib0 IMPORT sin, ln, exp,
  sqrt, arctan;
VAR x,y: REAL; i: CARDINAL;
BEGIN (*$T-$A-$S-$*)
  x:= 1.0;
  FOR i:= 1 TO 1000 DO
    y:= sin (x); y:= ln (x); y:= exp (x);
    y:= sqrt (x); y:= arctan (x);
    x:= x + 0.01;
  END;
END float.
  
```

```

MODULE calc;
VAR a,b,c: REAL; n, i: CARDINAL;
BEGIN (*$T-$A-$S-$*)
  n:= 5000;
  a:= 2.71828; b:= 3.14159; c:= 1.0;
  FOR i:= 1 TO n DO
    c:= c*a; c:= c*b; c:= c/a; c:= c/b;
  END;
END calc.
  
```

Product History

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

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

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

Other Modula-2 Products

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



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DEDUCTION

Solve the mystery color patterns

Deduction is a classy ST BASIC adaptation of the old game most recently popularized as Master Mind. You must guess a pattern of four colors chosen by the computer. Each color can occur only once in the sequence. The game's concept is ancient, having been played in old England as Cows and Bulls, and more recently as Code-Breaker.

First type in DEDUCT.BAS, checking with ST TYPO, and SAVE a copy before you RUN it. Load ST BASIC and click on BASIC.PRG. Then load DEDUCT.BAS and click on "Run" in the appropriate window. This calls up a low-resolution color screen that interacts with the user via the mouse. (Sorry, Deduction does not run on the ST's high-resolution monochrome monitor.)

To begin deducing, click on the left button for the easy version of the game, or right button for the hard version. Both versions give you a choice of red, yellow, green, blue, cyan and violet. But the hard version also adds pink. This might not sound like a big difference, but with six colors, the odds are one in 360 that you'll get it right the first time. Adding a seventh color raises the odds to one in 840.

12 TRIES

You get 12 chances to guess the correct sequence. After you click on a color, that color is copied above in the first open rectangle on the left. Click on "Accept"—or "Reject" if you change your mind. The squares to the right of the four rectangles change color to indicate how close your

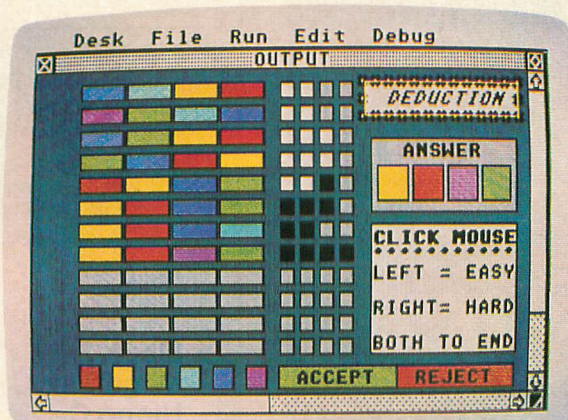
guess was. White squares show that you got a color right, but in the wrong sequence. Black squares indicate that both the color and sequence are right.

From this, you can probably see that those high odds decrease drastically as you play—if you use your head. If you see two white squares, one black and one blank, you know that three colors are correct, but only one is in the right place. From there, you can see how that guess relates to previous guesses. Once you know where a color *isn't*, you should be able to piece the puzzle together and determine where each color *is*.

But Deduction isn't a piece of cake. Just guessing randomly won't do. You might even try keeping

track of your deductions on paper to help you see a pattern. But if you just work it all out in your head, you're still likely to guess correctly within 12 turns—if you play the game right.

Deduction follows last month's Hangman in a series of classic public domain games revamped for ST BASIC by Stephen Everman and Paul Pratt of Hayward, California. Their flashy version of Star Trek will appear in the February, 1986 issue of Antic.



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| Megamax C | 1:10 | 0:24 | 3.83 |
| Hippo C | 0:58 | 1:37 | 8.4 |

C's w/o register variables

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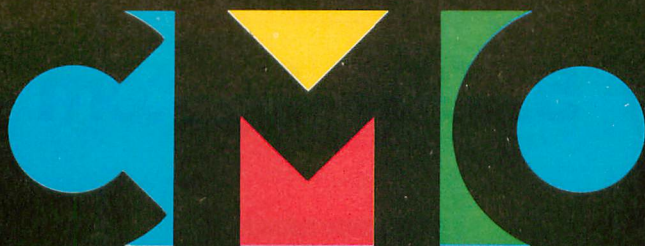
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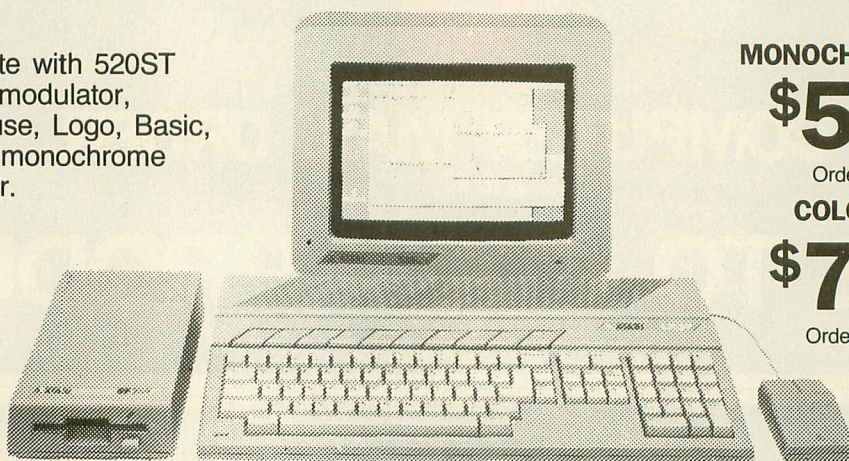
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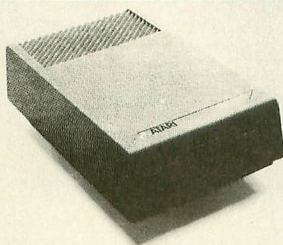
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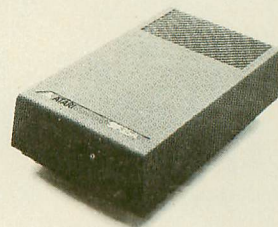


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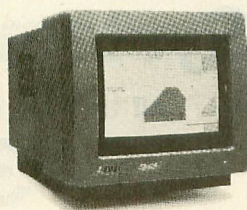


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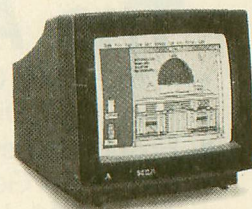


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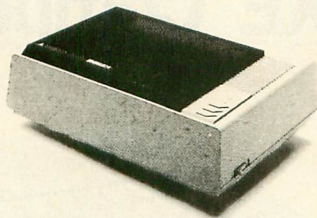
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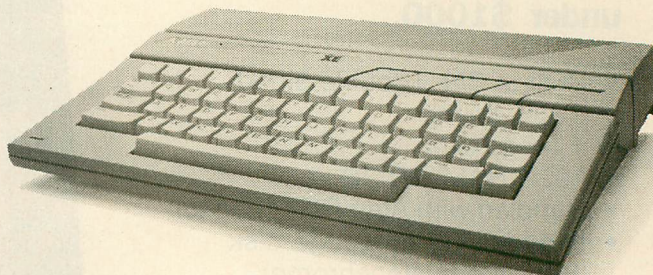
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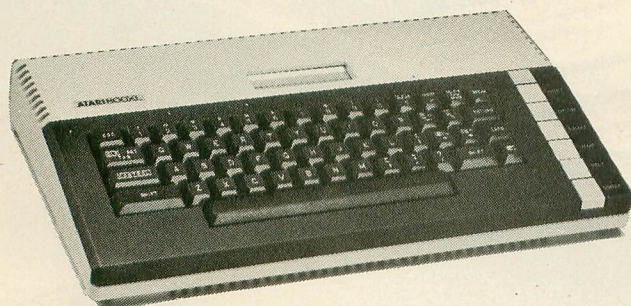
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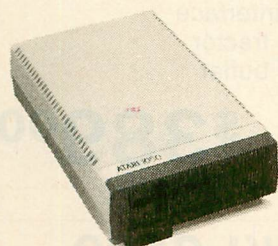
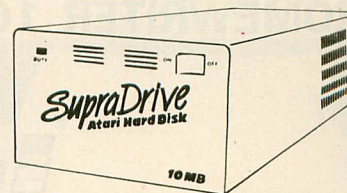
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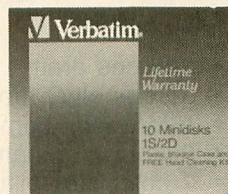
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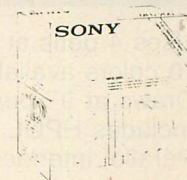
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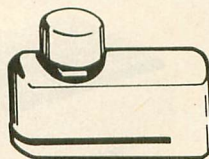
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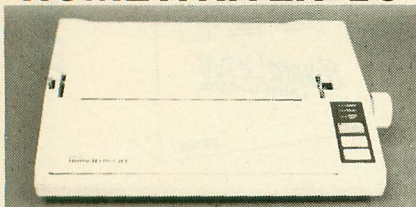


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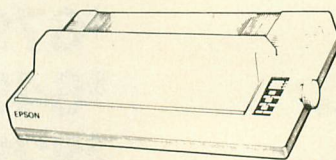
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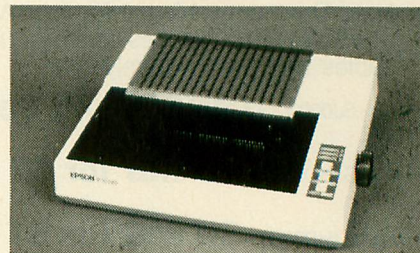
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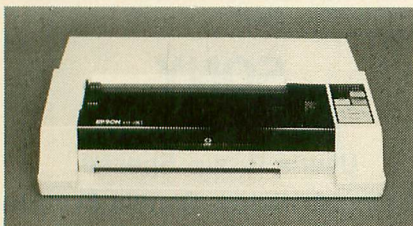


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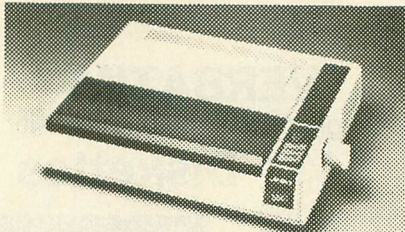


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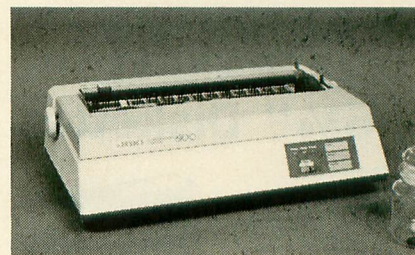
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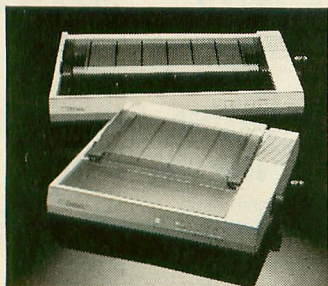
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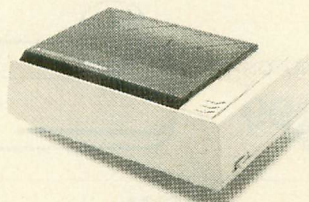
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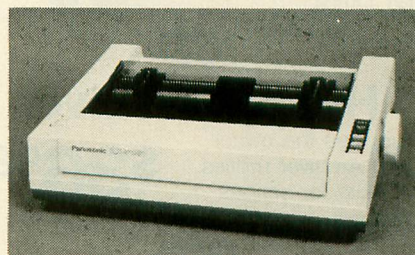
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No. AAXM801

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No. AAXM804

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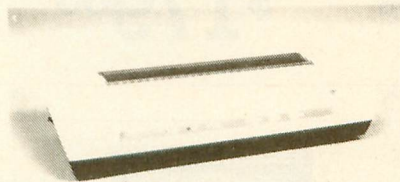


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No. PA1091

STAR LV1210 PRINTER

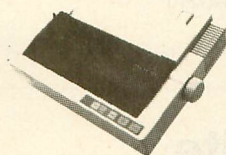


- 120 cps • IBM compatible
- Built-in tractor
- 80 column • Parallel Interface

\$189⁰⁰

No. SGLV1210

STAR NX-10 PRINTER

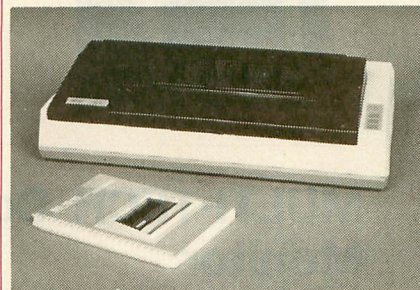


- 120 cps • Bi-direction
- Logic seeking
- IBM Character set
- Friction and Tractor feed

\$239⁰⁰

No. SGNX10

STAR SG-15 PRINTER

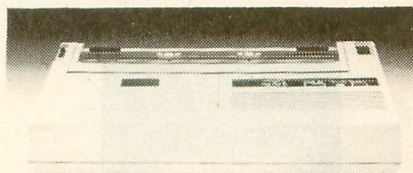


- 120 cps • 16K Buffer
- Wide Carriage

\$399⁰⁰

No. SGSG15

OKIDATA OKIMATE 20



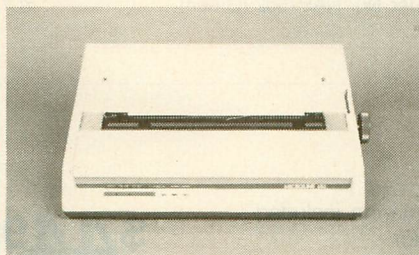
- Color Screen Print Software
- 80 cps Draft/40 cps NLQ
- 24 Element Print Head
- 80 Column, 8K Buffer

\$139⁰⁰

No. OK20

w/purchase of Interface

OKIDATA 182

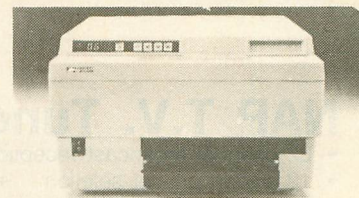


- 120 cps • 60 cps enhanced
- Adjustable pin feed
- Parallel Interface

\$219⁰⁰

No. OK182

CANON LASER LBP-8A1

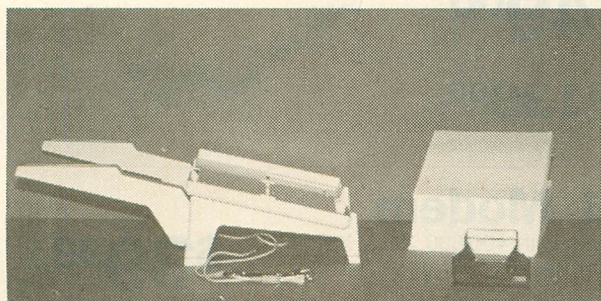


- 8 pages per minute
- High quality printing
- 16 fonts per page capability
- Diablo 630 emulation
- Parallel interface

\$1999⁰⁰

No. CCLBP8

“Don't forget to order accessories for your printer.”



Printer Stands

\$14⁹⁹

No. CUUPS1, Curtis Universal Printer Stand

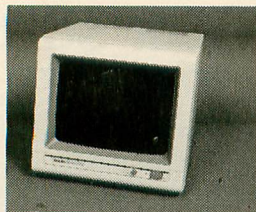
Paper

\$12⁹⁹

No. RF591, 8 1/2" x 11" Fan Fold

Ribbons - Please call a CMO sales consultant.

Interfaces - See page 9.



TAXAN Composite Color

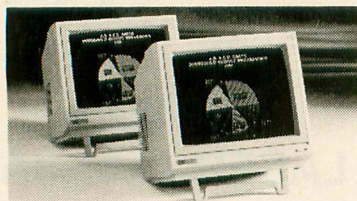
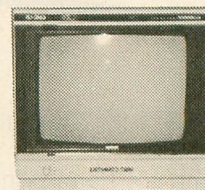
- 14" Composite with audio • Resolution 350x500
 - Comp. video, Chroma & Luma input connections
- Order No. TAC210

\$179⁰⁰

MULTI-TECH Composite Monitor

- 13" Composite Color with non-glare filter
- Order No. MO131

\$159⁰⁰



NAP Amber/Green Composite

- 80 col. x 25 line • 900x245 line res.
- 20 MHz band width • Includes audio input

Order No. NAP7522 (Amber)

Order No. NAP7552 (Green)

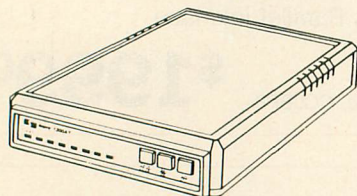
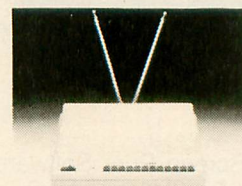
YOUR CHOICE

\$79⁹⁹

NAP T.V. Tuner

- 82 channel broadcast reception
 - 12 station pre-set selection • Rod antenna included
 - Works with any composite color monitor
- Order No. NAP7300

\$44⁹⁹



SUPRA 1200AT Modem

- Works on Atari 800XL & XE Computers • 300/1200 Baud
- Hayes Command compatible • Autoanswer/Autodial
- Smart Terminal Software • Includes cables & AC adapter

Order No. SJ1200AT (LX & XE)

Order No. SJ1200ST (ST)

YOUR CHOICE

\$159⁰⁰

ANCHOR 520 Modem

- 300/1200 BPS • Autoanswer/Autodial
- Designed for the Atari 520ST

Order No. AN520

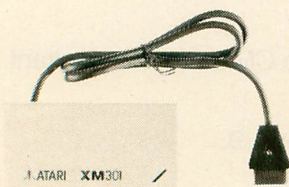
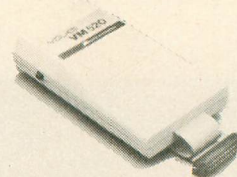
\$149⁰⁰

Also Available:

ANCHOR Volksmodem
No. ANVM

\$59⁹⁹

ANCHOR Volksmodem
300/1200 No. ANVM12 **\$139⁰⁰**



ATARI XM301 Modem

- Autoanswer/Autodial • Works with 400-800 XL & XE
- Includes XE term program on disk

Order No. AAXM301

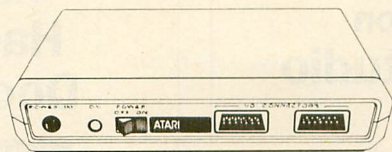
ATARI 835 Modem

Order No. AAB835

\$39⁹⁹

\$29⁹⁹

ATARI 850 Interface



Features 4 serial ports & one 8 Bit parallel port. Programmable baud rates. The original Atari interface.

Order No. AA850

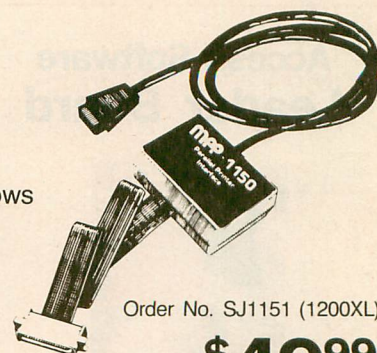
\$109⁰⁰

SUPRA Interface

Parallel interface for Atari Computers. Allows daisy chaining of other peripherals.

Order No. SJ1150

\$44⁹⁹



Order No. SJ1151 (1200XL)

\$49⁹⁹

ICD PR Connection

Low cost, compatible replacement for the Atari 850 Interface. Allows the use of standard RS232 modems & Centronics parallel printers.

Order No. ALICPR

\$69⁹⁹

ICD Printer Connection

Baby brother to the PR Connection. Low cost interface for parallel printers.

Order No. ALICP

\$44⁹⁹



A CMO EXCLUSIVE

AXLON RAM Expansion for Atari 400 & 800 Computers

32K designed for Atari 400 & 800

Order No. ALA32

\$29⁹⁹

48K designed for Atari 400 only

Order No. ALA48

\$49⁹⁹

128K RAM Disk designed for 800 only

Order No. ALA128

\$119⁹⁹

CURTIS Special 6 Outlet Safe Strip

Order No. CUSP3

\$19⁹⁹

COMPUGUARD 4 Slot Surge/Spike Suppressor

Order No. CGCPS4

\$14⁹⁹

SPECTRAVIDEO Joysticks

Quickshot I

Order No. WC2010

\$6⁹⁹

SUNCOM Atari Replacement Joystick

Order No. AA405

\$2⁹⁹

Access Software Leader Board



No. ADAS01

\$29⁹⁹

Activision Music Studio

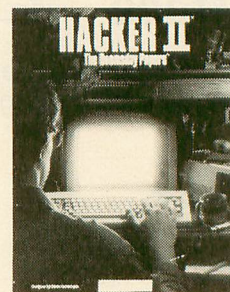
The Music Studio



No. ADAC01

\$44⁹⁹

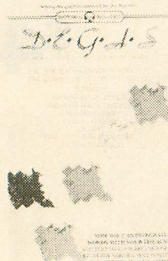
Activision Hacker II Doomsday



No. ADAC02

\$39⁹⁹

Batteries Included D•E•G•A•S



No. ADBI01

\$29⁹⁹

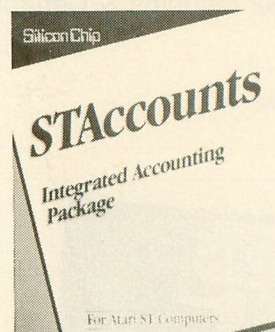
Cygnus Starfleet I



No. ADCY01

\$39⁹⁹

Ditek Software STA Accounts



No. ADDS01

\$189⁰⁰

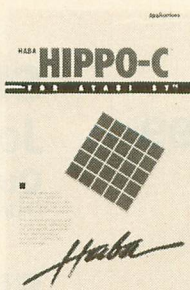
Epyx Winter Games



No. ADEX01

\$29⁹⁹

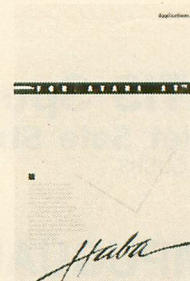
Haba Hippo C



No. ADHA01

\$44⁹⁹

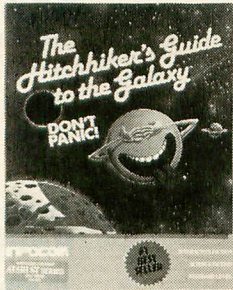
Haba HabaWriter



No. ADHA02

\$44⁹⁹

Infocom Hitchhiker's Guide To The Galaxy



No. ADIN01

\$29⁹⁹

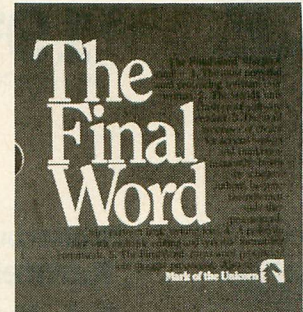
Mark of the Unicorn PC/Intercom



No. ADMU01

\$89⁹⁹

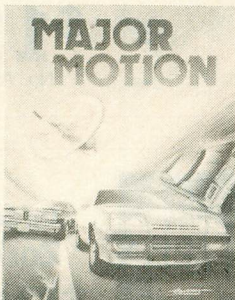
Mark of the Unicorn Final Word



No. ADMU02

\$99⁹⁹

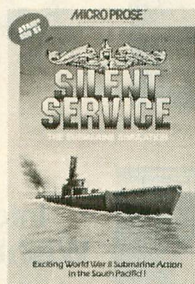
Michtron Major Motion



No. ADMI01

\$29⁹⁹

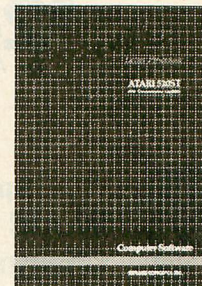
MicroProse Silent Service



No. ADMP01

\$29⁹⁹

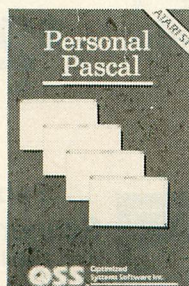
Mirage Concepts Express



No. ADMC01

\$34⁹⁹

Optimized Systems Personal Pascal



No. ADOS01

\$54⁹⁹

Strategic Simulations Phantasie



No. ADSS01

\$29⁹⁹

VIP Technologies VIP Professional



No. ADVP01

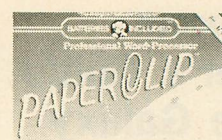
\$119⁰⁰



**Accolade
Fight Night**
\$19⁹⁹
No. AFAC01



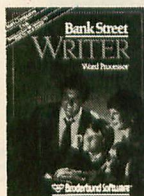
**Batteries
Included
B/Graph**
\$44⁹⁹
No. AFB101



**Batteries
Included
Paperclip**
\$37⁹⁹
No. AFB102



**Broderbund
Karateka**
\$19⁹⁹
No. AFBB01



**Broderbund
Bank Street
Writer**
\$34⁹⁹
No. AFBB02

Print Shop

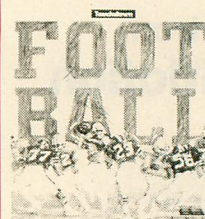
**Broderbund
Print Shop**
\$29⁹⁹
No. AFBB03

**Print Shop
COMPANION**

**Broderbund
Print Shop
Companion**
\$24⁹⁹
No. AFBB07



**Cygnus
StarFleet I**
\$34⁹⁹
No. AFCY01



**Electronic Arts
Touchdown
Football**
\$11⁹⁹
No. AFEA01



**Epyx
World Karate
Championship**
\$19⁹⁹
No. AFEX01



**Infocom
Wishbringer**
\$24⁹⁹
No. AFIF01



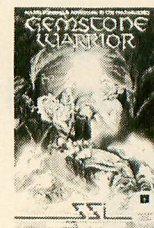
**Infocom
Zork III**
\$29⁹⁹
No. AFIF04



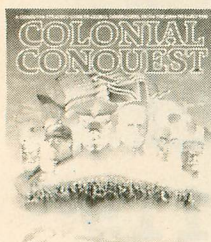
**MicroProse
Top Gunner**
\$19⁹⁹
No. AFMP01



**Origin Systems
Ultima IV**
\$39⁹⁹
No. AFOR01



**Strategic
Simulations
Gemstone
Warrior**
\$24⁹⁹
No. AFSS01



**Strategic
Simulations
Colonial
Conquest**
\$29⁹⁹
No. AFSS02



**Sublogic
Flight
Simulator II**
\$37⁹⁹
No. AFSU02

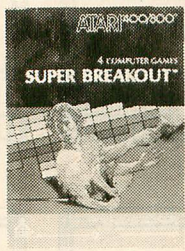


**Sublogic
Scenery Disk 3
(San Fran-LA-Las Vegas)**
\$14⁹⁹
No. AFSU03

FACTORY SEALED ROM CARTS FROM ATARI

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7⁹⁹
each

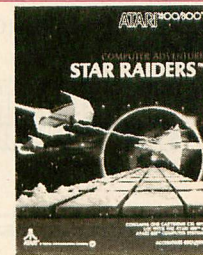
No. AA4006
**SUPER
BREAKOUT**



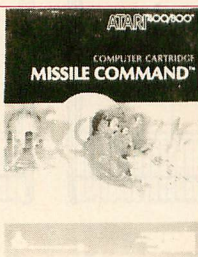
No. AA4007
**MUSIC
COMPOSER**



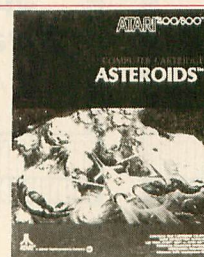
No. AA4011
**STAR
RAIDERS**



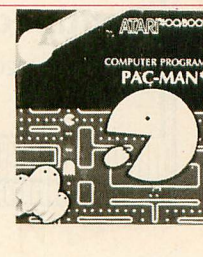
No. AA4012
**MISSILE
COMMAND**



No. AA4013
ASTEROIDS



No. AA4022
PACMAN



No. AA4025
DEFENDER



No. AA4527
QIX



No. AA8030
**E.T. PHONE
HOME**



No. AA8042
TENNIS



No. AA8043
**MS
PACMAN**



No. AA5047
TIMWISE
Diskette Version



BEST SELLING ATARI SOFTWARE AT INCREDIBLE SAVINGS

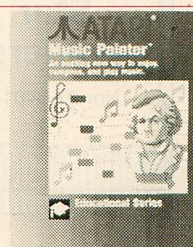
No. AA8036
ATARIWRITER
\$24⁹⁹
No. AA8036P
PLUS VERSION
39⁹⁹



PAINT
No. AA5048 (Disk)
10⁹⁹



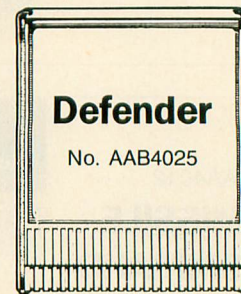
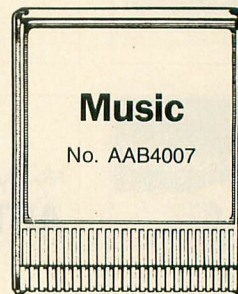
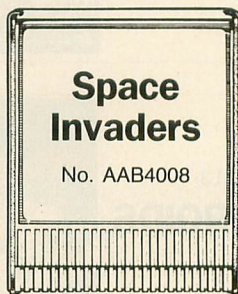
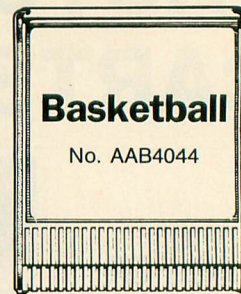
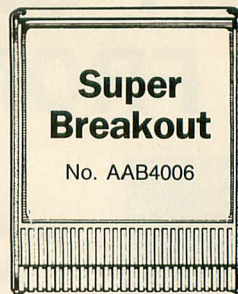
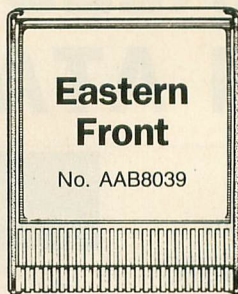
**MUSIC
PAINTER**
No. AA5081 (Disk)
14⁹⁹



Call toll-free: 1 800 233-8950.

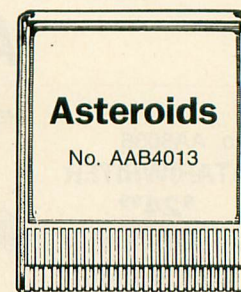
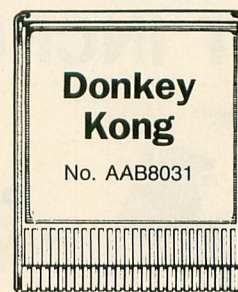
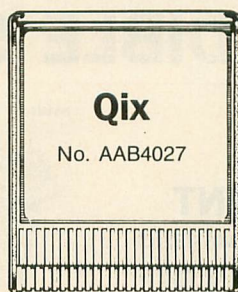
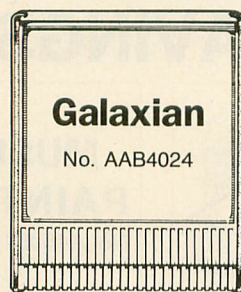
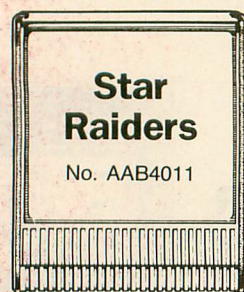
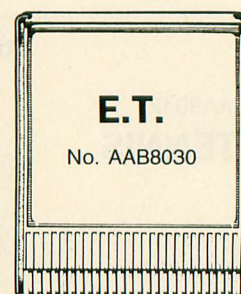
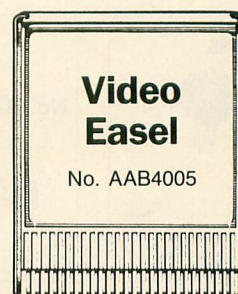
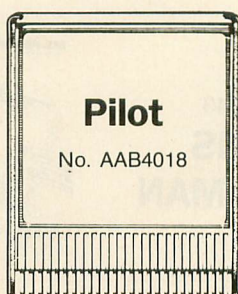
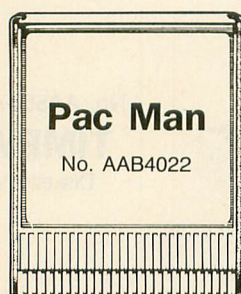
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**Atari ROM
Cartridges**

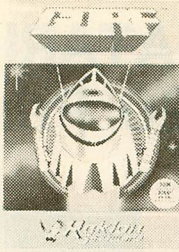
\$3⁴⁹ each
5 for \$14⁹⁹



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Order No. RKA04D, AT Anti/Sub (disk)
Order No. RKA05R, Journey to Planet (ROM)
Order No. RKA07R, Diamond Mine (ROM)

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CHOICE

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Order No. AEC148, Counter
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Order No. AES120, Salmon Run
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CHOICE

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Hacker's Special Atari 410 Cassette Recorders (Not in working condition)

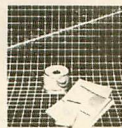
**2 for
\$9⁹⁹**

Order No. AAB410P



Visicorp
VisiCalc
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Order No. AA5049



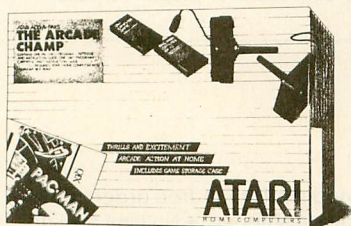
Synapse
Syntrend
\$5⁹⁹

Order No. AA2032



Atari
Invitation to
Programming
\$4⁹⁹ ea.

No. AA4101, INTRO. I
No. AA4106, INTRO. II
No. AA4117, INTRO. III



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Package includes Pac Man
Cartridge and Qix Cartridge as
well as a 6 Rom Cart Holder.
Joysticks not included.

\$7⁹⁹

No. AA7102

| | | |
|-------------|---|--------------------------|
| No. DYACW | Designware Codewriter..... | \$19⁹⁹ |
| No. AA9035 | Mickey in the Great Outdoors (Cassette).... | \$3⁴⁹ |
| No. AA4112 | States & Capitals..... | \$1⁹⁹ |
| No. AA4107 | Biorhythm..... | \$1⁹⁹ |
| No. AA4102 | Kingdom..... | \$1⁹⁹ |
| No. AA4104 | Mailing List..... | \$1⁹⁹ |
| No. AA4121 | Energy Czar..... | \$1⁹⁹ |
| No. AA4129 | Juggles Rainbow..... | \$1⁹⁹ |
| No. AA4115 | Mortgage & Loan Analysis..... | \$1⁹⁹ |
| No. AA6006 | Counseling Procedure..... | \$1⁹⁹ |
| No. AAC81 | Atari 810 Dust Covers..... | \$1⁹⁹ |
| No. AA4126 | Speed Reading..... | \$4⁹⁹ |
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Table Order No. BU120

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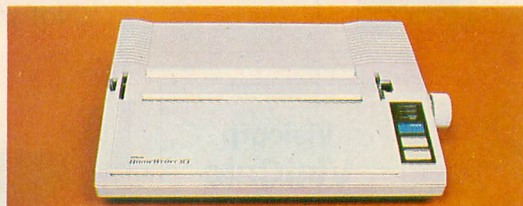


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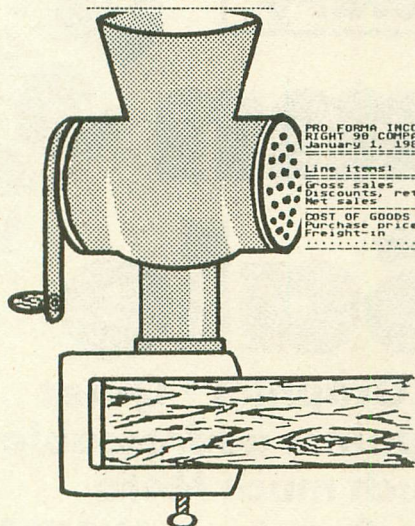
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January 1, 1985 to December 31, 1985

Line Items: Months Jan-85
Gross sales 130,000
Discounts, returns & allow. 500
Net sales 37500

COST OF GOODS SOLD
Purchase price 22000
Freight-in 500



PRO FORMA INCOME STATEMENT - FIRST YEAR
RIGHT 90 COMPANY
January 1, 1985 to December 31, 1985

| Line Items | Months | Jan-85 | Feb-85 | Mar-85 | Apr-85 | May-85 | Jun-85 |
|-----------------------------|--------|---------|---------|---------|---------|---------|---------|
| Gross sales | | 530,000 | 530,000 | 530,000 | 530,000 | 530,000 | 530,000 |
| Discounts, returns & allow. | | 500 | 500 | 500 | 500 | 500 | 500 |
| Net sales | | 37500 | 37500 | 37500 | 37500 | 37500 | 37500 |
| COST OF GOODS SOLD | | | | | | | |
| Purchase price | | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 |
| Freight-in | | 500 | 500 | 500 | 500 | 500 | 500 |

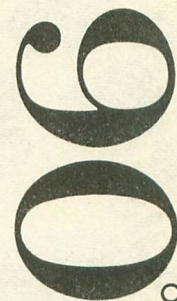
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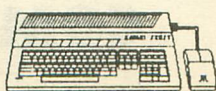
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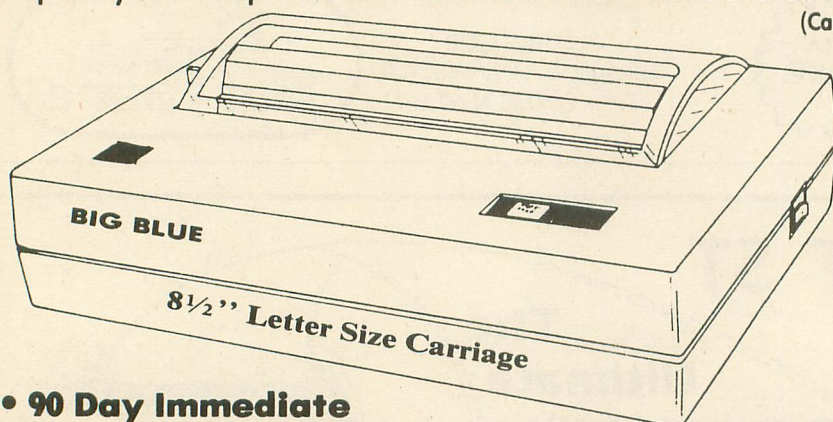
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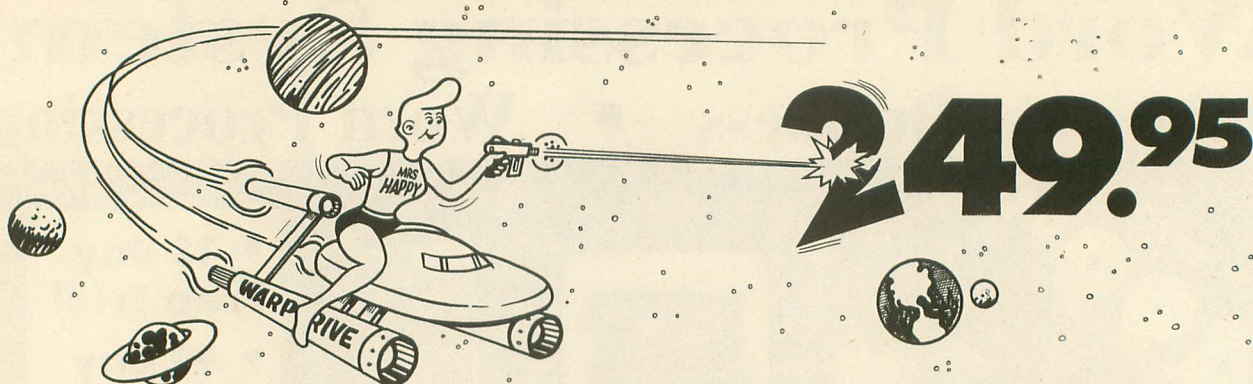
