NO. 39
FEBRUARY 1986

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THE #1 MAGAZINE FOR ATARI® COMPUTER OWNERS

ANALOG COMPUTING™

Commodore vs. Atari—

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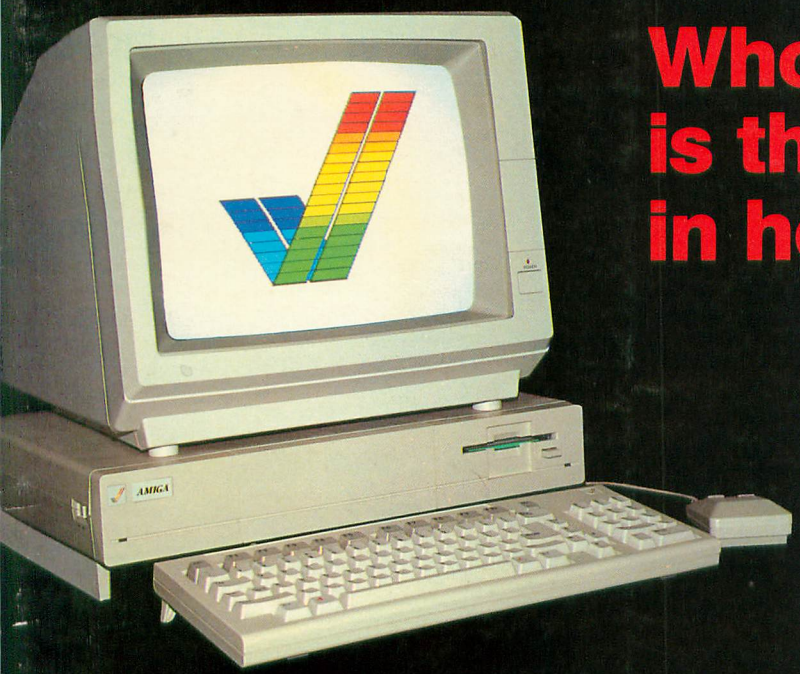

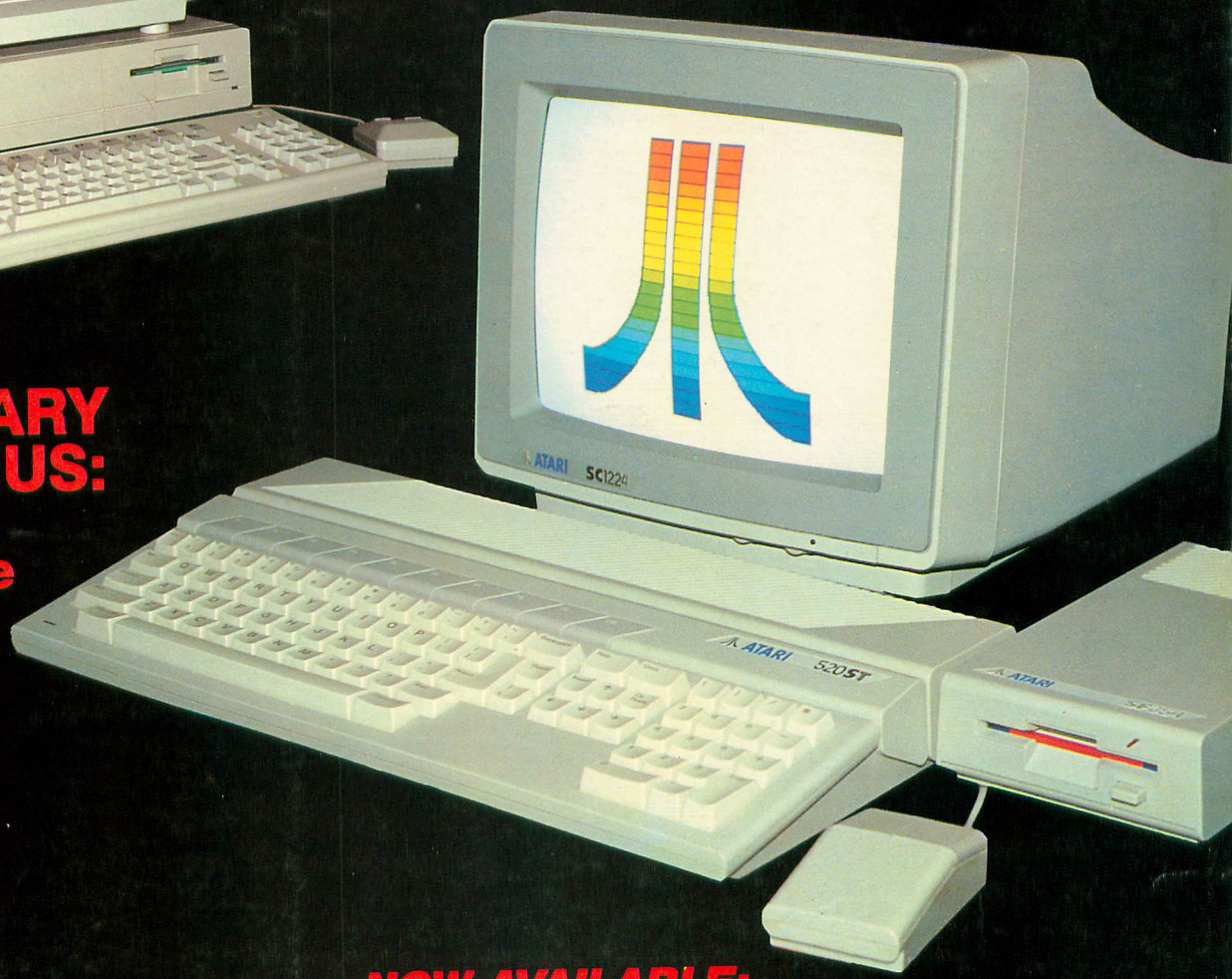

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CIRCLE #101 ON READER SERVICE CARD