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ST PRODUCT NEWS

ST Reviews

ATARI ST BASIC TRAINING GUIDE

Abacus Software
P.O. Box 7219, Dept. A9
Grand Rapids, MI 49510
(616) 241-5510
\$16.95
(\$14.95 optional disk)

CIRCLE 252 ON READER SERVICE CARD

Reviewed by David Plotkin

The **Atari ST BASIC Training Guide** is a first-class text for ST BASIC users. It is clear, thorough, well-written and remarkably free of errors and typos. It doesn't address some advanced features of ST BASIC, but does a good job on the subjects covered.

The first chapter leads you step by step through the process of creating a program, beginning with fundamentals such as the concepts of programs and algorithms. It continues with flowcharts, documentation, introduction to bits and bytes, and the hexadecimal system.

Successive chapters explain how to use various ST BASIC commands. The sections are short and easy to digest, just right for the beginner. Each chapter includes sample programs which adequately illustrate the concepts being explained. At various points in the chapter there are problems to test your understanding of the material.

(Don't worry, the answers are in back.)

The Guide progresses from easier commands such as arithmetic and random numbers to more advanced commands such as IF/THEN, FOR/NEXT, GOSUB and GOTO. Good sections cover multi-dimensional arrays, disk files, sound and graphics, and using GEM VDI and AES commands for special effects. A good reference section lists the ST BASIC commands alphabetically, along with numerous examples.

This book does not go into great depth about the commands. Details of file structure and use of sequential and random files are not explained, and no mention of the complex WAVE command is made. The concept of partially RESTOREing data is also ignored.

The one serious error I spotted is in the reference section. Under the explanation of the NEW command, it says that the program still remains in memory after the NEW command is invoked. The novice who believes this is in for quite a nasty surprise, because NEW completely erases the program from memory.

I like **ST BASIC Training Guide**. It does a good job of introducing the user to ST BASIC programming fundamentals. It also provides a valuable reference section for the more advanced user.

ESTE CLOCK CARTRIDGE

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Minneapolis, MN 55406
(612) 722-9515
\$48.50

CIRCLE 257 ON READER SERVICE CARD

Reviewed by Patrick Bass

The **eSTe Clock** by BigFoot Systems gives the ST a real-time clock with a five-year lithium battery backup. Plug the gray eSTe Clock cartridge into the cartridge port on the left side of your computer and copy the CLK.ACC file onto your start-up disk. The correct time and date will now be displayed on the desktop whenever you boot your ST.



Our eSTe Clock Cartridge came with the correct time and date already programmed in. To actually set the time yourself, a small program called SETCLK.PRG is provided. Double-clicking on this icon allows you to set

continued on next page

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CIRCLE 009 ON READER SERVICE CARD

the date or time independently of each other. The best part is having all your files correctly time/date-stamped when written. There won't be any more confusion over which file was written last.

The eSTe Clock Cartridge has two built-in EPROM sockets, so you can insert and run your own pre-programmed EPROM chips. (Otto Baade, who runs BigFoot Systems, says he can also supply blank, pre-etched, drilled, and socketed ST cartridge boards which accept and utilize up to four 2732, 2764, or 27128 EPROMS. Price for these boards runs \$15 each in quantities up to 999.)

I like anything that works without me needing to read the directions. The eSTe Clock fills the bill and keeps good time too. When we used it with Flash!—which demands use of the clock while running—the correct time was automatically reset when we returned to the desktop. My only wish-list feature would be a cartridge slot built into the eSTe, so that I could use other cartridges without losing my eSTe Clock.

Sorry, but I somehow feel compelled to write this: It's my personal opinion that the eSTe is the beSTe ST plug-in clock yet.

ACTION PAK

Action Software
69 Clementina Street
San Francisco, CA 94105
(415) 974-6638
\$39.95

CIRCLE 256 ON READER SERVICE CARD

Reviewed by Sol Guber

Action Pak consists of four utility programs that make labels for 3 1/2-inch disks, print banners, emulate a typewriter and convert SynFile+ data for the ST.

The menu-driven disk labeler lets you print the directory of the disk in drive A, B or C, using normal, italic or bold print and sorting the files alphabetically. You can rename the disk, change the border around the label, or just print the directory in 80-column format. Included with the

package are 50 disk labels to get you started.

The banner program lets you print banners of up to four lines with as many as 72 characters each or send them to a disk file. For one-line banners the characters are about 64 asterisks high. On four-line banners, the size decreases to 16 asterisks. The disk contains four different fonts. The provided letters are slightly chunky and unattractive. But more fonts can be generated from Batteries Included's DEGAS or loaded from other sources.

The typewriter desktop accessory sends information directly to your printer. Just load the program and start typing. When you press [RETURN], that line is sent to the printer as shown, along with a line feed. You can delete characters before they are printed. This program can be used to

Make labels or banners, emulate a typewriter and convert SynFile+ data

address envelopes, fill out forms or write memos from within a program. It can also be used to send special characters to a printer to modify the printing.

The SynFile+ converter lets you make ST conversions of files generated on Atari 8-bit computers with Broderbund's SynFile+ database. The six programs supported are HippoSimple, Zoomracks, dBMAN, H&D Base, dbOne and dbMaster. To use the program, either connect your ST to an 8-bit machine via null modem cable, or upload and download the files to and from a bulletin board.

The SynFile converter is easy to use and has many prompts to help you. As it runs it gives information about the file and the record count, and displays a running total of the records processed. Once the records have been converted to ST format, some

massaging of the data may be needed to have them work properly.

All four programs are easy to learn, not copy-protected and have good documentation.

EZ-TRACK ST

Hybrid Arts
11920 W. Olympic Blvd.
Los Angeles, CA 90064
(213) 826-3777
\$65

CIRCLE 251 ON READER SERVICE CARD

Reviewed by Chris Many

During the past three or four years, programs called sequencers have been the bridge between computers and synthesizers. These programs emulate computerized player-pianos, but can control a whole orchestra of synthesized sounds. **EZ Track ST** is a simple but sophisticated home-market sequencer from Hybrid Arts, who manufacture the 8-bit MIDI Mate system reviewed in *Antic*, June 1985.

It should be noted immediately that EZ Track does not access the Atari's internal sound chips at all. Playing music requires an external MIDI synthesizer, such as the Casio CZ-101 (approximately \$300) or one of Yamaha's inexpensive new models. MIDI (Musical Instrument Digital Interface) is basically an electronics standard, such as serial and parallel computer interface standards. MIDI lets two or more synthesizers and computers "talk" to each other, translating musical notation into bits and bytes.

EZ Track is easy to use. Just connect your synthesizer to the MIDI In and MIDI Out ports on the back of the ST, click the start button, play a few notes and click the store button—you've recorded your first bit of music. Move to another track and add a bass line, click, click. Add a lead line on a third track, click, click. Three-part harmony in minutes. It's that easy.

To correct mistakes, just redo the tracks until you're satisfied. EZ Track's forward, record and pause controls and time counter all function identically to those on your home cassette

continued on next page

recorder. In fact, the whole program operates much like a multi-track tape recorder—except that it records musical information *digitally*.

With 20 recording tracks available, the possibilities seem almost endless. You can record up to 28,000 notes on a 520ST, and an amazing 63,000 on a 1040ST. Included in this program are several advanced features usually found only on high-end professional sequencers. A technique called quantizing lets you automatically smooth the timing of awkwardly-played notes, correct to the nearest 32nd-note.

For example, if you are playing a pattern of eighth notes and you want each note to fall precisely on the beat, it's easy to correct any minor fingering errors. You can copy music from one track to another and even combine tracks with no loss of musical clarity.

Tempo adjustment also helps makes recording easier. Playing *The Flight of the Bumblebee* at full speed is no mean feat, so just slow down the

tempo to where it's comfortable for you. When you speed up the playback, you'll sound like a virtuoso.

You can also assign any track a MIDI channel—up to 16 are available. For example, if you have a synthesizer playing an electric piano sound, then everything that comes out of EZ Track

**Operates like
a multi-track
tape recorder—
but it records
digitally**


will sound like an electric piano. But if you tune one track to MIDI channel 1, (electric piano) and tune another track (bass) to channel 2, then tune one synthesizer (electric piano) to channel 1 and your *second* synthesizer (bass) to channel 2, you'll get

two distinct sounds.

Yes, it gets expensive this way, so some companies make synthesizers that can play more than one sound at the same time. Casio's CZ-101 is probably the most affordable example.

All functions are readily accessible through the mouse or the ST keyboard. Normal disk access and file manipulation are available from within the program.

My only disappointment with EZ Track is the lack of cut-and-paste. Most simple 8-bit home music programs include this feature, which makes composition much easier. However, according to Hybrid Arts, this and many other features will be included on the upcoming MIDItrack ST and MIDI-track ST Professional.

Right now, EZ Track ST is the best sequencer available for the ST—an excellent, simple program. It brings a number of advanced features to the amateur musician and bridges the gap between high-tech music and an affordable, well-presented home program. 

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ST New Products

BY GREGG PEARLMAN, ANTIC JUNIOR EDITOR

LATE NEWS FLASHES

Cartridge-based **Fast BASIC** is quick, powerful and easy to use, yet requires surprisingly little memory. The **Antic** technical staff is thoroughly impressed by our beta version. The language features *key-word* support of BIOS and XBIOS calls and makes good use of the GEM interface.

Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX, England. (0442) 63933. BETA.

CIRCLE 281 ON READER SERVICE CARD

On the day we closed this issue, Atari began shipping the ST version of their classic 8-bit game **Star Raiders**. The software is described as a faithful expansion of the original *Star Raiders* that uses the full power of the ST.

\$34.95 Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000. FINAL.

CIRCLE 282 ON READER SERVICE CARD

MIDI

Midiplay stores more than 200,000 MIDI notes/events—approximately three hours of music—in 1Mb of RAM. A real-time record/playback system, *Midiplay* supports all 16 channels of MIDI information including velocity, key and channel aftertouch, pitch bend, program changes and all 128 MIDI controllers such as pedals. With *Midiplay* you can record and play back your own music from any MIDI keyboard or synthesizer, change the musical key, tempo and timbre of the playback independently, even retrieve music files from disks to create medleys.

\$49.95. Electronic Music Publishing House Inc., 2210 Wilshire Blvd., Santa Monica, CA 90403. (213) 455-2025. FINAL.

CIRCLE 271 ON READER SERVICE CARD

SYS/EX is a universal and generic MIDI librarian that lets musicians store songs to disk. It works with about 60 different synthesizers, samplers, drum machines and other MIDI instruments. Files from different MIDI instruments can be appended from simultaneous uploading. MIDI dump files can be constructed from within the software.

\$150. Key Clique, 3960 Laurel Canyon Blvd. Suite 374, Studio City, CA 91604. (818) 905-9136. FINAL.

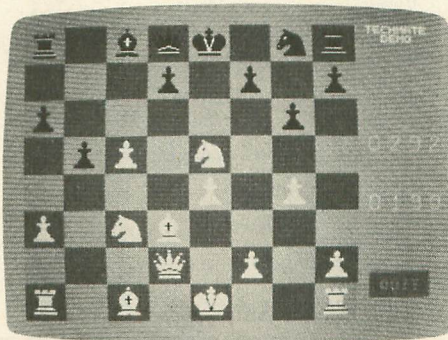
CIRCLE 272 ON READER SERVICE CARD

MEGABYTE UPGRADE

EZRAM 520, a 512K memory upgrade kit, increases the RAM of the 520ST to 1Mb, improves the ST's capacity to process memory-intensive applications such as spreadsheets and databases and makes disk access more efficient through larger RAM-disk space. *EZRAM 520* comes with a memory-check diagnostic program, three additional accessory programs and an entertainment program. Soldering is required.

\$199. Terrific Peripherals, 17 St. Mary's Court, Brookline, MA 02146. (617) 232-2317. PRESS.

CIRCLE 277 ON READER SERVICE CARD



ST CHESS

TechMate Chess from Szabo Software is completely mouse-driven and boasts a powerful new algorithm for speedy, competitive play. Crisp RGB color graphics are featured, the program does not work on monochrome monitor. Each side has an adjustable tournament clock. The software plays under complete official F.I.D.E. chess rules.

\$49.95. Szabo Software, P.O. Box 623, Borrego Springs, CA 92004. FINAL.

CIRCLE 270 ON READER SERVICE CARD

K-RESOURCE EDITOR

Kuma Software announces **K-Resource**, a complete resource editor for creating and updating AES icon resource files. The program operates fully through GEM and is a powerful tool for customizing the GEM interface for new applications programs in either monochrome or color. It features an Icon/Image Editor with auto-snap and auto-size. *K-Resource* produces files for inclusion in C, Pascal, Modula 2 and Fortran 77.

\$39.95 in British pounds. Kuma Software, 12 Horseshoe Park, Pangbourne, Berks RG8 7JW, England. 07357 4335.

CIRCLE 283 ON READER SERVICE CARD

UNIX SHELL

MT C-Shell is a multitasking, multiuser operating system that runs TOS programs in a fully TOS-compatible file system. Included is the powerful UNIX C Shell and a full-featured set of UNIX commands. The software supports remote dumb terminals via modem and is compatible with Micro RTX TOS. Each user can run several tasks concurrently, both real-time and time-shared. The program supports existing compilers, linkers and editors.

\$129.95. Beckmeyer Development Tools, 592 Jean Street #304, Oakland, CA 94610. (415) 658-5318. PRESS.

CIRCLE 273 ON READER SERVICE CARD

Pecan Software Systems has introduced a enhanced implementation of Softech Mirosys' **UCSD Pascal Power System**, a development environment with facilities for creating and running application programs on a variety of machines and operating systems including MS-DOS. A Modula-2 compiler is under development.

Pecan Software Systems Inc., 1410 39th Street, Brooklyn, NY 11218. (718) 851-3100. FINAL. PRESS.

CIRCLE 274 ON READER SERVICE CARD

FAST/BASIC GEM

Version 1.35 of **Philon Fast/BASIC-M** now fully supports the GEM VDI graphics interface. Graphics output is produced by using PEEKS and POKES into VDI.

\$129. Philon Inc., 641 Avenue of the Americas, New York, NY 10011. (212) 807-0303. PRESS

CIRCLE 276 ON READER SERVICE CARD

New ST product notices are compiled from information provided by the products' manufacturers. Antic assumes no responsibility for the accuracy of these notices or the performance of the product. Each mention is followed by a code word indicating that, at press time, Antic had seen a FINAL marketable version, near-final BETA, earlier ALPHA, incomplete DEMO, or PRESS release.



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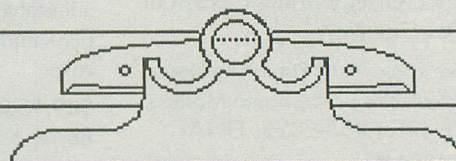
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CIRCLE 068 ON READER SERVICE CARD



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| Gunship - Microprose | Wargame Const. - SSI |
| | Warship - SSI |

FOR THE ST
 Breach - Omnitrend
 Flight Sim II - Sublogic
 Ultima III - Origin Sys.

SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

| | |
|---|---------|
| ► SCROLLING SCENERY FOOLS THE EYE | |
| LANDSCAPE ILLUSION | 105 |
| ► EDUCATION: BONUS GAME | |
| SPELLBLAST | 107 |
| ► NEW VIEWS FOR 3-D GRAPHICS | |
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| ► STARTING OUT | |
| NEW OWNERS COLUMN: LESSON 8 | 112 |
| ► GAME OF THE MONTH | |
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| ERROR FILE | 103 |
| HOW TO USE TYPO ST | 104 |

DISK SUBSCRIBERS: Programs for 8-bit Atari computers can be used immediately. Just follow instructions in the accompanying magazine articles. ST Owners: See monthly disk's ST Help File for instructions on how to transfer programs to 3-1/2 inch disk.

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Antic program listings are typeset on the Star's SB-10 printer—from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

```

ABCDEFGHIJKLMN OPQRSTU VWXYZ
ABCDEFGHIJKLMN OPQRSTU VWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789          0123456789
  
```

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

| NORMAL VIDEO | | | | INVERSE VIDEO | | | |
|--------------|-----------|-----------------|-----------|------------------|-----------|------------------|-----------|
| FOR THIS | TYPE THIS | FOR THIS | TYPE THIS | FOR THIS | TYPE THIS | FOR THIS | TYPE THIS |
| CTRL , | | CTRL S | | CTRL X | | CTRL X | |
| CTRL A | | CTRL T | | CTRL Y | | CTRL Y | |
| CTRL B | | CTRL U | | CTRL Z | | CTRL Z | |
| CTRL C | | CTRL V | | ESC | | ESC | |
| CTRL D | | CTRL W | | SHIFT CLEAR | | SHIFT CLEAR | |
| CTRL E | | CTRL X | | ESC SHIFT INSERT | | ESC SHIFT INSERT | |
| CTRL F | | CTRL Y | | ESC CTRL TAB | | ESC CTRL TAB | |
| CTRL G | | CTRL Z | | ESC SHIFT TAB | | ESC SHIFT TAB | |
| CTRL H | | ESC ESC | | CTRL . | | CTRL . | |
| CTRL I | | ESC CTRL - | | CTRL ; | | CTRL ; | |
| CTRL J | | ESC CTRL = | | CTRL * | | CTRL * | |
| CTRL K | | ESC CTRL * | | CTRL . | | CTRL . | |
| CTRL L | | CTRL . | | CTRL ; | | CTRL ; | |
| CTRL M | | CTRL ; | | CTRL = | | CTRL = | |
| CTRL N | | CTRL = | | ESC SHIFT CLEAR | | ESC SHIFT CLEAR | |
| CTRL O | | ESC SHIFT CLEAR | | ESC DELETE | | ESC DELETE | |
| CTRL P | | ESC DELETE | | CTRL INSERT | | CTRL INSERT | |
| CTRL Q | | ESC TAB | | | | | |
| CTRL R | | ESC TAB | | | | | |

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

| SPECIAL | | STANDARD | |
|---------|--------|----------|---------|
| | CTRL F | | / |
| | CTRL G | | SHIFT + |
| | CTRL N | | SHIFT - |
| | CTRL R | | - |
| | CTRL S | | + |

HOW TO USE TYPO II (8-BIT)

TYPO II automatically proofreads **Antic's** type-in BASIC listings for 8-bit Atari computers. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at the left of the line number. Press the [RETURN] key.


Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:"). Type NEW, then ENTER "D:FILENAME"[RETURN](Cassette—ENTER "C:"). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

LISTING 1

Don't type the
TYPO II Codes! 

```
WB 32000 REM TYPO II BY ANDY BARTON
UM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "K":POSITION 11,1:? "TYPE II CODES"

EM 32050 TRAP 32040:POSITION 2,3:? "Type
in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
$:IF LINE$="" THEN POSITION 2,4:LIST B
:GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
```

```
ET 32120 ? "K":POSITION 11,1:? "TYPE II CODES"
":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
LINE$="" THEN ? "LINE ";B;" DELETED":G
OTO 32050
UV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
(LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
t match Press [RETURN] and edit line a
bove.":GOTO 32050
```

ERROR FILE

WEFAX SOURCES

Radio Shack is discontinuing the XR2211 chip specified for the WEFAX Interface Board (September, 1986). The XR2211 is a generic chip that can be found at a number of large electronics suppliers and mail-order dealers.

FILE MASTER

Disk subscribers should load *File Master* (August, 1986) from DOS and copy it to another disk. It does not RUN properly from the monthly disk menu.

If you have the *File Master* lockup problem that occurs under some combinations of DOS's and disk drives, change the 100 in line 2625 to a 90.

MICRO JULIUS

For some dates, *Micro Julius* (June, 1986) puts in the wrong day of the week. To cure this, type in the following one-line fix:

```
WF 830 DIF=(DOM-D)/7:DIF=2*INT(7*(DIF-INT
(DIF))+0.5)+1
```


HOW TO USE TYPO ST

TYPO ST is the automatic proofreading program for checking **Antic's** ST BASIC type-in listings. It finds any program line where you made a typing mistake.

Type in TYPO ST and SAVE a copy to disk before you RUN it. Now type RUN in the command window and press the [RETURN] key, or click on RUN from the RUN menu.

TYPO ST first asks for the name of the file to check. Type the desired filename and press [RETURN]. (TYPO ST will proofread itself if you type TYPOST.BAS as the filename.) Next, TYPO ST asks where you want the TYPO table printed. Type [S] [RETURN] for Screen, or [P] [RETURN] for Printer.

TYPO ST now reads your ST BASIC program and prints out a table of four-number codes—and the line number for each code. Compare your printed TYPO ST table with the **Antic** TYPO ST table published at the end of the program you are checking. If any of your four-number codes don't match the magazine's codes, you have made a typing mistake somewhere in that line. Carefully recheck your line against the published version.

Antic uses a word processor to format ST BASIC listings for publication, so we can indent lines and make the program structure more understandable. ST BASIC doesn't allow indentation and will strip off any spaces between the line number and the first BASIC instruction. Therefore, TYPO ST ignores space characters and does not care how far instructions are spaced apart.

TYPO ST cannot determine if two different characters have been switched within a line. For example, PRINT and PRNIT will look the same to TYPO ST. However, ST BASIC itself catches this error and points it out to you.

```

1000 ' TYPO/ST, (c) 1986 Antic Publishing, by Bill Marquardt
1010 DISK=1: OUTPUT=2: TRUE=(-1): FALSE=0: CHECKSUMMING=TRUE
1020 TV=FALSE: PRINTER=FALSE
1030 print "File to Check:": input FILENAME$: print "Output on:"
1040 print "(S)creen or ": print "(P)rinter ": input DEVICES
1050 if( DEVICES="P" )or( DEVICES="P" )then PRINTER=TRUE else TV=TRUE
1060 if TV then print "Checksum for file: ": print FILENAME$: print
1070 if PRINTER then lprint "Checksum for file: ";FILENAME$: lprint
1080 open "I", #DISK, FILENAME$
1090 while CHECKSUMMING
1100     LINENUMBER=0: CHECKSUM=0: gosub GETALINE
1110     DECIMAL=CHECKSUM: gosub DECTOHEX
1120     OUTPUT$=str$( LINENUMBER )+" :"+HI$+LO$
1130     if PRINTER then lprint OUTPUT$ else print OUTPUT$
1140     wend
1150     close DISK
1160 end
1170 GETALINE:
1180     BLINES$="": on error goto 1150
1190     GOTALINE=FALSE
1200     while not GOTALINE
1210         line input#DISK, BLINES$: if len( BLINES )>1 then GOTALINE=TRUE
1220     wend
1230     LINENUMBER=val( BLINES )
1240     for CHAR=1 to len( BLINES )
1250         OK=TRUE: CHARACTERS$=mid$( BLINES, CHAR, 1 )
1260         if CHARACTERS$=" " then OK=FALSE
1270         if OK then CHECKSUM=CHECKSUM+asc( CHARACTERS$+chr$( 0 ) )
1280     next CHAR
1290     return
1300 DECTOHEX:
1310     DECIMAL=abs( DECIMAL )
1320     HI=int( DECIMAL/256 ): LO=( DECIMAL-( HI*256 ) )
1330     HH=int( HI/16 ): HL=( HI-( HH*16 ) )
1340     LH=int( LO/16 ): LL=( LO-( LH*16 ) )
1350     HI$=chr$( 48+HH-( 7*( HH>9 ) ))+chr$( 48+HL-( 7*( HL>9 ) ))
1360     LO$=chr$( 48+LH-( 7*( LH>9 ) ))+chr$( 48+LL-( 7*( LL>9 ) ))
1370     return

```

| | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|
| 1000 :110B | 1060 :13E7 | 1120 :0A48 | 1180 :089A | 1240 :079B | 1300 :0352 | 1360 :0C29 |
| 1010 :0EA2 | 1070 :140E | 1130 :1000 | 1190 :04C6 | 1250 :0AEB | 1310 :0667 | 1370 :036B |
| 1020 :071B | 1080 :0713 | 1140 :0274 | 1200 :0680 | 1260 :08BB | 1320 :0B13 | |
| 1030 :12D2 | 1090 :0661 | 1150 :0408 | 1210 :11B9 | 1270 :0F36 | 1330 :07E3 | |
| 1040 :10E6 | 1100 :0BBD | 1160 :01FF | 1220 :0273 | 1280 :03A8 | 1340 :0804 | |
| 1050 :11A2 | 1110 :09F0 | 1170 :034C | 1230 :0716 | 1290 :036C | 1350 :0C0E | |

scrolling scenery fools the eye

LANDSCAPE ILLUSION

Article on page 67

LISTING 1

Don't type the
TYPO II Codes!

```

IM 10 REM GOIN' WEST
XV 20 REM BY JOE BRZUSZEK
GL 30 REM c) 1986, ANTIC PUBLISHING
OC 40 GRAPHICS 23:X1=0:POKE 559,X1:DL=PEEK<560>+PEEK<561>*256+4:POKE DL-1,68
AN 50 FOR X=2 TO 40:POKE DL+X,112:NEXT X:POKE 708,22:POKE 709,X1:POKE 710,X1:POKE 711,24
TX 60 POKE 82,X1:POKE 87,X1:? "    GGOI N' WEST          SNNNNNNN"
UI 70 POKE 559,34:FOR X=40 TO 2 STEP -1:FOR Y=96 TO X1 STEP -16:POKE DL+X,Y:NEXT Y:POKE DL+X,7:NEXT X
EH 80 FOR X=6 TO 9:POKE DL+X,2:NEXT X:? "   An optical illusion     by Joe Brzuszek";
TQ 90 ? "Created for ANTIC MagazineDec. 1986Press start":POKE 709,26
QR 100 IF PEEK<53279><>6 THEN 100
HF 110 POKE 559,X1?: "POKE DL-1,68:FOR X=66 TO 70:POKE DL+X,112:NEXT X
F5 119 REM SET UP DISPLAY LIST
DT 120 FOR X=3 TO 63 STEP 3:POKE DL+X,84:NEXT X:POKE DL+2,128:POKE DL+24,212:POKE DL+36,212:POKE DL+45,212
KO 130 Y1=PEEK<DL>+PEEK<DL+1>*256+80:GOSUB 1000:Y1=Y1-4
AY 140 FOR X=4 TO 64 STEP 3:Y=INT(Y1/256):POKE DL+X+1,Y:POKE DL+X,Y1-Y*256:Y1=Y1+80:NEXT X
BC 149 REM READ COLOR DATA
NZ 150 READ C$:FOR X=1 TO LEN(C$):POKE 703+X,ASC(C$(X)):NEXT X
RF 159 REM READ PLAYER DATA
IX 160 READ X,Y,Y1:POKE 53248,X:POKE 53249,X:POKE 53250,160:POKE 53256,Y:POKE 53257,Y:POKE 53258,Y1
XX 170 Y1=PEEK<106>-48:POKE 54279,Y1:Y1=Y1*256:POKE 53277,2:POKE 623,2
EV 179 REM MIRROR
ZA 180 READ C$:FOR X=1 TO LEN(C$):POKE Y1+1197+X,ASC(C$(X))-1:POKE Y1+1448+X,ASC(C$(X)):NEXT X
HC 190 READ C$:FOR X=1 TO LEN(C$):POKE Y1+1500+X,ASC(C$(X)):NEXT X
SM 199 REM SUN
IA 200 READ C$:FOR X=1 TO LEN(C$):POKE Y1+1600+X,ASC(C$(X)):NEXT X
ZU 209 REM INITIALIZE UBI
XN 210 Y=USR(ADR("hh00r00n00p00q00k00l00m00a00i00c00n00i00f00p00f0afn0pf0oujpm"))\&"")
WX 219 REM INIZIALIZE DLI
F5 220 POKE 512,X1:POKE 513,6:POKE 54286,192:POKE 559,63:SOUND X1,60,2,6
PK 230 POKE 16,112:POKE 53279,112
NR 240 GOTO 240
GF 1000 DIM C$(840),C$(100):FOR X=X1 TO 5:READ C1:C$(X*100+1)=C1:NEXT X:X=PEEK<106>-36:POKE 756,X
KK 1009 REM MOVE CHARACTER SET
DM 1010 Y=USR(ADR("hh00r00n00p00q00k00l00m00a00i00c00n00i00f00p00f0afn0pf0oujpm"))\&"",ADR(C$),X*256)
IS 1020 FOR X=X1 TO 8:READ C1:C$(X*100+1)=C1:NEXT X
JG 1029 REM DOUBLE SCREEN DATA

```

[illegible]

LISTING 2

Don't type the
TYPO II Codes!

```


AT 10 REM GOIN' WEST, LISTING 2
XV 20 REM BY JOE BRZUSZEK
GL 30 REM (C) 1986, ANTIC PUBLISHING
WA 35 REM (CREATES LINES 210,1010,1030,11
00-1150,1270,1280 AND 1330-1350)
CQ 40 REM (LINES 10-220 MAY BE USED WITH
OTHER BASIC LOADERS IN THIS ISSUE.)
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
QZ 70 FN$="D:GWLINES.LST":REM THIS IS THE
NAME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? " ANTIC'S GENERIC
BASIC LOADER"
CD 90 ? , "BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...Plea
se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
2,255
DG 150 LM=LM-1:POSITION 10,10:? "Countdo
wn...T-":INT(LM/10):? "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "TOO
MANY DATA LINES!":? "CANNOT CREATE FIL
E!":END
CZ 180 IF C<LN+1 THEN ? :? "TOO FEW DATA
LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,0,FN$
PP 210 POKE 766,1:? #1,A$,:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? "COMPLETED"
"
HI 1000 DATA 1224
TK 1010 DATA 0500490480320890610850830820
40065068082040034104173049002133207133
209173048002133206024105003
XI 1020 DATA 1332081440061652091050001332
09169000133203133204133205133065160008
177206105040141185006160029
OQ 1030 DATA 1772061050401411860061600411
7720610504014118700616007160038162006
032092228096034041041155049
TN 1040 DATA 0400490480320890610850830820
40065068082040034104104133209104133208
104133207104133206169224133
PW 1050 DATA 2041690001332031681620021772
03145206200208249230204230207202208242
162002177208145206230208208
PI 1060 DATA 0022302092302062082422302072
02208237096034041044065068082040067036
041044088042050053050401155
HF 1070 DATA 0490480510480320890610850830
82040065068082040034104104133207104133
206104133209104133208169021
VQ 1080 DATA 1330641620401600001772061452
08160040145208230208208002230209230206
208002230207202208231198064
LI 1090 DATA 2400131652080241050401332081
44216230209208212096034041044065068082
040067036041044089049041058
KP 1100 DATA 067036061034034155049040800
48032068065084065032000054127127062028
008000024024024031031024024
PF 1110 DATA 0240030030030030030030030031
07107107239175191243192189189189255251
251255060107107107107107107
QK 1120 DATA 1071071891891891891891891891
89175175175175171170106085085255255255
187170170085107235235235171
TL 1130 DATA 1711711071891911911911911901
91189191255255255255255173085175239187
238155049049049048032068065
JL 1140 DATA 0840650321701702380851751751
751751751751751750851091751751751751
175085085085085085085091107107
UV 1150 DATA 0850850850850851811891890910
9917513617008909085245053253205253047
171105090088107099111171170
XK 1160 DATA 1692452052550512552051810850
85085085085085016060004085085085085085
127119127000000000255255024
CL 1170 DATA 02402402402425525550000000
00155049049050048032068065084065032240
240240240240240240240024024
HN 1180 DATA 0240310310000000001200961200
96126024030000000024060126024024024000
000024024024126060024000000
VU 1190 DATA 0240481260480240000000000240
12126012024000000000024060126126060024
000000000000000000012060063
DS 1200 DATA 00000000000000000602522550000
03015015063063255255003003015015015063
255255000192192240155049049
QQ 1210 DATA 0510480320680650840650322522
5225525519219224024025225225255255255
255255255255255255255255255
ID 1220 DATA 2552552552150852552552552552
55255213085255127095215119087221117127
127127223087119213117255253
FT 1230 DATA 2532532452130850852552532532
13213213085085117221085117087085085085
085085085085085085085085087
CE 1240 DATA 2152152211251171191190871190
9322125119119119119155049049052048032068
065084065032215223223255255
ZR 1250 DATA 1911860402472552551871901
74128085085085085085085085085085085085
0850850850850850850850000102102
FD 1260 DATA 102060024000000000991071270
62054000000000102060024060102000000000
102102102062012120000000000
LL 1270 DATA 0000000002552550000240601261
26024060000024024024024024024024024000
1261201241101020060000008024
XV 1280 DATA 0561201550490490530480320680
65084065032056024008000016024028030028
024016000155049050055048032
IB 1290 DATA 0680650840650320721380721980
64208017141010212169010141024208169004
141026208104170104064166064
OC 1300 DATA 1812021410102121410042121041
70104064169004133064165065208073160041
162009173187006141188006032
JZ 1310 DATA 1220061982041652042012552080
17169007133204160029162003173186006141
188006032122006206184006208
HE 1320 DATA 0301690031411840061982051652
05201255155049050056048032068065084065
032208017169007133205160008
WU 1330 DATA 1620061731850061411880060321
22006076098228177206105001145206208008
200177206105000145206136177
LB 1340 DATA 2062051880062080150562330401
45206176008208177206233000145206136177
206024105000145208200177206
EQ 1350 DATA 1452081440041050001452082002
00202208233096004155049051048048032068
065084065032136000046000036
IO 1360 DATA 1981002000261550490510510480
32068065084065032001003007015031063127
255255255255255255255255255
ND 1370 DATA 2552552552552552552552552552
55255255255255255255255255255255255255
255255255255255255255255255
DG 1380 DATA 1270630310150070031550490510
52048032068065084065032255255255255255
255127063031015007003001001
WH 1390 DATA 0010010010010010011550490510
53048032068065084065032024060060126126
126126255255255255255255255
WC 1400 DATA 2552552552552552552552551261261
26126060060024155

```


SPELLBLAST

Article on page 59

LISTING 1

 Don't type the
 TYPO II Codes! 

```

YU 2 REM SPELL BLASTER
TR 3 REM BY MATTHEW RATCLIFF
FS 4 REM (C) 1986, ANTIC PUBLISHING
AT 10 GRAPHICS 23:DIM A$(410),B$(45):AD=A
    DR(A$):BD=ADR(B$)
ON 19 C0=0:C1=1:C2=2:C3=3:C4=4:C5=5:C6=6:
    C8=8:C9=9:C10=10:C15=15:C50=50:C255=25
    5:CGET=7:C127=127:C256=256
    100 DIM C$(354):CD=ADR(C$)
WN BS 110 GOSUB 5000:GOSUB 6000
CM 170 REM TEXT
ZH 180 C0=0:RESTORE 190:FOR I=C0 TO 21:RE
    AD X:POKE 1536+I,X:NEXT I:GOTO 1000
ON 190 DATA 169,0,133,212,162,8,70,186,14
    4,3,24,101,187,106,102,212,202,208,243
    ,133,213,96
GO 200 B=C0:FOR I=C1 TO C4
MP 210 A=INT(26*RND(C0))+C1:IF A=B THEN 2
    10
KB 220 B=A:CR(I)=ALPH(A):NEXT I
XK 230 A=INT(LW*RND(C0))+C1:B=INT(C4*RND(
    C0))+C1:C=ASC(WORD$(A,A))
IE 240 FOR I=C1 TO C4:IF CR(I)=C THEN 260

NR 250 NEXT I:CR(B)=C
QO 260 IF CR(C2)<>77 AND CR(C2)<>87 THEN
    GOTO 290
HR 270 A=CR(C1):IF A<>77 AND A<>87 THEN C
    R(C1)=CR(C2):CR(C2)=A:GOTO 290
XR 280 A=CR(C3):IF A<>77 AND A<>87 THEN C
    R(C3)=CR(C2):CR(C2)=A
ZQ 290 RETURN
HL 300 PASS=C0:POKE KEY,C255:DED=C0:COLOR
    C2:PLOT C50,44:PLOT 56,C50:PLOT C50,5
    6:PLOT 44,C50:COLOR C1
XJ 310 SPELL=C0:SEL=C0:DISP=35:FOR Y=45 T
    O 55:PLOT 45,Y:DRAWTO 55,Y:NEXT Y
CS 320 A=USR(CD,CR(C1),C1,47,44-DISP)
YH 330 A=USR(CD,CR(C2),C2,C50+DISP,48)
BQ 340 A=USR(CD,CR(C3),C3,46,52+DISP)
RU 350 A=USR(CD,CR(C4),C2,42-DISP,46)
UT 360 IF PEEK(KEY)<>C255 THEN SPELL=C1:G
    ET #C1,K:RETURN
IG 370 IF NOT PEEK(TRG0) THEN PASS=C1:RE
    TURN
DZ 380 A=PEEK(STK0):SEL=(A=14)+C2*(A=7)+C
    3*(A=13)+4*(A=11)
IV 390 IF SEL THEN RETURN
ZI 400 POKE 50,DISP*C2+40
XB 410 DISP=DISP-C1:IF DISP>C5 THEN 320
CG 420 FOR W=C15 TO C0 STEP -.15
EX 430 SOUND C0,PEEK(RD),C8,W:SETCOLOR C4
    ,W,C10
LM 440 NEXT W
CX 450 SETCOLOR C4,C0,C0:DED=C1:RETURN
NN 460 X=C8*(C10-LW):A=USR(AD,ADR(BLANK$)
    ,C,LW,C0,X):RETURN
PZ 500 COLOR C2:PLOT 97,C10:DRAWTO 97,95
OF 510 A=USR(AD,ADR("SCR"),C6,C3,C15,112)

UR 520 A=USR(AD,ADR("GES"),C5,C3,45,112)
LB 530 A=USR(AD,ADR("OK"),C10,C2,65,128)
UO 540 B$=STR$(GUES):A=USR(AD,BD,C5,LEN(B
    $),55,128)
FR 550 B$=STR$(OK):A=USR(AD,BD,C10,LEN(B$
    ),75,128)
KA 560 B$=STR$(SCR):I=C1:Y=30:B$(LEN(B$)+
    C1)=" "
BY 570 FOR X=112 TO 112+C8*(LEN(B$)-C1) S
    TEP C8
TO 580 A=USR(CD,ASC(B$(I,I)),C3,X,Y)

```

```

YB 590 I=I+C1:NEXT X
AI 595 RETURN
AX 600 FOR I=7 TO 87 STEP C8
BU 610 A=USR(AD,ADR(" ),C0,C6,I)
GA 620 NEXT I
ZI 630 RETURN
AP 640 A=USR(AD,ADR(" ),C0,C6,87,C0
    )
ZM 650 RETURN
HX 1000 TRG0=644:STK0=632:KEY=764:RD=5377
    0:TGES=C0:GUES=C0:SCR=C0:HSCR=C0:BLNK=
    ASC(" ")
BL 1010 DIM CR(C4),ALPH(26),WORD$(C10),BL
    ANK$(C10):FOR I=C1 TO 26:ALPH(I)=I+64:
    NEXT I
PY 1020 RESTORE 20000:READ LINES:50=53760
    :OK=C0:TOK=C0:BGR=100
JP 1030 OPEN #C1,C4,C0,"K:"
OE 1040 GRAPHICS 23:SETCOLOR C0,C10,C10:5
    ETCOLOR C1,12,C8:SETCOLOR C2,C4,C10
RU 1050 B$="SPELLblast":SOUND C0,C0,C8,C1
    0:GOSUB 6000
SD 1060 FOR Y=C0 TO 80:A=USR(AD,BD,C5,LEN
    (B$),Y,C0):POKE 50,Y*2:NEXT Y
RD 1070 FOR Y=80 TO 20 STEP -1:A=USR(AD,
    BD,C15,LEN(B$),Y,C0)
KV 1080 SOUND C0,Y,C10,C10:SOUND C1,Y+C4,
    C10,C10
MK 1090 NEXT Y
GH 1100 POKE KEY,C255
YE 1110 A=USR(AD,ADR("FROM ANTIC"),C10,C1
    0,C50,C0)
IK 1120 A=USR(AD,ADR("PRESS"),C15,C5,70,4
    0)
OE 1130 A=USR(AD,ADR("BUTTON"),C5,C6,80,4
    0)
BR 1140 SOUND C0,60,C10,C5:SOUND C1,64,C1
    0,C5
BU 1150 FOR I=C5 TO C15 STEP C5:C=PEEK(RD
    )/2:POKE KEY,C255
QG 1160 A=USR(AD,BD,I,LEN(B$),20,C0)
SO 1170 POKE 50,C:POKE 50+C2,C5*I
ZI 1180 IF (PEEK(KEY)<>C255 OR PEEK(TRG0)
    =C0) THEN 1200
NU 1190 NEXT I:GOTO 1150
DC 1200 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,
    C0:GRAPHICS C0:SETCOLOR C2,C15,C0:POKE
    752,C1:GOSUB 6000
FT 1210 ? :? :GOSUB 1400
TY 1220 B$=" USE JOYSTICK TO PLAY":? :
    GOSUB 1400
FU 1230 B$="POINT HANDLE IN DIRECTION":?
    :GOSUB 1400
VO 1240 B$="OF LETTER THAT YOU THINK":GOS
    UB 1400
VU 1250 B$="WILL FIT IN THE WORD AT TOP":
    GOSUB 1400
UK 1260 B$="PRESS FIRE BUTTON TO PASS":?
    :GOSUB 1400
SJ 1270 B$="IF LETTERS WON'T FIT OR":GOSU
    B 1400
ED 1280 B$="ARE ALREADY CHOSEN":GOSUB 140
    0
WN 1290 B$="TO TRY SPELLING THE WORD, PRE
    55":? :GOSUB 1400
TV 1300 B$="SPACEBAR (FOR MORE POINTS)":
    GOSUB 1400
ND 1310 B$="PRESS [Q] KEY TO QUIT THE GAM
    E":? :GOSUB 1400
OZ 1320 B$="AND SEE TOTALS":GOSUB 1400
NC 1330 B$="PRESS [BUTTON] TO START":? :?

```

continued on next page


```

      :GOSUB 1400
GX 1340 POKE KEY,C255
BH 1350 IF NOT (PEEK<KEY><>C255 OR PEEK<
TRG0>=C0) THEN 1350
RP 1360 GOTO 2800
PU 1400 A=38-LEN(B$):L=INT(A/C2)
YG 1410 FOR I=C1 TO L:?"":NEXT I
DD 1420 ? B$
AQ 1430 RETURN
GN 1500 TGES=TEGES+GUES:GUES=C0:TOK=TOK+OK
:OK=C0:TW=TW-C1:IF TW=C0 THEN GOTO 230
0
NU 1510 LINE=INT(LINES*AND(C0))+BEGLIN:RE
STORE LINE:BLANK$=WORD$
BP 1520 A=INT(C5*AND(C0))+C1
ZB 1530 FOR I=C1 TO A:READ WORD$:NEXT I:L
W=LEN(WORD$)
BJ 1540 IF BLANK$=WORD$ THEN 1510
DD 1550 BLANK$="-----"
OH 1560 GRAPHICS 23:SETCOLOR C0,C4,C10:SE
TCOLOR C1,9,C10:SETCOLOR C2,12,C10:POK
E 77,C0
AE 1570 C=C10:GOSUB 6000:GOSUB 460
XV 1580 GOSUB 500
WO 1590 GOSUB 200
GQ 1600 SOUND C0,C0,C0,C0:GOSUB 300
RH 1610 IF PASS THEN GOSUB 600:GOTO 1570
GJ 1620 IF NOT DED THEN 1750
ZC 1630 GRAPHICS 23:SETCOLOR C1,C4,C10
ML 1640 SETCOLOR C2,9,C10:SETCOLOR C3,12,
C10:GOSUB 6000
UR 1650 BLANK$=WORD$:C=C5:GOSUB 460
AB 1660 C=C10*LN:SCR=C
BN 1670 A=USR<AD,ADR<"LOSE">,C10,C4,40,48
>
SW 1680 B$=STR$(C):A=USR<AD,BD,C5,LEN(B$)
,60,C8*(C10-LEN(B$))>
RH 1690 A=USR<AD,ADR<"POINTS">,C15,C6,80,
32>
HH 1700 FOR W=C15 TO C0 STEP -.1
KF 1710 SOUND C0,C15*W,C6,W
SX 1720 SOUND C1,C15*W,12,W
LK 1730 NEXT W
PW 1740 GOTO 1500
EA 1750 IF NOT SPELL THEN 2030
IO 1760 GRAPHICS 23:SETCOLOR C1,C10,C10:SE
TCOLOR C2,14,C10:GOSUB 6000
HP 1770 IF K=ASC<"Q"> THEN 2300
ED 1780 POKE (KEY),C255:C=C15:GOSUB 460
QX 1790 CC=C5:FOR I=C10 TO 82 STEP C8:A=U
SR<AD,ADR<"*****">,CC,C10,I,C0>:C
C=CC+C1
BL 1792 IF CC>C15 THEN CC=C5
GU 1794 NEXT I
CL 1800 FOR I=C1 TO LW:A=ASC<BLANK$(I,I)>
LO 1810 IF A<>BLNK THEN 1900
VI 1820 A=USR<AD,ADR<"■">,CC,C1,C0,16*(I-
C1)+X>
YF 1830 CC=CC+C1:IF CC>C255 THEN CC=C1
PX 1840 IF PEEK<KEY>=C255 THEN 1820
GT 1850 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,
C0:GET #C1,K:IF CHR$(K)<>WORD$(I,I) TH
EN 1900
PS 1860 SCR=SCR+C10:GUES=GUES+C1:BLANK$(I
,I)=WORD$(I,I):OK=OK+C1
HL 1870 FOR J=80 TO C0 STEP -C2
VU 1880 A=USR<AD,ADR<WORD$>+I-C1,J+C5,C1,
J,16*(I-C1)+X>
BW 1890 SOUND C0,J*2,C10,C5:SOUND C1,J*2+
C4,C10,C5:NEXT J
IE 1900 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,
C0:NEXT I
QV 1910 FOR I=C0 TO 80 STEP C8:A=USR<AD,A
DR<"",C0,C10,I,C0>:NEXT I
NJ 1920 GOSUB 500:B$="CORRECT"
OW 1930 FOR I=C1 TO LEN(B$)
YC 1940 A=USR<CD,ASC<B$(I,I)>,C1,C8*I,C4*
I+20>
FW 1950 NEXT I
PA 1960 A=USR<AD,ADR<"PRESS">,C15,C5,70,C
0>:A=USR<AD,ADR<"A KEY">,C10,C5,80,C0>
TO 1970 IF NOT (PEEK<KEY><>C255 OR PEEK<
TRG0>=C0) THEN 1970
OU 1971 IF PEEK<TRG0>=C0 THEN 1978
HR 1975 GET #C1,A:IF A=ASC<"Q"> THEN 2300
RP 1978 GOTO 1500
US 1980 FOR W=C15 TO C0 STEP -.25

```

```

IX 1990 SOUND C0,PEEK<RD>,C6,W
YU 2000 A=USR<AD,ADR<"*WRONG*">,W,7,20,16
>
KR 2010 NEXT W
SD 2020 GOTO 1560
JO 2030 IF NOT SEL THEN 3000
RK 2040 ON SEL GOTO 2050,2060,2070,2080
MO 2050 COLOR C3:PLOT C50,45:DRAWTO C50,5
1+DISP:GOTO 2090
AH 2060 COLOR C1:PLOT 55,C50:DRAWTO 51+DI
SP,C50:GOTO 2090
KD 2070 COLOR C2:PLOT C50,55:DRAWTO C50,5
1+DISP:GOTO 2090
LS 2080 COLOR C1:PLOT 45,C50:DRAWTO 49+DI
SP,C50
DI 2090 FOR W=C15 TO C0 STEP -C3
XZ 2100 A=INT(PEEK<RD>/.125):SOUND C0,A,1
2,W:SOUND C1,A+C8,C8,W
KT 2110 NEXT W
BB 2120 B$=CHR$(C<SEL>):C=C0:GUES=GUES+C
1
RP 2130 FOR I=C1 TO LW
LB 2140 IF B$=BLANK$(I,I) THEN GOSUB 600:
GOTO 1570
WO 2150 IF B$<>WORD$(I,I) THEN 2180
ZT 2160 BLANK$(I,I)=WORD$(I,I):SCR=SCR+C2
:C=C+C1:OK=OK+C1
KT 2165 FOR A=40 TO 30 STEP -C2:SOUND C0,
A,C10,C10:SOUND C1,A+C4,C10,C10:NEXT A
YP 2167 SOUND C0,C0,C0,C0:SOUND C1,C0,C0,
C0:C=C10:GOSUB 460
KX 2170 IF BLANK$(C1,LW)=WORD$(C1,LW) THE
N 2210
FQ 2180 NEXT I
LM 2190 IF C=C0 THEN SCR=SCR-C2
BW 2200 GOSUB 600:GOTO 1570
HQ 2210 GRAPHICS 23:SETCOLOR C1,C10,C10:SE
TCOLOR C2,14,C10:GOSUB 6000
UG 2220 C=C5:GOSUB 460
HQ 2230 SCR=SCR+C10:GOTO 1910
HP 2300 GRAPHICS 23:SETCOLOR C0,C4,C10:SE
TCOLOR C1,12,C8:SETCOLOR C2,9,C10:POKE
KEY,C255:GOSUB 6000
EF 2305 TGES=TEGES+GUES:TOK=TOK+OK
ZY 2310 A=USR<AD,ADR<"SPELLblast">,C5,C10
,C0,C0>:C=C1:CC=C1
BL 2320 B$="Final Score ":B$(LEN(B$)+C1)=
STR$(SCR):Y=C10:GOSUB 2700
PL 2330 B$="High Score ":IF SCR>HSCR THEN
HSCR=SCR
RG 2340 B$(LEN(B$)+C1)=STR$(HSCR):Y=20:GO
SUB 2700
SH 2350 B$="Total Correct LTRS":Y=30:GOSUB
B 2700
UG 2360 B$=STR$(TOK):Y=38:GOSUB 2700
CW 2370 B$="Total Guesses":Y=C50:GOSUB 27
00
JK 2380 B$=STR$(TEGES):Y=58:GOSUB 2700:IF
TOK=C0 THEN TOK=C1
XD 2390 B$="AVG of ":AV=(INT(TGES*C10/TOK
))/C10
OZ 2400 IF AV<BGR THEN BGR=AV
LO 2410 B$(LEN(B$)+C1)=STR$(AV):B$(LEN(B$
)+C1)="GES/LTR"
EJ 2420 Y=70:GOSUB 2700
MD 2430 B$="Best AVG is ":B$(LEN(B$)+C1)=
STR$(BGR):Y=80:GOSUB 2700
FE 2440 POKE 50,PEEK<RD>
XP 2450 IF NOT (PEEK<KEY><>C255 OR PEEK<
TRG0>=C0) THEN 2320
EP 2460 SOUND C0,C0,C0,C0:GOTO 2800
ZZ 2700 CC=CC+C1:IF CC>C15 THEN CC=C1
CZ 2710 POKE 77,C0:A=USR<AD,ADR<"SPELLbla
st">,CC,C10,C0,C0>
PL 2720 L=LEN(B$):S=C8*((21-L)/C2):I=C1
KS 2730 FOR X=5 TO 5+C8*(L-C1) STEP C8
DP 2740 A=USR<CD,ASC<B$(I,I)>,C,X,Y>:I=I+
C1
GU 2750 SOUND C0,C5*CC+X,C10,C4:SOUND C1,
C5*CC+X+C4,C10,C4
AT 2755 IF (PEEK<KEY><>C255 OR PEEK<TRG0>
=C0) THEN RETURN
MF 2760 NEXT X
BV 2770 C=INT(C3*AND(C0))+C1
BM 2780 RETURN
PC 2800 GRAPHICS C0:POKE 752,C1:SOUND C0,
C0,C0,C0:SOUND C1,C0,C0,C0:POKE 710,C0
:GOSUB 6000

```



```

DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
wn...T-";INT(LM/10);") "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))) :C=C+
1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "TOO
MANY DATA LINES!":? "CANNOT CREATE FILE!"
END
CZ 180 IF C<LN+1 THEN ? :? "TOO FEW DATA
LINES!":? "CANNOT CREATE FILE!" :END
AL 200 OPEN #1:8,0,FN$
PP 210 POKE 766,1:? #1:A$ :POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? "UNEXPECTED"
"
MC 1000 DATA 956
CC 1010 DATA 0530480480480320650360400490
44056049041061034165200133223169001133
222165084133229165085133227
SH 1020 DATA 1650861332281660871690102240
05144008169020224007144002169040133239
104240048170104133213104133
OS 1030 DATA 2122022400491041041332232022
40042104104133222240035104104133229
202240022104133228104133227
OL 1040 DATA 2022400190341550530480490480
32065036040056050044049054051041061034
104104202208251024144011169
QZ 1050 DATA 2530761642461690001332271332
28165229133233165239133236169000133230
162008010038230006233144007
YT 1060 DATA 0241012361440022302302022082
39133229165088133216165089133217165229
024101216133216165230101217
XL 1070 DATA 1332171620011650872010091760
07162034155053048050048032065036040049
054052044050052052041061034
SD 1080 DATA 0020741760021620031652271012
28240025070228102227202240005070227202
208251230233024165227101216
FR 1090 DATA 1332161440022302171652161332
24165217133225169000133226162000169000
149218232165223149218010010
BC 1100 DATA 0100102321492180052192321492
18164226177212162000134234201034155053
048051048032065036040050052
MI 1110 DATA 0530440510500540410610341281
44004041127198234170133236224096176013
169064224032144002169224024
UC 1120 DATA 1012361332361690081332331690
00133215162008010038215006233144007024
101236144002230215202208239
CR 1130 DATA 1332140241732440021012151332
15160000132235160008132238024144003024
144169164235177214034155053

```

```

CD 1140 DATA 0480520480320650360400510500
55044052049048041061034230235069234133
232169000133237169004133231
UK 1150 DATA 1690001332331600020062320382
33136208249166233181218164237145216230
237198231208229024165216101
KU 1160 DATA 2391332161440022302171982382
08196198222208001096230226024165224105
004133224144002230225133216
BI 1170 DATA 1652251332170241441660960341
55053048054048032067036040049044056050
041061034104240010201004240
OR 1180 DATA 0131701041042022082511690221
33185076064185104133195104201128144004
041127198195170141022006224
LQ 1190 DATA 0961760151690642240321440021
69224024109022006141022006104104141023
006104104141024006201004144
DZ 1200 DATA 0050562330041762471332142010
00240007169004034155053048054050032067
036040056051044049054052041
FZ 1210 DATA 0610340562292141332140780240
06078024006006214024104104141025006133
186166087169010224003240008
BA 1220 DATA 1690202240052400021690401332
07133187165088133203165089133204032000
006024173024006101203133203
YQ 1230 DATA 1440022302040241652031012121
33203165204101213133204173022006133187
034155053048054052032067036
TD 1240 DATA 0400490540530440500520540410
61034169008133186032000006165212133205
17324002101213133206160000
YA 1250 DATA 1620081690001332091332081772
05069195072104010072144008024173023006
005208133208224001240008006
EW 1260 DATA 2080382090062080382092022082
28104152072160000132215132212166214240
088056038215202208250177203
CY 1270 DATA 0341550530480540540320670360
40050052055044051050056041061034005215
069215145203165215073255133
ZZ 1280 DATA 2152002001772030052150692151
45203166214006209038212202208249160000
024177203101212145203169008
CK 1290 DATA 0562292141701322120702081022
12202208249240002208135160002024177203
101212145203024165208101209
NR 1300 DATA 1600011452030241440091652090
34155053048054056032067036040051050057
044051053052041061034145203
WG 1310 DATA 2001652081452031041680241652
03101207133203144002230204200192008208
206096034155

```

new views for 3-D graphics

RESPONSE SURFACE MAPPING

Article on page 47

LISTING 1

Don't type the
TYPO II Codes!

```

OS 1000 REM RSMAP
Y5 1010 REM BY JIM PIERSON-PERRY
NR 1020 REM (c) 1986, ANTIC PUBLISHING
ZO 1025 REM DO NOT RENUMBER THIS PROGRAM
NM 1030 BREAK=1:IF PEEK(53279)=5 THEN BRE
AK=0
CB 1040 DEG :GOTO 1240
QQ 1050 Z=SQR(X^2+Y^2)
AR 1060 RETURN
DT 1080 REM COMPUTE FUNCTION, PLOT MAP
JU 1090 FOR J=C0 TO 40:Y=Y-SY:X=X1-SX:B$(
C1,C63)=BL$(C1,C63):IF J/C5=INT(J/C5)
THEN B$(C1,C1)="*":B$(C63,C63)="*"
LD 1100 TRAP 2810:FOR I=C2 TO 62:X=X+5X

```

```

SB 1110 IF PEEK(CON)=OPTION THEN POP :POP
:GOTO 2410
ZJ 1120 GOSUB 1050
HF 1130 IF Z<21 THEN K=C1:GOTO 1160
XG 1140 IF Z>22 THEN K=51:GOTO 1160
OT 1150 K=INT((Z-21)/52)+C1
ZA 1160 TRAP CLEAR:B$(I,I)=C$(K,K):NEXT I
FC 1165 POSITION C5,19:? " *** Plotti
ng *** ":POKE 712,50
FG 1170 ? #C2:B$(C1,C63):BL$(C1,C4):C$(J+
C6,J+C6):GOSUB 1210:POKE 712,160
TZ 1175 POSITION C5,19:? " --- Thinki
ng --- "

```



```

GA 1180 NEXT J
BC 1190 RETURN
LG 1200 REM DISABLE BREAK KEY
HN 1210 POKE 77,0:IF BREAK THEN POKE 16,1
12:POKE 53774,112
AJ 1220 RETURN
IT 1230 REM START OF MAIN PROGRAM
GG 1240 DIM B$(63),BL$(67),C$(51),F$(80),
C$(51)
XS 1250 GRAPHICS 0:CR1=PEEK(709):CR2=PEEK
(710):CR4=PEEK(712):POKE 709,172:POKE
710,160:POKE 712,160
JA 1255 POKE 559,C NOT (BREAK))*34
XO 1260 GOSUB 1210:C0=0:C1=1:C2=2:C3=3:C4
=4:C5=5:C6=6:C10=10:C63=63:C67=67:CLEAR
R=40000:CON=53279
YC 1270 OPTION=C3:SELECT=C5:START=C6:PI=3
.14159:E=2.71828179:BL$(C1)=" ":BL$(C6
7)=" ":BL$(C2)=BL$
BH 1280 C$="A,B,C,D,E,F,G,H,I,J,K,L,M,N,O
,P,Q,R,S,T,U,V,W,X,Y,Z"
EC 1290 POKE 752,C1
UO 1300 REM INTRO
CH 1310 ? "M":POSITION C6,C4:? "*****
*****"
KY 1320 POSITION C6,C5:? "I" RSMA
BP 1330 POSITION C6,C6:? "I Response Surf
ace Mapping I"
IF 1340 POSITION C6,7:? "*****
*****":POSITION 19,10:? "by"
VI 1350 POSITION 11,12:? "Jim Pierson-Per
ry":POSITION 7,14:? "C" 1986 Antic Pu
blishing"
DX 1355 POSITION 10,16:? "ALL RIGHTS RESE
RVED":POKE 559,34
NQ 1360 FOR I=C1 TO 700:NEXT I
AC 1620 REM ENTER FUNCTION
FW 1630 ? "M":POSITION 9,C0:? "PLOT FNC
TION INPUT"
PL 1640 POSITION C3,C2:? "Type in the plo
tting function. Use valid BASIC synt
ax. The function can"
OV 1650 POSITION C0,C4:? "Use up to 2 ind
ependent variables: X and/or Y."
ZC 1660 POSITION C3,7:? "Press BACKSPACE
To Erase Typos"
LI 1670 POSITION C3,9:? "Press RETURN Whe
n Finished"
UX 1680 POSITION C0,13:? "Z=":FOR I=C1 T
O 78:? " ":NEXT I
IW 1690 POKE 752,C0:POSITION C2,13:F$="":
F$(C1,C2)="Z":I=C3
PB 1700 CLOSE #C6:OPEN #C6,C4,C0,"K":GOS
UB 1210
FQ 1710 GET #C6,X:IF X=155 THEN CLOSE #C6
:GOTO 1780
UP 1720 IF X=126 AND I>3 THEN ? CHR$(X):"
":CHR$(30):I=I-C1:F$(I,I)=" ":GOTO 1
710
WU 1730 IF I=81 THEN 1710
XE 1740 IF (X>39 AND X<44) OR (X>44 AND X
<58) OR (X>64 AND X<91) OR X=94 THEN 1
760
RK 1750 GOTO 1710
QS 1760 F$(I,I)=CHR$(X):? CHR$(X):I=I+C1
:GOTO 1710
KM 1770 REM INSTALL FUNCTION
UH 1780 POKE 559,C NOT (BREAK))*34:POKE 7
52,C1:? "M":? "1050 ":F$=?
EH 1790 ? "CONT":POSITION C0,C0:POKE 842,
13:STOP
ED 1800 TRAP 2570:POKE 842,12:TRAP CLEAR
OP 1810 ? "M":POSITION 8,C0:? "PLOT PARA
METERS INPUT":POKE 559,34
DR 1820 REM GET PLOT AXES BOUNDARIES
WH 1830 POSITION C0,C2:? "ENTER VALUES FO
R:"
HD 1840 POSITION C3,C4:? "X-axis minimum=
":INPUT X1
DK 1850 POSITION C10,C5:? "maximum=":IN
PUT X2
MY 1860 IF X2<X1 THEN GOSUB 2660:POSITION
C0,C4:? BL$(C1,38):? BL$(C1,38):GOTO
1840
CX 1870 POSITION C3,7:? "Y-axis minimum=
":INPUT Y1
SP 1880 POSITION C10,8:? "maximum=":INP
UT Y2
UQ 1890 IF Y2<Y1 THEN GOSUB 2660:POSITION

```

```

C0,7:? BL$(C1,38):? BL$(C1,38):GOTO 1
870
LT 1900 REM ESTIMATE RESPONSE RANGE OVER
PLOT AXES
AH 1910 POSITION C0,10:? "PLEASE WAIT- ES
TIMATING RESPONSE RANGE"
EX 1920 SX=(X2-X1)/C10:SY=(Y2-Y1)/C10:TRA
P 2810
FM 1930 X=X1:Y=Y1
AF 1940 GOSUB 1050
PE 1950 ZLO=Z:ZHI=Z
AP 1960 FOR Y=Y1 TO Y2 STEP SY
YD 1970 FOR X=X1 TO X2 STEP SX
AR 1980 GOSUB 1050
ZV 1990 IF Z<ZLO THEN ZLO=Z
LT 2000 IF Z>ZHI THEN ZHI=Z
LC 2010 NEXT X
LQ 2020 NEXT Y
UT 2030 TRAP CLEAR
BE 2040 POSITION C0,C10:? BL$(C1,38):POSI
TION C0,C10:? "ESTIMATED RESPONSE (Z)
RANGE:"
FC 2050 POSITION C3,11:? "Z minimum=":ZL
O
YS 2060 POSITION C5,12:? "maximum=":ZHI
FF 2070 POSITION C0,20:? "Press START T
o Use These Values"
AF 2080 POSITION C0,21:? "Press OPTION
To Enter Response Range"
OZ 2090 IF PEEK(CON)=START THEN Z1=ZLO:Z2
=ZHI:GOTO 2170
BT 2100 IF PEEK(CON)=OPTION THEN 2120
RS 2110 GOTO 2090
VJ 2120 FOR I=C10 TO 21:POSITION C0,I:? B
L$(C1,39):NEXT I
RC 2130 POSITION 8,C10:? "Z minimum=":I
NPUT Z1
PW 2140 POSITION C10,11:? "maximum=":IN
PUT Z2
QF 2150 IF Z2<Z1 THEN GOSUB 2660:POSITION
C0,C10:? BL$(C1,38):? BL$(C1,38):GOTO
2130
UQ 2160 REM SET PRINTER - START MAPPING
NI 2170 ? "M":POSITION C5,C0:? "RESPONSE
SURFACE MAP OUTPUT":POKE CON,7
WU 2180 POSITION 9,C2:? "Prepare your pri
nter:"
JL 2190 POSITION C10,C4:? "--Power on"
XC 2200 POSITION C10,C6:? "--Set paper at
top of page":GOSUB 1210
LR 2210 POSITION C5,20:? "Press START t
o continue."
MB 2220 POSITION C5,21:? "Press OPTION
to abort."
VH 2230 IF PEEK(CON)<>START THEN 2230
RM 2240 TRAP 2720:CLOSE #C2:OPEN #C2,C8,C
0,"P":TRAP CLEAR
XE 2250 POSITION C5,19:? " *** Plotti
ng ***"
HU 2251 POSITION C5,20:? "
"
IF 2260 SX=(X2-X1)/60:SY=(Y2-Y1)/40:SZ=(Z
2-Z1)/50:C(C1)=Z1
IE 2270 FOR I=C2 TO 51:C(I)=C(I-C1)+SZ:NE
XT I
NC 2280 TRAP 2720:? #C2:? #C2:I=40-LEN(F$
):C2:? #C2:BL$(C1,I):F$=? #C2:? #C2:TR
AP CLEAR
KE 2290 ? #C2:? #C2:? #C2:BL$(C1,15):"X-a
xis range=":X1:" to ":X2
BT 2300 ? #C2:BL$(C1,15):"Y-axis range="
:Y1:" to ":Y2
JM 2310 FOR I=C1 TO C4:? #C2:BL$(C1,C67):
C$(I,I):"=":C(I):NEXT I
ZL 2320 B$(C1,C63)=BL$(C1,C63):FOR I=C2 T
O 62 STEP C5:B$(I,I)="":NEXT I
ZL 2330 ? #C2:B$(C1,62):BL$(C1,C5):C$(C5,
C5):"=":C(C5)
IP 2340 REM
RX 2350 Y=Y2+SY
EI 2360 REM CALL THE MAPPING SUBROUTINE
HC 2370 POSITION C5,19:? " --- Thinki
ng --- ":GOSUB 1090
AD 2380 B$(C1,C63)=BL$(C1,C63):FOR I=C2 T
O 62 STEP C5:B$(I,I)="":NEXT I
QJ 2390 ? #C2:B$(C1,62):BL$(C1,C5):C$(47,
47):"=":C(47)
UD 2400 FOR I=48 TO 51:? #C2:BL$(C1,C67):
C$(I,I):"=":C(I):NEXT I
PR 2410 ? #C2:CHR$(12):CLOSE #C2

```

continued on next page


```

VA 2420 REM MAP COMPLETE - ALLOW RERUNS
XC 2430 ? "R":POSITION C5,C0:? "RESPONSE
SURFACE MAP OUTPUT"
SI 2440 POSITION C5,C3:? "Response Map Ou
tput Completed"
VQ 2450 POSITION 15,C6:? "OPTIONS":POS
ITION 15,7:? "=====
LD 2460 POSITION C5,9:? "START - Remap
same function with":POSITION 15,10:? "
new Plot Parameters"
ZK 2470 POSITION C5,12:? "OPTION - Exit
Program"
HA 2480 POSITION 7,15:? "Please Make Your
Selection"
JF 2490 IF PEEK(CON)=OPTION THEN 2530
VA 2500 IF PEEK(CON)=START THEN 1810
TW 2510 GOTO 2490
IU 2520 REM ALL DONE - EXIT TO BASIC
YG 2530 GRAPHICS 0:POKE 709,CR1:POKE 710,
CR2:POKE 712,CR4:POKE 82,C2:POKE 752,C
0
UG 2550 ? "Program RSMAP done.":END
FF 2560 REM HANDLE BASIC SYNTAX ERRORS IN
THE PLOT FUNCTION
DU 2570 ? "R":GOSUB 2860
YO 2580 POSITION 8,C5:? "There is a synta
x error":POSITION 7,7:? "in your plott
ing function."
AR 2590 POSITION 12,C10:? "BASIC Error #"
;PEEK(195)
IW 2600 POSITION C5,20:? "Press START T
o Re-enter Function"
IY 2610 POSITION C5,21:? "Press OPTION
To Exit Program"
YX 2620 IF PEEK(CON)=START THEN POKE 712,
160:GOTO 1630
BZ 2630 IF PEEK(CON)=OPTION THEN POKE 712
,160:GOTO 2530
RS 2640 GOTO 2620
GW 2650 REM ERROR HANDLING CODE TO HANDLE

```

```

UNREAL PLOT AXIS BOUNDS (MINIMUM GREA
TER THAN MAXIMUM)
FG 2660 GOSUB 2860
ZK 2670 POSITION C0,20:? "The minimum mus
t be less"
YG 2680 POSITION C0,21:? "than the maximu
m value. Try again."
AJ 2690 FOR I=C1 TO 300:NEXT I:POSITION C
0,20:? BL$(C1,38):? BL$(C1,38)
VE 2700 POKE 712,160:RETURN
FU 2710 REM HANDLE PRINTER ERRORS
EW 2720 GOSUB 2860
QE 2730 POSITION 9,C10:? "Printer Error D
etected":POSITION 11,12:? "BASIC Error
#";PEEK(195)
AB 2740 POSITION 13,14:? "Please Correct"
CH 2750 IF PEEK(CON)=OPTION THEN POKE 712
,160:GOTO 2530
EL 2760 IF PEEK(CON)=START THEN 2780
UC 2770 GOTO 2750
WI 2780 FOR I=C10 TO 14:POSITION C0,I:? B
L$(C1,38):NEXT I
RQ 2790 POKE 712,160:GOTO 2230
AD 2800 REM HANDLE ERRORS IN FUNCTION EVA
LUATION
EV 2810 GOSUB 2860
XH 2820 ? "R":POSITION C5,C0:? "RESPONSE
SURFACE MAP OUTPUT"
PT 2830 POSITION 7,C2:? "BASIC Error #";P
EEK(195);" Occurred":POSITION C4,C3:?
"During Plot Function Evaluation"
PI 2840 FOR I=C1 TO 500:NEXT I:POKE 712,1
60:GOTO 2450
YG 2850 REM ERROR SOUND
HX 2860 POKE 712,50:SOUND C0,121,10,8:50U
ND C1,128,10,8:SOUND C2,8,C2,C2:FOR I=
C1 TO 20:NEXT I
FA 2870 FOR I=C0 TO C2:SOUND I,C0,C0,C0:N
EXT I:RETURN

```

lesson 9: subscripted variables

NEW OWNERS COLUMN

Article on page 54

LISTING 1

Don't type the
TYPO II Codes!

```

EM 10 REM NEW OWNER'S COLUMN PART 9
PR 11 REM BY DAVID PLOTKIN
GN 12 REM (c) 1986, ANTIC PUBLISHING
AI 20 REM LISTING 1: STUDENT TEST SCORES
JU 30 DIM SCORE(30):AVG=0:REM MAX. OF 30
TEST SCORES
BV 40 STUDENT=1:REM INITIALIZE THE STUDEN
T ID NUMBER
HK 50 READ SCORE:REM GET THE SCORE FROM T
HE DATA STATEMENT
EL 60 IF SCORE=-1 THEN GOTO 100:REM A SCO
RE OF -1 IS IMPOSSIBLE, SO WE USE -1 T
O FLAG THE END OF DATA
EE 70 SCORE(STUDENT)=SCORE:REM PUT THE SC
ORE INTO SINGLY SUBSCRIPTED VARIABLE "
SCORE".
LG 80 STUDENT=STUDENT+1:GOTO 50:REM GO AR
OUND FOR ANOTHER SCORE.
JQ 100 STUDENT=STUDENT-1:REM WE DID NOT U
SE THE LAST STUDENT (SCORE=-1).
JP 110 GRAPHICS 0:POSITION 8,2:PRINT "STU
DENT TEST SCORES":REM PRINT HEADING

```

```

PX 120 POSITION 8,3:PRINT "TOTAL STUDENTS
: ";STUDENT
US 130 POSITION 3,4:PRINT "STUDENT ID #";
:POSITION 25,4:PRINT "TEST SCORE";
TU 140 FOR LOOP=1 TO STUDENT:REM LOOP THR
U THE NUMBER OF STUDENTS
ZZ 150 POSITION 9,LOOP+4:PRINT LOOP:POSIT
ION 28,LOOP+4:PRINT SCORE(LOOP):AVG=AV
G+SCORE(LOOP)
NE 160 NEXT LOOP
DS 170 POSITION 2,LOOP+4:PRINT "AVERAGE S
CORE IS: ";INT(AVG/STUDENT)
NC 180 HIGHSCORE=0:FOR LOOP=1 TO STUDENT:
REM FIND THE HIGH SCORE
UE 190 IF SCORE(LOOP)>HIGHSCORE THEN HIGH
SCORE=SCORE(LOOP):HIGHSTUDENT=LOOP
MT 200 NEXT LOOP
HJ 210 POSITION 2,LOOP+5:PRINT "HIGH SCOR
E WAS ";HIGHSCORE;" BY STUDENT ";HIGHST
UDENT
NM 250 DATA 91,56,77,89,88,98,56,72,75,81
,78,93,66,-1

```


LISTING 2

```

EM 10 REM NEW OWNER'S COLUMN PART 9
PR 11 REM BY DAVID PLOTKIN
GN 12 REM (c) 1986, ANTIC PUBLISHING
CK 20 REM LISTING 2-STARSHIP SIMULATION
TH 30 DIM UNIVERSE(10,12):REM DIM THE ARR
AY TO HOLD THE VALUES
DM 40 GRAPHICS 0:POKE 752,1:POSITION 3,3:
PRINT "SETTING UP UNIVERSE. PLEASE WAI
T"
GH 50 FOR OUTERLOOP=1 TO 10:REM STEP THRU
THE FIRST SUBSCRIPT
YG 60 FOR INNERLOOP=1 TO 12:REM STEP THRU
THE SECOND SUBSCRIPT
MK 70 NUMBERSHIPS=INT(RND(0)*4):REM USE R
ANDOM FUNCTION TO SET UP NUMBER OF SHI
PS
GA 80 UNIVERSE(OUTERLOOP,INNERLOOP)=NUMBE
RSHIPS:REM PUT THE NUMBER IN THE ARRAY

HM 90 NEXT INNERLOOP:REM FINISH UP SECOND
SUBSCRIPT
NE 100 NEXT OUTERLOOP:REM FINISH UP FIRST
SUBSCRIPT
DC 110 PRINT CHR$(125):POSITION 9,0:PRINT
"*****FRACTAL SHIP*****";
LS 120 FOR LOOP=1 TO 10:POSITION LOOP*3,1
:PRINT LOOP:NEXT LOOP:REM PRINT ROWS
AN 125 FOR LOOP=1 TO 32:POSITION LOOP,2:P
RINT "-":NEXT LOOP
LR 130 FOR LOOP=1 TO 12:POSITION 0,LOOP+2
:PRINT LOOP:NEXT LOOP:REM PRINT COLUMN
PRINT UNIVERSE(10,12)
XL 135 FOR LOOP=1 TO 12:POSITION 2,LOOP+2
:PRINT " ":NEXT LOOP
MW 140 FOR OUTERLOOP=1 TO 10
HO 150 FOR INNERLOOP=1 TO 12
SA 160 POSITION OUTERLOOP*3,INNERLOOP+2:P
RINT UNIVERSE(OUTERLOOP,INNERLOOP)
PJ 170 NEXT INNERLOOP
XM 180 NEXT OUTERLOOP
JC 250 POKE 752,0

```

LISTING 3

```

BX 2 REM NEW OWNER'S COLUMN PART 9
JO 4 REM BY DAVID PLOTKIN
FU 6 REM (c) 1986, ANTIC PUBLISHING
UY 8 REM LISTING 3 - FRACTAL SHAPES
YT 10 COLOR 1
LK 20 DIM D(64,33),PR$(1),A$(1):BX=0:BY=0

ZQ 30 GRAPHICS 0:POSITION 2,5:PRINT "*****
OF LEVELS (3-6)":INPUT LE:IF LE>6 O
R LE<3 THEN 30
NL 35 GOSUB 1200
BL 40 DS=2:FOR N=1 TO LE:DS=DS+2^(N-1):NE
XT N
SK 50 MX=DS-1:MY=MX/2:PI=3.14159:RH=PI*30
/180:VT=RH*1.2
SJ 60 FOR N=1 TO LE:L=10000/1.8^N
LC 70 PRINT "WORKING ON LEVEL ";N
DS 80 IB=MX/2^N:SK=IB*2
DC 90 GOSUB 150:REM ASSIGN HEIGHTS ALONG
X IN ARRAY
VZ 100 GOSUB 220:REM ASSIGN HEIGHTS ALONG
Y IN ARRAY
GJ 110 GOSUB 290:REM ASSIGN HEIGHTS ALONG
DIAG. IN ARRAY
HT 120 NEXT N
HQ 130 GOTO 640:REM DRAW
PR 140 REM HEIGHTS ALONG X
PR 150 FOR YE=0 TO MX-1 STEP SK
AA 160 FOR YE=IB+YE TO MX STEP SK
UC 170 AX=XE-IB:AY=YE:GOSUB 370:D1=D:AX=X
E+IB:GOSUB 370:D2=D
FW 180 D=(D1+D2)/2+RND(0)*L/2-L/4:AX=XE:A
Y=YE:GOSUB 420
PI 190 NEXT YE

```

```

QJ 200 NEXT YE:RETURN
QJ 210 REM HEIGHTS ALONG Y
TH 220 FOR XE=MX TO 1 STEP -SK
DQ 230 FOR YE=IB TO XE STEP SK
RI 240 AX=XE:AY=YE+IB:GOSUB 370:D1=D:AY=Y
E-IB:GOSUB 370:D2=D
FR 250 D=(D1+D2)/2+RND(0)*L/2-L/4:AX=XE:A
Y=YE:GOSUB 420
PN 260 NEXT YE
QN 270 NEXT XE:RETURN
FL 280 REM HEIGHTS ALONG DIAGONAL
PR 290 FOR XE=0 TO MX-1 STEP SK
BW 300 FOR YE=IB TO MX-XE STEP SK
MG 310 AX=XE+YE-IB:AY=YE-IB:GOSUB 370:D1=
D
LB 320 AX=XE+YE+IB:AY=YE+IB:GOSUB 370:D2=
D
QY 330 AX=XE+YE:AY=YE:D=(D1+D2)/2+RND(0)*
L/2-L/4:GOSUB 420
PK 340 NEXT YE
QK 350 NEXT XE:RETURN
UN 360 REM RETRIEVE DATA FROM ARRAY
WB 370 IF AY>MY THEN 390
LX 380 BY=AY-BX=AX:GOTO 400
YC 390 BY=MX+1-AY-BX=MX-AX
IV 400 D=D+(ABS(INT(BX)),BY):RETURN
MC 410 REM PUT DATA INTO ARRAY
SP 420 IF AY>MY THEN 440
PZ 430 BY=AY-BX=AX:GOTO 450
XT 440 BY=MX+1-AY-BX=MX-AX
ZK 450 D=(BX,BY)=D:RETURN
ZO 470 RETURN
IH 630 REM DISPLAY HERE
TO 640 GOSUB 1110:REM SET UP SCREEN
PX 650 XS=0.04:YS=0.04:REM SCALING FACTOR
S
HA 660 FOR AX=0 TO MX:X0=-999:FOR AY=0 TO
AX
EY 670 GOSUB 370:ZZ=D:YY=AY/MX*10000:XX=A
X/MX*10000-YY/2
RY 680 GOSUB 940:NEXT AY:NEXT AX
EA 690 FOR AY=0 TO MX:X0=-999:FOR AX=AY T
O MX
EL 700 GOSUB 370:ZZ=D:YY=AY/MX*10000:XX=A
X/MX*10000-YY/2
RT 710 GOSUB 940:NEXT AX:NEXT AY
DG 720 FOR EX=0 TO MX:X0=-999:FOR EY=0 TO
MX-EX
MR 730 AX=EX+EY:AY=EY:GOSUB 370:ZZ=D:YY=A
Y/MX*10000
KT 740 XX=AX/MX*10000-YY/2:GOSUB 940:NEXT
EY:NEXT EX
LR 750 GOTO 1130
WM 760 REM ROTATE
ZQ 770 IF XX<>0 THEN 800
II 780 IF YY<=0 THEN RA=-PI/2:GOTO 820
UI 790 RA=PI/2:GOTO 820
MD 800 RA=ATN(YY/XX)
IX 810 IF XX<0 THEN RA=RA+PI
ZB 820 R1=RA+RH:RD=SQR(XX*XX+YY*YY)
KG 830 XX=RD*COS(R1):YY=RD*SIN(R1)
ZM 840 RETURN
TU 850 REM TILT DOWN
HF 855 IF ZZ<1E-30 THEN ZZ=0
WQ 860 RD=SQR(ZZ*ZZ+XX*XX)
MV 870 IF XX=0 THEN RA=PI/2:GOTO 900
NS 880 RA=ATN(ZZ/XX)
JN 890 IF XX<0 THEN RA=RA+PI
SB 900 R1=RA-VT
VN 910 XX=RD*COS(R1)+XX:ZZ=RD*SIN(R1)
ZJ 920 RETURN
RY 930 REM MOVE OR DRAW TO (XP,YP)
UP 940 GOSUB 470
OS 950 XX=XX*XS:YY=YY*YS:ZZ=ZZ*ZS
AB 960 GOSUB 770:REM ROTATE
CH 970 GOSUB 855:REM TILT UP
JG 980 IF X0=-999 THEN PR$="M"
MH 985 IF X0<>-999 THEN PR$="D"
XE 990 XP=INT(YY)+CX:YP=INT(ZZ)
XZ 1000 GOSUB 1030
AC 1010 RETURN
GG 1020 REM PLOT LINE HERE
FS 1030 X=XP*0.625:YP=33.14-0.663*YP:POK
E 77,0
TN 1040 IF PR$="M" THEN X8=XP:Y8=YP:X0=X
YU 1045 IF Y8>179 OR Y8<0 OR YP>179 OR YP
<0 THEN RETURN
IT 1050 PLOT X8,Y8:DRAWTO XP,YP:X8=XP:Y8=
YP:RETURN

```

continued on next page


```

JX 1100 REM SET UP SCREEN
GW 1110 GRAPHICS 8:COLOR 1:POKE 710,0:RET
URN
UP 1130 POKE 764,255:PRINT "PRESS RETURN
TO CONTINUE":INPUT A$
QC 1140 GOTO 30
GY 1200 POSITION 7,12:PRINT "PRESS"
TH 1210 POSITION 2,13:PRINT "1 LOW MOUNTA
INS":POSITION 2,14:PRINT "2 MED MOUNTA
INS"

```

```

XT 1220 POSITION 2,15:PRINT "3 HIGH MOUNT
AINS"
SI 1230 INPUT A$:IF A$<>"1" AND A$<>"2" A
ND A$<>"3" THEN GRAPHICS 8:GOTO 1200
TN 1240 IF A$="1" THEN Z5=0.04
AG 1250 IF A$="2" THEN Z5=0.055
XW 1260 IF A$="3" THEN Z5=0.07
AY 1270 RETURN


```

game of the month

UNCLE HENRY'S NUCLEAR WASTE DUMP

Article on page 35

LISTING 1

Don't type the
TYPO II Codes! 

```

ES 10 REM UNCLE HENRY'S NUCLEAR WASTE DUM
P
WQ 20 REM BY JAMES HAGUE
GL 30 REM (c) 1986, ANTIC PUBLISHING
OK 40 BRK=1:IF PEEK(53279)=5 THEN BRK=0
FG 100 GOSUB 9000:REM MAIN INIT.
FX 110 GOSUB 8000:REM TITLE SCREEN
VJ 120 GOSUB 7000:REM GAME INIT.
CI 195 REM MAIN GAME LOOP
MA 200 GOSUB 6000:LAST1=A
PB 210 GOSUB 6000:IF LAST1=A THEN 210
GI 220 LAST2=A
UH 230 TIME=C6-SPEED:POSITION 18,C0:? #C6
;TIME
BO 240 GOSUB 6000:IF A=LAST1 OR A=LAST2 T
HEN 240
JJ 250 LAST2=LAST1:LAST1=A:CHAR=A
FO 260 X=C9:Y=C3:PLOT X,Y
NY 270 POKE 20,C0
IA 275 REM DECIDE WHERE TO DUMP WASTE
ZU 280 IF PEEK(20)>=90 THEN 360
PZ 290 B=STICK(C0)
GB 300 IF B=11 AND X>C3 THEN A=X-C1:GOTO
340
BB 310 IF B=C7 AND X<16 THEN A=X+C1:GOTO
340
YA 320 IF NOT STRIG(C0) THEN 390
PI 330 GOTO 280
GS 340 COLOR C32:PLOT X,Y:COLOR CHAR:PLOT
A,Y:X=A
BJ 350 SOUND C0,RND(C0)*C10+C10,C2,C6:FOR
A=C1 TO C10:NEXT A:SOUND C0,C0,C0,C0:
GOTO 280
GN 360 TIME=TIME-C1:POSITION 18,C0:? #C6;
TIME
FJ 370 IF TIME>C0 THEN 270
QX 380 SOUND C0,30,12,C15:FOR A=C1 TO 200
:NEXT A:SOUND C0,C0,C0,C0
KD 385 REM HANDLE FALLING WASTE
TI 390 A=Y+C1:COLOR C32:PLOT X,Y:COLOR CH
AR:PLOT X,A:Y=A
CY 400 LOCATE X,Y+C1,A:IF A<>C32 THEN 430
QT 410 SOUND C0,Y+200,C10,C8:SOUND C1,Y+2
00,C10,C8:A=C2:GOSUB 6100
QC 420 GOTO 390
GX 430 FOR A=C10 TO C15:SOUND C0,50,C8,A:
SOUND C1,150,C8,A:NEXT A
HC 440 FOR A=C15 TO C0 STEP -C1:SOUND C0,
40,C8,A:SOUND C1,125,C8,A:NEXT A
FB 450 LOCATE X-C1,Y+C1,A:IF A=C32 THEN A
=-C1:GOTO 550
NA 460 LOCATE X+C1,Y+C1,A:IF A=C32 THEN A
=C1:GOTO 550

```

```

SL 470 LOCATE X-C1,Y,A:LOCATE X+C1,Y,B:LO
CATE X,Y+C1,C:IF A=CHAR OR B=CHAR OR C
=CHAR THEN 700:REM LOSE!
RG 480 SCORE=SCORE+C10:POSITION C7,C0:? #
C6;SCORE
LQ 490 IF SCORE>HIGH THEN HIGH=SCORE
UX 500 IF Y=C7 THEN 1000:REM WIN!
IH 510 IF PEEK(633)=13 THEN COLOR 78:PLOT
C1,C6:COLOR 90:PLOT 18,C6
NF 520 GOTO 230
TC 550 A=X+A:COLOR C32:PLOT X,Y:COLOR CHA
R:PLOT A,Y:X=A
ZM 560 A=C5:GOSUB 6100:GOTO 390
SX 695 REM END OF THE WORLD
MB 700 POSITION C7,C3:? #C6;"XXXXXXXXXX"
SN 710 FOR A=C1 TO C3
TD 720 FOR B=48 TO C0 STEP -C1:SOUND C0,B
,C8,C15:SOUND C0,B*C3,C8,C15:POKE 712,
B:NEXT B:NEXT A
SG 730 SOUND C0,50,C8,C15:GRAPHICS 18:A=U
SR(ADR(BOOM$))
HR 740 GRAPHICS C0:POKE 559,C0,C0:POKE 710,C
0:POKE 752,C1:SOUND C0,C0,C0,C0:SOUND
C1,C0,C0,C0
XG 750 POSITION C4,12:? CHR$(34);"Good he
lp is so hard to find.";CHR$(34):POSIT
ION 22,14:? "-Uncle Henry"
KF 760 COLOR 14:PLOT C0,23:DRAWTO 39,23
PA 770 COLOR 160:FOR A=C0 TO C2:PLOT 28,2
1+A:DRAWTO 30,21+A:NEXT A:PLOT 30,23
TY 780 POSITION 28,20:? "XXXXXXXX":POSITION 28
,19:? "XXXX"
NQ 790 COLOR 124:PLOT 29,18:COLOR 19:PLOT
29,17
CL 800 POKE 559,34:A=240:GOSUB 6100
MA 810 GOTO 110
IN 900 IF BRK THEN POKE 16,112:POKE 53774
,112:REM DEBUG
ZH 910 RETURN
BY 995 REM YOU WIN!
UV 1000 POSITION C7,C3:? #C6;"YAHOO!"
RU 1010 FOR A=200 TO C10 STEP -C10:FOR B=
C15 TO C10 STEP -C1:SOUND C0,A,C10,B:5
OUND C0,A+25,C10,B:NEXT B:NEXT A
DA 1015 SOUND C0,243,C10,C10:SOUND C1,193
,C10,C10:SOUND C2,162,C10,C10
PQ 1020 GRAPHICS 18:POKE 708,C0
PJ 1030 POSITION C1,C5:? #C6;"1000 BONUS
POINTS!":A=USR(ADR(RAINBOW$))
SP 1035 FOR A=C0 TO C2:SOUND A,C0,C0,C0:N
EXT A
XL 1040 SCORE=SCORE+1000:IF SCORE>HIGH TH
EN HIGH=SCORE

```


| | |
|----|---|
| HX | 1010 DATA 0570480520480320660790790770 3606103410416900013302017301021041026 20816502020112014424096034 |
| WQ | 1020 DATA 1550570480530480320820650730 78066079087036061034104169001133020140 010212140026208200165020208 |
| WN | 1030 DATA 2450960341550570480560530320 65061085083082040065068082040034104169 000133205168169224133206177 |
| RH | 1040 DATA 2051452032082082492302042302 06165206201226208239096034041041155 |


```

TX 870 POKE PORTA,A:GOSUB 1510
NM 880 P=P+1+((P>TP)*-2)
SU 890 POKE TXTROW,2:POKE TXTCOL,28:? P;"
      ":POKE CONSOL,7
RH 900 IF P<>TP THEN 780
NX 910 GOSUB 1750:POSITION 0,15:? #6;"MOV
      "E DONE"
      ":FOR PAUSE=1 TO
      150:NEXT PAUSE:GOSUB 1730
ZJ 920 RETURN
JL 930 POSITION 0,12:? #6;"CHOOSE SPEED
      ":REM SET SPEED OF TRAVEL
JS 940 ? #6:? #6;"10=slow 99=fast"
VS 950 GOSUB 70
NR 960 R=ANS-48:? #6:? #6;R;
VW 970 GOSUB 70
VQ 980 ? #6;ANS-48:R=R*10+(ANS-48)
OU 990 POKE TXTROW,3:POKE TXTCOL,28:? R;"
      "
BT 1000 DELAY=100-R
AC 1010 RETURN
FM 1020 POSITION 0,12:? #6;"START=UP
      ":REM GO UP FAST
UC 1030 IF PEEK<CONSOL><>6 THEN 1030
KO 1040 POKE PORTA,D:POKE CONSOL,7
ZE 1050 POKE PORTA,C
YQ 1060 POKE PORTA,B
YC 1070 POKE PORTA,A
OV 1080 P=P+1
IN 1090 POKE TXTROW,2:POKE TXTCOL,28:? P;
      " "
XQ 1100 IF PEEK<CONSOL>=6 THEN 1040
AE 1110 RETURN
SV 1120 POSITION 0,12:? #6;"START=DOWN
      ":REM GO DOWN FAST
VJ 1130 IF PEEK<CONSOL><>6 THEN 1130
IR 1140 POKE PORTA,A:POKE CONSOL,7
YP 1150 POKE PORTA,B
ZJ 1160 POKE PORTA,C
AD 1170 POKE PORTA,D
PP 1180 P=P-1
IP 1190 POKE TXTROW,2:POKE TXTCOL,28:? P;
      " "
YH 1200 IF PEEK<CONSOL>=6 THEN 1140
AG 1210 RETURN
TG 1220 REM DISPLAY SETTINGS
JA 1230 POSITION 12,0:? TP;:POSITION 12,1
      :? L;:POSITION 12,2:? P;
YS 1240 POSITION 12,3:? R;:RETURN
GB 1250 POKE PORTA,255:REM TURN OFF ALL T
      HE PHASES
YQ 1260 ? "PRESS START TO KEEP RUNNING,"
CA 1270 IF PEEK<CONSOL><>6 THEN 1270
RW 1280 GOTO 370
AR 1290 POSITION 0,12:? #6;"WORKING..."
      ":REM MOVE TO TOP
BI 1300 IF P=TP THEN 1380
KL 1310 POKE PORTA,D:POKE CONSOL,7
ZB 1320 POKE PORTA,C
YN 1330 POKE PORTA,B

```

```

XZ 1340 POKE PORTA,A
GZ 1350 P=P+1+((P>TP)*-2)
IK 1360 POKE TXTROW,2:POKE TXTCOL,28:? P;
      " "
XM 1370 IF P<>TP THEN 1300
CW 1380 ? #6:? #6;"move done
      ":FOR PAUSE=1 TO 150:NEXT PAUSE
BG 1390 RETURN
UP 1400 POSITION 0,12:? #6;"WORKING..."
      "
ST 1410 IF P=L THEN 1490
IR 1420 POKE PORTA,A:POKE CONSOL,7
YP 1430 POKE PORTA,B
ZJ 1440 POKE PORTA,C
AD 1450 POKE PORTA,D
IR 1460 P=P-1+((P<L)*2)
IP 1470 POKE TXTROW,2:POKE TXTCOL,28:? P;
      " "
LX 1480 IF P<>L THEN 1410
OG 1490 ? #6;"move done
      ":FOR PAU
      SE=1 TO 150:NEXT PAUSE
AJ 1500 RETURN
CQ 1510 FOR Q=1 TO DELAY
BV 1520 IF PEEK<CONSOL>=6 THEN WLOOP=2
RW 1530 NEXT Q:GOSUB 1730:RETURN
JQ 1540 GRAPHICS 17:REM TITLE SCREEN
VO 1550 FOR X=1 TO 3:? #6;"
      "
      X
MR 1560 ? #6;"
      "
BO 1570 ? #6;"
      "
IO 1580 ? #6;"
      "
EK 1590 ? #6;"
      "
BJ 1600 FOR X=1 TO 5:? #6;"
      ":NEXT X
MC 1610 ? #6;"
      ":? #6;"
      "
MR 1620 ? #6;"
      "
IJ 1630 ? #6;"
      "
ZY 1640 ? #6;"
      "
IS 1650 ? #6;"
      "
QF 1660 ? #6;"
      ":? #6;"
      "
BI 1670 ? #6;"
      "
IA 1680 ? #6;"
      "
XP 1690 FOR WLOOP=0 TO 1 STEP 0
JP 1700 GOSUB 1710:NEXT WLOOP:RETURN
QT 1710 POKE 708,0:POKE 709,15:GOSUB 1510
      "
GV 1720 POKE 708,15:POKE 709,0:GOSUB 1510
      :RETURN
AN 1730 POKE 77,0:POKE 764,255:IF BRK THE
      N POKE 16,64:POKE 53774,64
AZ 1740 RETURN
FH 1750 DUR=1:LO=57:HI=45:NT=HI
RT 1760 FOR TIME=0 TO DUR*2
EC 1770 SOUND 0,NT,10,14
PP 1780 FOR WT=1 TO 18
BL 1790 IF PEEK<CONSOL>=6 THEN WLOOP=1
XX 1800 NEXT WT
GA 1810 NT=LO:LO=HI:HI=NT
PL 1820 NEXT TIME
XZ 1830 SOUND 0,0,0,0:RETURN

```

ST RESOURCE

STEPPER MOTOR ROBOT-CONTROLLER

Article on page 62

LISTING 1

```

/*
* ST Stepper Motor
* (c) 1986 Antic Publishing
* Version 073086 Wednesday

```

continued on next page


```

*   Written by Patrick Bass
*
*   The purpose of this program is to explore creating
*   and manipulating a form while performing a job.
*
*---- Alcyon Include File -----*/

```

```

#include      "stepper.h"
#include      "osbind.h"

```

```

#define      TRUE          (1)
#define      FALSE        (0)
#define      begin        {
#define      end          }
#define      wend         }
#define      repeat       }
#define      next         }
#define      endif        }
#define      not          !
#define      equals       ==
#define      does_not_equal !=
#define      then
#define      CONSOL       2
#define      PRINTER      0
#define      DELAY        for( i=0; i<1000; i++ );
#define      LWGET(x)      ( (int) *((int *) (x)) )
#define      OB_W(x)       ( box_address+(x)*sizeof(OBJECT)+20 )
#define      OB_H(x)       ( box_address+(x)*sizeof(OBJECT)+22 )

```

```

typedef struct object
begin
    int          ob_next;
    int          ob_head;
    int          ob_tail;
    unsigned int ob_type;
    unsigned int ob_flags;
    unsigned int ob_state;
    long         ob_spec;
    int          ob_x;
    int          ob_y;
    int          ob_width;
    int          ob_height;
end OBJECT;

```

```

typedef struct text_edinfo
begin
    long         te_ptext;
    long         te_ptmplt;
    long         te_pvalid;
    int          te_font;
    int          te_junk1;
    int          te_just;
    int          te_color;
    int          te_junk2;
    int          te_thickness;
    int          te_txtlen;
    int          te_tmplen;
end TEDINFO;

```

```

/*----- Alcyon Declarations/Equates -----*/
int  contrl[ 12 ],
     intin[ 256 ],  ptsin[ 256 ],

```



```

intout[ 256 ], ptsout[ 256 ],
workin[]={ 1,1,1,1,1,1,1,1,1,2 }, workout[ 57 ],
i, j, k, l, x, y, w, h,
mtopx, mtopy, mbotx, mboty,
t_x, t_y, t_w, t_h,
b_x, b_y, b_w, b_h,
c_x, c_y, c_w, c_h,
s_x, s_y, s_w, s_h,
top, bottom, current, speed,
delay, drive, dum, gem_handle,
button, pressed, finished, xdial, ydial, wdial, hdial;

char topstring[ 20 ], botstring[ 20 ],
currstring[ 20 ], speedstring[ 20 ],
a, b, c, d;

long box_address;

/*-----*/
main()
begin
    initialize();

    do begin
        move_the_stepper_motor();

        repeat while( not finished );

        terminate();
    end

/*-----*/
initialize()
begin
    appl_init();
    gem_handle=graf_handle( &i, &i, &i, &i );
    v_opnvwk( workin, &gem_handle, workout );

    rsrc_load( "\STEPPER.RSC" );
    rsrc_gaddr( 0, TREE1, &box_address );

    a=5; b=6; c=10; d=9;

    graf_mouse( 0, 0L );
    finished=FALSE;
end

/*-----*/
move_the_stepper_motor()
begin
    x=0; y=0, w=10, h=10;
    form_center( box_address, &xdial, &ydial, &wdial, &hdial );

    find_box_sizes();

    form_dial ( 0, x, y, w, h, xdial, ydial, wdial, hdial );
    form_dial ( 1, x, y, w, h, xdial, ydial, wdial, hdial );

    objc_draw( box_address, TREE1, 2, xdial, ydial, wdial, hdial );

    do begin

```

continued on next page


```

        button=form_do( box_address, 0 );

        if( button equals MOVETOP )then move_top();
        if( button equals MOVEBOT )then move_bottom();

        if( button equals TOPUP )then d_topup();
        if( button equals TOPDN )then d_topdn();

        if( button equals BOTUP )then d_botup();
        if( button equals BOTDN )then d_botdn();

        if( button equals CURRUP )then d_curup();
        if( button equals CURRDN )then d_curdn();

        if( button equals SPEEDUP )then d_speup();
        if( button equals SPEEDDN )then d_spedn();

    repeat while( button does_not_equal QUIT );

    form_dial( 3, x, y, w, h, xdial, ydial, wdial, hdial );
    form_dial( 2, x, y, w, h, xdial, ydial, wdial, hdial );

    finished=TRUE;

end

/*-----*/
find_box_sizes()
begin
    objc_offset( box_address, TOPNUM, &t_x, &t_y );
    t_w=( LWGET( OB_W( TOPNUM ))) -1;
    t_h=( LWGET( OB_H( TOPNUM ))) -1;

    objc_offset( box_address, BOTNUM, &b_x, &b_y );
    b_w=( LWGET( OB_W( BOTNUM ))) -1;
    b_h=( LWGET( OB_H( BOTNUM ))) -1;

    objc_offset( box_address, CURRNUM, &c_x, &c_y );
    c_w=( LWGET( OB_W( CURRNUM ))) -1;
    c_h=( LWGET( OB_H( CURRNUM ))) -1;

    objc_offset( box_address, SPEEDNUM, &s_x, &s_y );
    s_w=( LWGET( OB_W( SPEEDNUM ))) -1;
    s_h=( LWGET( OB_H( SPEEDNUM ))) -1;

end

/*-----*/
d_topup()
begin
    top=top+1;
    adjust( TOPNUM, top, &topstring, t_x, t_y, t_w, t_h );
end

/*-----*/
d_topdn()
begin
    if( top>bottom )then begin
        top=top-1;
        adjust( TOPNUM, top, &topstring, t_x, t_y, t_w, t_h );
        if( top<=current )then begin
            current=top;
            d_curdn();
        endif
    endif
end

```


end

/*-----*/

d_botup()

```
begin
    if( bottom<top )then begin
        bottom=bottom+1;
        adjust( BOTNUM, bottom, &botstring, b_x, b_y, b_w, b_h );
        if( bottom>=current )then begin
            current=bottom;
            d_curup();
        endif
    endif
end
```

/*-----*/

d_botdn()

```
begin
    bottom=bottom-1;
    adjust( BOTNUM, bottom, &botstring, b_x, b_y, b_w, b_h );
end
```

/*-----*/

d_curup()

```
begin
    int i;

    current=current+1;
    adjust( CURRNUM, current, &currstring, c_x, c_y, c_w, c_h );
    Bconout( PRINTER, d ); DELAY
    Bconout( PRINTER, c ); DELAY
    Bconout( PRINTER, b ); DELAY
    Bconout( PRINTER, a ); DELAY
end
```

/*-----*/

d_curdn()

```
begin
    int i;

    current=current-1;
    adjust( CURRNUM, current, &currstring, c_x, c_y, c_w, c_h );
    Bconout( PRINTER, a ); DELAY
    Bconout( PRINTER, b ); DELAY
    Bconout( PRINTER, c ); DELAY
    Bconout( PRINTER, d ); DELAY
end
```

/*-----*/

d_speup()

```
begin
    speed=speed+1;
    adjust( SPEEDNUM, speed, &speedstring, s_x, s_y, s_w, s_h );
end
```

/*-----*/

d_spdn()

```
begin
    if( speed>0 )then begin
        speed=speed-1;
        adjust( SPEEDNUM, speed, &speedstring, s_x, s_y, s_w, s_h );
    endif
end
```

continued on next page


```

end

/*-----*/
adjust( object, variable, string, x, y, w, h )
int  object, variable, x, y, w, h;
char *string;
begin
    ftoa( (float)variable, string, 0 );
    set_text( box_address, object, string );
    objc_draw( box_address, object, 1, x, y, w, h );
    beep( 0, 1, 50 );

```

end

```

/*-----*/
set_text( tree_address, obj_number, string_address )
OBJECT    *tree_address;
int        obj_number;
char       *string_address;

```

```

begin
    TEDINFO    *obj_specification;

```

```

    obj_specification=(TEDINFO *) (tree_address+obj_number)->ob_spec;
    obj_specification->te_ptext={ string_address };
    obj_specification->te_txtlen={ 4 };

```

end

```

/*-----*/

```

```

move_top()

```

```

begin
    int  i, j, k, mx, my, pressed, key;

    for( i=current; i<top; i++ )begin
        graf_mkstate( &mx, &my, &pressed, &key );
        if( pressed )then i=top;
        if( not pressed )then begin
            d_curup();
            for( j=0; j<speed; j++ )begin
                for( k=0; k<500; k++ );
            next
        endif
    next
    beep( 0, 2, 15000 );
    beep( 0, 1, 15000 );
    beep( 0, 2, 15000 );

```

end

```

/*-----*/

```

```

move_bottom()

```

```

begin
    int  i, j, k, mx, my, pressed, key;

    for( i=current; i>bottom; i-- )begin
        graf_mkstate( &mx, &my, &pressed, &key );
        if( pressed )then i=bottom;
        if( not pressed )then begin
            d_curdn();
            for( j=0; j<speed; j++ )begin
                for( k=0; k<500; k++ );
            next
        endif
    next

```

TYPO ST codes
for Deduction!

Don't type these.

1000 :07FC
1010 :0879
1020 :0E26
1030 :00EB
1040 :07E7
1050 :06D8
1060 :0E3A
1070 :00EF
1080 :0603
1090 :08A6
1100 :071E
1110 :08A1

1120 :05D4
1130 :097C
1140 :05D2
1150 :040C
1160 :0AC1
1170 :08B5
1180 :04CA
1190 :06C2
1200 :0B2C
1210 :058B
1220 :0713
1230 :05C8
1240 :05F6
1250 :07EE
1260 :03D2
1270 :051F
1280 :0803
1290 :03D5
1300 :04A4
1310 :0818
1320 :0A5F
1330 :04B4
1340 :045B
1350 :0717
1360 :0679
1370 :0420
1380 :02ED
1390 :067A
1400 :0871
1410 :088B
1420 :06EC
1430 :07C3
1440 :053D
1450 :0479
1460 :0890
1470 :0720
1480 :07C8
1490 :04F8


```

beep( 0, 2, 15000 );
beep( 0, 1, 15000 );
beep( 0, 2, 15000 );

end

/*-----*/
beep( notelo, notehi, delay )
char notehi;
int notelo, delay;

begin
    int portstate;

    Giaccess( 15, 8+128 );
    Giaccess( 0, 128 );
    portstate=Giaccess( portstate, 7 );
    Giaccess( 60, 7+128 );

    Giaccess( notelo, 0+128 );
    Giaccess( notehi, 1+128 );

    for( i=0; i<delay; i++ );
    Giaccess( 0, 0+128 );
    Giaccess( 0, 1+128 );

    Giaccess( portstate, 7+128 );
    Giaccess( 0, 8+128 );

end

/*-----*/
terminate()
begin
    rsrc_free();
    v_clswk( gem_handle );
    appl_exit();
end

```

```

1500 :03EE
1510 :074F
1520 :03D1
1530 :03B3
1540 :0458
1550 :01D4
1560 :0365
1570 :03D4
1580 :04CF
1590 :0330
1600 :1281
1610 :122A
1620 :0881
1630 :050D
1640 :04E3
1650 :02C7
1660 :099C
1670 :0729
1680 :0358
1690 :0370
1700 :02BF
1710 :03ED
1720 :073A
1730 :04C2
1740 :0727
1750 :072E
1760 :036E
1770 :01F2
1780 :0401
1790 :0644
1800 :0735
1810 :0741
1820 :0649
1830 :048E
1840 :036D
1850 :0667
1860 :0FEA
1870 :08D8
1880 :03D8
1890 :0C9D
1900 :0F80
1910 :0315
1920 :03AC
1930 :0A0B
1940 :03F2
1950 :08FB
1960 :03F5
1970 :0932
1980 :07ED
1990 :079C
2000 :06AC
2010 :08CF
2020 :0283
2030 :0775
2040 :081F
2050 :08D4
2060 :0287
2070 :07BC
2080 :0600

```

ST RESOURCE

DEDUCTION!

Article on page 89

LISTING 1

```

1000 'ST Classics: MASTERMIND
1010 '(C)1986 Antic Publishing
1020 'Written by Paul Pratt & Steven Evermann
1030 '
1040 defint A, Z:gosub KOLOR
1050 A#=GB:MOUSE=peek( A#+12 )
1060 fullw 2:clearw 2:randomize 0:TRUE=1:FALSE=0
1070 '
1080 clearw 2:color 1
1090 gotoxy 22, 0: Print "*****"
1100 gotoxy 22, 1: Print "#          #"
1110 gotoxy 22, 2: Print "*****"
1120 TXT=4:gosub TEXT

```

continued on next page

| | | | |
|------|---|------|-------|
| 1130 | gotoxy 24, 1: Print "DEDUCTION" | 2090 | :0604 |
| 1140 | TXt=0:gosub TEXT | 2100 | :0A53 |
| 1150 | color 1, 8, 14 | 2110 | :0A77 |
| 1160 | gotoxy 17, 17: Print " ACCEPT REJECT"; | 2120 | :0756 |
| 1170 | gotoxy 25, 4: Print "ANSWER" | 2130 | :03CF |
| 1180 | 'answer box | 2140 | :04AA |
| 1190 | C=1:F=8:BX=206:BY=35:L=38 | 2150 | :0EE8 |
| 1200 | W=89:gosub BOX:fill 229, 41:fill 269, 40 | 2160 | :030D |
| 1210 | BY=49:L=18:W=18:F=11 | 2170 | :0403 |
| 1220 | for BX=210 to 281 step 21 | 2180 | :0404 |
| 1230 | gosub BOX:next | 2190 | :03CD |
| 1240 | 'deduction box | 2200 | :050C |
| 1250 | F=0:C=14:BX=203:BY=6:L=17:W=94 | 2210 | :075B |
| 1260 | gosub BOX | 2220 | :055F |
| 1270 | 'message box | 2230 | :02D1 |
| 1280 | F=0:C=1:BX=206:BY=79:W=89:L=67 | 2240 | :03EC |
| 1290 | gosub BOX | 2250 | :04D3 |
| 1300 | 'accept box | 2260 | :06A9 |
| 1310 | F=7:C=1:BX=150:BY=152:W=72:L=12 | 2270 | :0420 |
| 1320 | gosub BOX:fill 164, 158:fill 196, 157 | 2280 | :03F0 |
| 1330 | 'reject box | 2290 | :03AB |
| 1340 | F=2:BX=222:W=72 | 2300 | :06A4 |
| 1350 | gosub BOX:fill 236, 157 | 2310 | :07E3 |
| 1360 | color 1, 11:fill 3, 100 | 2320 | :09E7 |
| 1370 | gosub MENU | 2330 | :03D1 |
| 1380 | COLUM=13 | 2340 | :0347 |
| 1390 | 'guessing boxes | 2350 | :00F1 |
| 1400 | W=26:F=8:L=8:C=1:COLUM=COLUM-1 | 2360 | :047A |
| 1410 | for BY=6 to COLUM*12-4 step 12 | 2370 | :0C9A |
| 1420 | for BX=30 to 137 step 28 | 2380 | :0D93 |
| 1430 | gosub BOX:next:next | 2390 | :08D6 |
| 1440 | 'reply boxes | 2400 | :084C |
| 1450 | W=8:F=8:L=8:C=9 | 2410 | :08E5 |
| 1460 | for BY=6 to COLUM*12-4 step 12 | 2420 | :0368 |
| 1470 | for BX=151 to 193 step 12 | 2430 | :01EA |
| 1480 | gosub BOX:next:next | 2440 | :0423 |
| 1490 | gosub INITIAL | 2450 | :0589 |
| 1500 | 'pointer | 2460 | :058D |
| 1510 | F=1:C=1:BX=10:BY=8:L=4:W=17 | 2470 | :0579 |
| 1520 | gosub BOX | | |
| 1530 | gosub 2350 | | |
| 1540 | ROW=1:COLUM=1 | | |
| 1550 | FO=7 | | |
| 1560 | MAINLOOP: | | |
| 1570 | gosub RAT | | |
| 1580 | F=INT((MX-10)\20) | | |
| 1590 | IST=9+D*20 | | |
| 1600 | if MB=1 and MX>IST and MX<150 and YOK and FO<>F then gosub CHOOSE | | |
| 1610 | if MB=1 and MX>222 and MX<294 and MY>173 and MO<>MX then gosub 1700 | | |
| 1620 | if ROW =5 then gosub ACCEPT | | |
| 1630 | if MB=2 then 2230 | | |
| 1640 | goto MAINLOOP | | |
| 1650 | CHOOSE: | | |
| 1660 | color 1, CO(F):FO=F:GUS(ROW)=CO(F) | | |
| 1670 | fill ROW*28+14, COLUM*12-2 | | |
| 1680 | ROW=ROW+1 | | |
| 1690 | return | | |
| 1700 | REJECT: | | |
| 1710 | gosub 2350: | | |
| 1720 | if ROW>1 then ROW=ROW-1 | | |
| 1730 | color 1, 8:FO=7 | | |
| 1740 | fill ROW*28+14, COLUM*12-2 | | |
| 1750 | for DELAY=1 to 10:next | | |
| 1760 | return | | |
| 1770 | BOX: | | |
| 1780 | color 1, F, C | | |
| 1790 | linef BX, BY, BX, BY+L | | |
| 1800 | linef BX, BY+L, BX+W, BY+L | | |
| 1810 | linef BX+W, BY+L, BX+W, BY | | |
| 1820 | linef BX+W, BY, BX, BY | | |
| | | 2480 | :0CC5 |
| | | 2490 | :036F |
| | | 2500 | :0288 |
| | | 2510 | :03C5 |
| | | 2520 | :0499 |
| | | 2530 | :0620 |
| | | 2540 | :04E0 |
| | | 2550 | :06E6 |
| | | 2560 | :06AC |
| | | 2570 | :058D |
| | | 2580 | :0504 |
| | | 2590 | :0772 |
| | | 2600 | :0368 |
| | | 2610 | :01F1 |
| | | 2620 | :0E8B |
| | | 2630 | :0BB1 |
| | | 2640 | :036C |
| | | 2650 | :0377 |


```

1830 fill BX+2, BY+2
1840 return
1850 ACCEPT:gosub EMPTY
1860 gotoxy 23, 10: Print " ACCEPT":gotoxy 23, 12: Print " OR "
1870 gotoxy 23, 14: Print " REJECT"
1880 gosub RAT
1890 if MB=1 and MX>149 and MX<222 and YOK then 1920
1900 if MB=1 and MX>222 and MX<294 and YOK and MO<>MX then 1700
1910 Goto 1880
1920 BLK=0:WHT=0
1930 gosub 2350:'PRINT SELECT 4 colors
1940 for X=1 to 4
1950 if GUS( X )=PAT( X ) then BLK=BLK+1
1960 for Y=1 to 4
1970 if GUS( X )=PAT( Y ) then WHT=WHT+1
1980 next:next:WHT=WHT-BLK
1990 color 1, 0:for X=1 to WHT
2000 fill X*12+146, COLUM*12-2
2010 sound 1, 10, 3, 5, 5:sound 1, 0, 0, 0, 0
2020 next
2030 color 1, 1:for X=1 to BLK
2040 fill ( X+WHT )*12+146, COLUM*12-2
2050 sound 1, 10, 3, 6, 5:sound 1, 0, 0, 0, 0
2060 next
2070 F=11:C=11:BX=10:BY=COLUM*12-4
2080 L=4:W=17:gosub BOX
2090 ROW=1:COLUM=COLUM+1
2100 if BLK=4 then gosub WIN:goto 2230
2110 if COLUM>12 then MB=2:F0=0:return
2120 F=1:C=1:BX=10:BY=COLUM*12-4
2130 gosub BOX
2140 F0=7:return
2150 if FL=0 then TRYS=TRYS-1:gotoxy 13, 7: Print TRYS
2160 INITIAL:
2170 RANDOMIZE 0
2180 for X=D to 6
2190 TEMP=PAT( X )
2200 Y=INT( RND*( 7-D ) )+D
2210 PAT( X )=PAT( Y ):PAT( Y )=TEMP
2220 next:return
2230 ANSWER:
2240 for X= 1 to 4
2250 color 1, PAT( X )
2260 fill X*18+205, 51:next
2270 gosub MENU
2280 for X= 1 to 4
2290 color 1, 11
2300 fill X*18+205, 51:next
2310 if COLUM>12 then goto 1400
2320 F=11:C=11:BX=10:BY=COLUM*12-4:W=17:L=4
2330 gosub BOX
2340 goto 1400
2350 '
2360 gosub EMPTY
2370 color 11: gotoxy 23, 9: Print "RIGHT=ANSW"
2380 color 1: gotoxy 23, 10: Print string$( 11, 249 )
2390 gotoxy 23, 11: Print " SELECT"
2400 gotoxy 23, 13: Print " FOUR "
2410 gotoxy 23, 15: Print " COLORS"
2420 return
2430 RAT:
2440 gemsys( 79 )
2450 MX=peek( MOUSE+2 )
2460 MY=peek( MOUSE+4 )
2470 MB=peek( MOUSE+6 )
2480 YOK=FALSE: if MY>174 and MY<186 then YOK=TRUE
2490 return
2500 KOLOR:
2510 dim KOL%( 16 )

```

```

2660 :09C4
2670 :0C31
2680 :05DC
2690 :0CD7
2700 :0A7A
2710 :089F
2720 :073C
2730 :0926
2740 :049B
2750 :0580
2760 :07DE
2770 :05DC
2780 :04DA
2790 :05D4
2800 :0596
2810 :036B
2820 :023B
2830 :047C
2840 :0894
2850 :05DC
2860 :09DE
2870 :05DD
2880 :0BOE
2890 :09B5
2900 :09EF
2910 :09FF
2920 :03D4
2930 :0FC0
2940 :04FC
2950 :0584
2960 :0518
2970 :0562
2980 :0373
2990 :029D
3000 :036F
3010 :03C2
3020 :0703
3030 :0285
3040 :0367
3050 :0247
3060 :0981
3070 :09A0
3080 :032E
3090 :036C

```

continued on next page


```

2520 restore 2550
2530 for A=0 to 15:read B
2540 KOLX( A )=B:next
2550 data 1911, 1792, 112, 51, 775, 80
2560 data 5, 1365, 546, 101, 51, 1904
2570 data 1796, 1360, 1285, 0
2580 defdb1 K: K = 1114
2590 poke K, varptr( KOLX( 0 ) )
2600 return
2610 WIN:
2620 for Y=1 to 3: for X=7 to 10: sound Y, 13, X, 5+Y, 2: next
2630 next: for Y=1 to 3: sound Y, 0, 0, 0: next
2640 return
2650 KOLORBOX:
2660 gosub EMPTY: TXT=1:gosub TEXT
2670 color 5: gotoxy 23, 9: print " RESETTING "
2680 TXT=0:gosub TEXT
2690 color 1:gotoxy 23, 10: print STRING$( 11, 249 )
2700 gotoxy 25, 11: print chr$( 189 );" 1986"
2710 gotoxy 23, 13: print " PRATT "
2720 gotoxy 23, 14: print " & "
2730 gotoxy 23, 15: print " EVERMAN "
2740 restore 2800
2750 BY=152: C=1: W=12: L=12
2760 for BX=10+D*20 to 130 step 20
2770 read F: X=( ( BX-10 )/20 )
2780 CO( X )=F: PAT( X )=F
2790 gosub BOX: next
2800 data 2, 14, 7, 10, 4, 13, 12
2810 return
2820 MENU:
2830 gosub EMPTY
2840 gosub RAT: if MB<>0 then 2840
2850 TXT=1:gosub TEXT
2860 gotoxy 23, 9: print "CLICK MOUSE"
2870 TXT=0:gosub TEXT
2880 gotoxy 23, 10: print string$( 11, 249 )
2890 gotoxy 23, 11: print "LEFT = EASY"
2900 gotoxy 23, 13: print "RIGHT= HARD"
2910 gotoxy 23, 15: print "BOTH to END"
2920 gosub RAT
2930 if MB=1 then D=1:BX=10:BY=152:C=6:F=11:W=12:L=12:gosub BOX
2940 if MB=2 then D=0
2950 if MB=3 then end
2960 if MB=0 then 2920
2970 gosub KOLORBOX
2980 return
2990 EMPTY:
3000 color 1, 0
3010 FOR X=9 to 15
3020 gotoxy 23, X: print " "
3030 next
3040 return
3050 TEXT:
3060 poke CONTRL, 106:poke CONTRL+2, 0
3070 poke CONTRL+6, 1:poke INTIN, TXT
3080 VDISYS( 0 )
3090 return

```


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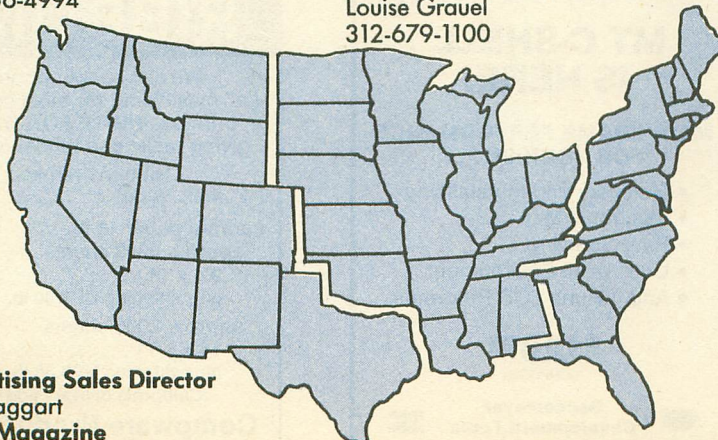
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BY BILL MARQUARDT, ANTIC TECHNICAL ASSISTANT

This month's Tech Tips will explain some handy ways to modify Atari DOS 2.0 for special purposes. DOS 2 is older than DOS 2.5 and the not-recommended DOS 3, but it is still the most commonly used official Atari Disk Operating System. And it serves as the standard for DOS compatibility. DOS 2 is the operating system you will find on each month's Antic Disk.

First, a few words of CAUTION: The following enhancements were designed specifically for Atari DOS 2. We don't know exactly what would happen if you try these changes any other DOS, but we doubt if the results would be anything good. And be sure to keep a backup copy of original DOS 2, in case you later change your mind about using any of these modifications.

DUPLICATE FILENAMES

One problem with DOS 2 is that it is possible to rename a file to an existing filename. If you attempt to delete or rename one of them, they will both be deleted or renamed. Here is a solution to this problem.

Take a disk with the DOS.SYS and DUP.SYS files on it. Put it in your drive and turn on your computer. At the READY prompt, type POKE 3117,234 and POKE 3118,234. Then type DOS. This patch will let you rename the first file without affecting the second when using option E from the DOS menu. We found this tip from Jerry White in the August, 1986 newsletter of the Lawrence Atari Computer Club.

The next tips appeared in various users group newsletters and were credited to the sysop of the Atlantis BBS.

ERROR 164

You will see Error 164 (File Number Mismatch) if your file is scrambled. Normally, your computer won't allow you to see the file and you are hopelessly lost if this was your only copy. However, if you do a POKE 4148,234: POKE 4149,234 you will be able to LOAD your file, garbage and all, and correct it! Be sure to SAVE the corrected file to another disk and avoid using the damaged version.

OVER TWO DRIVES

You must tell DOS that you have more than two drives attached to your system if you want to access them. Location 1802 is the flag for this purpose. Each bit in the byte stored there represents a drive. Setting a bit will allow DOS to access the corresponding drive.

Normally, the lowest two bits are set, so you would find a 3 in location 1802. By POKEing in a 7 you set DOS for three drives, and by POKEing in 15, you set DOS for four drives. This is because the bit patterns are 0111 and 1111 respectively. This is a change that should be made permanent by re-writing DOS to disk after the POKE. You can access as many as eight drives. But keep in mind that

every drive you add requires 128 bytes of memory to store its buffer.

OPEN FILE LIMITS

DOS limits you to three simultaneously open files. But if you find this restrictive, you can expand the limit to seven by simply doing a POKE 1801,7. A buffer of 128 bytes is used for each file. Use a number less than seven if you don't want to give up all that valuable RAM.

LOWERCASE FILENAMES

If you are bored with all uppercase filenames try this: POKE 3818,48:POKE 3822,123. Now you can use any ATASCII character from CHR(48) to CHR(122) ("0" to "z"). Note that the second POKE value is the ATASCII value plus one. It is *not* recommended to go above or below these values.

CHANGING WILDCARDS

This tip is of dubious value, but if you would like your wildcard character to be something other than the asterisk [*], POKE 3783 with the ATASCII value of your chosen character.

PERMANENT POKES

Remember that all the above POKES are made from BASIC in the immediate mode. You do *not* need line numbers. The changes can then be made permanent by typing DOS to go to the DOS menu and using option H to rewrite your modified version of DOS to disk.

DIRECTORY TEXT

Would you like to create a text file on your disk that contains the directory? This short routine by Sally Nagy appeared in the newsletter of the Capitol Hill Atari Owners Society (CHAOS):

```
10 DIM A$(20),B$(1280)
20 OPEN #1,6,0,"D:*.*":TRAP 80
40 INPUT #1;A$:B$(LEN(B$)+1)=A$
60 GOTO 40
80 CLOSE #1:OPEN #1,8,0,"D:DISKDIR"
90 B$(LEN(B$)+1)=" ":B$(LEN(B$)+1)=A$
110 M=17:FOR N=1 TO LEN(B$)/M
130 PRINT #1,B$((N-1)*M+1,N*M)
140 NEXT N:CLOSE #1
```

If you have a Tech Tip that you would like to share with other readers, send it along to Antic Tech Tips, 524 Second Street, San Francisco, CA 94107. You might get your name in print. We always welcome very short programs that demonstrate the Atari's powers, simple hardware modifications, or useful macros for popular software.

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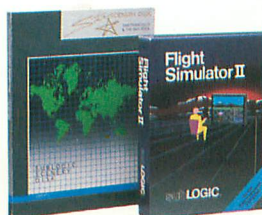
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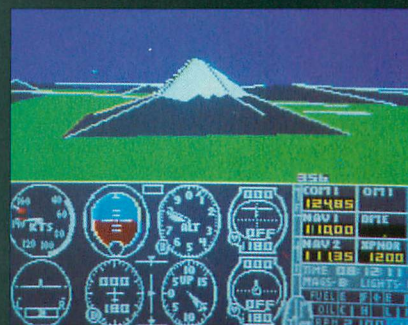
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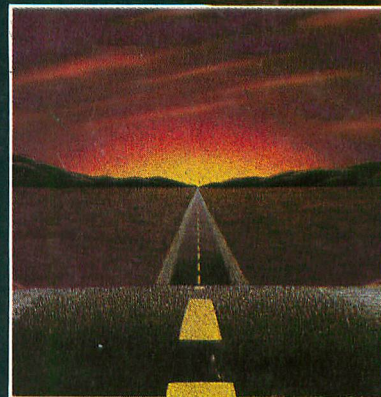
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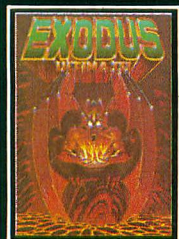
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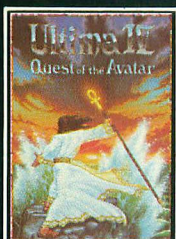


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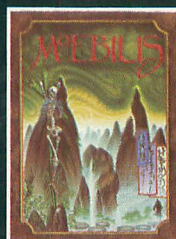
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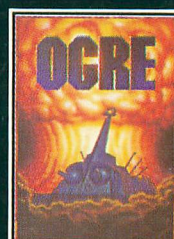
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