NO. 39

FEBRUARY 1986

THE #1 MAGAZINE FOR ATARI® COMPUTER OWNERS™

ANALOG COMPUTING

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Advertising Manager
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Production/Distribution
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Contributors
CURTIS CROWE
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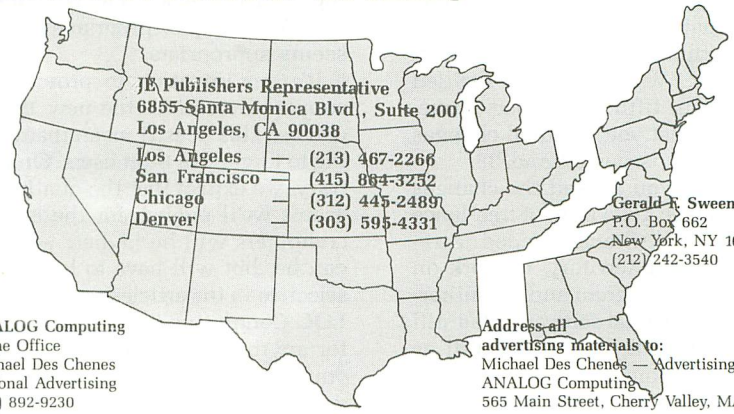

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ANALOG Computing
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EDITORIAL

We know that **ANALOG Computing** readers are astute, detail-oriented and infused with loyalty to the magazine. We know that you're intensely interested in everything we do here in the editorial offices. We know you're *thrilled* that this is our fifth anniversary issue. So we know that you've noted changes in our staff for issues 37 and 38.

Just in case you missed the changes . . .Tom Hudson got a taste of free-lance work with **DEGAS** and decided to return to his home territory, to work on promoting that program and on authoring more commercial software. He's still writing **Boot Camp** for us, as well as other articles. Jon Bell has also gone back home for now, doing free-lance art, writing and heading in new directions. His work was on the cover of issue 38.

Lee Pappas will be on to other projects by the time you read this. He's been in the publishing business for five years now, so he's ready to try his hand at other entrepreneurial ventures.

I'm now Managing Editor. Basically, this just means that I'm more involved with the art, graphics and decision making than I was. It's *my* turn for ulcers. Clayton Walnum has joined our technical staff. You know him; he wrote **Nightshade**, **MicroCheck** and **Dragonlord** (issues 36, 27 and 29). . .He's good—at both programming and writing.

The changes in our organization are minor. We're still concerned with bringing you Atari news *fast*, and with giving you the best programs, games and tutorials for your computer.

In this vein, we're proud to announce the **ANALOG Computing** 3½-inch disk subscription—the first ST-only disk subscription anywhere. It begins with this issue and includes programs for the 520ST from this month, as well as some from earlier issues. Since those are only a drop in the bit bucket, we're also going to have demos, **NEO-Chrome** and **DEGAS** sample programs—whatever seems appropriate.

It's our intention to provide all the support we can for the new 16-bit machines. This doesn't mean that we're going to forget you 8-bit users. On the contrary, we expect that the quality of programs we'll publish for the 8-bit Atari computers will be higher; we not only can be, but will have to be even more selective in the articles we accept. **ANALOG Computing** just doesn't have room for anything but the best. So those of you with new or old Atari equipment, get busy and submit your blockbuster programs to us.

One of our main objects of interest here (and one of yours, too, we hope) is the selling of Atari. The 520ST is a major breakthrough, in both capability and price. Yet it's not getting its fair share of coverage in the media, as was pointed out in last month's **End User** column. We see the Commodore Amiga everywhere, often compared and contrasted with Apple and IBM machines, but even *Newsweek* failed to include the ST in these comparisons. They heard from us; did you write to them?

Certainly, it's understandable that media coverage is influenced by marketing monies. But realistic thinking also demands that a computer in the under-$1000 price range be covered, too, especially when that computer is as versatile and usable as the 520ST. The feeling at **ANALOG Computing** is that it's our job—as consumers, publishers and end users—to show the media and the marketers that we, the people, are interested in what Atari's selling.

User groups, the backbone of the Atari world, are in a unique position to present the ST's case to the computing public. We urge you to show people the ST's capabilities. Get their attention. No one can ignore its price. The future of Atari is in your hands, almost literally.

Those of you who are waiting to see what software develops—don't. There's a list of what's available (already outdated by our publication lag time) in the center section of this issue. You can't expect the ST to attract software developers (and, ultimately, to succeed) without your support.

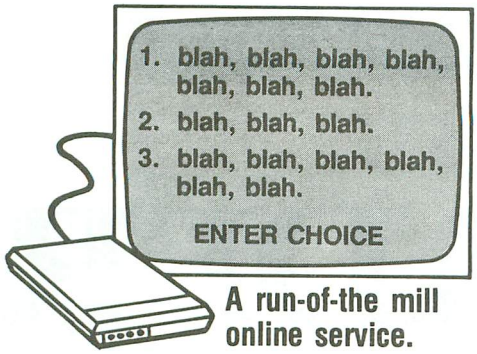
Imagine all of our readers going out this week and buying an ST. The sudden sale of over 100,000 machines would *insure* the success of the ST. We know you can't all afford to do that, but those of you who are toying with the idea of getting a 520ST—let's see some action!

If there's a computer store in your area that isn't selling the ST, tell them to carry it. If you know a business that's considering one of the more expensive machines, tell them to check out the cost-effective Atari. If you see another article that compares all the other 16-bit equipment with no mention of the ST, write to ask why they omitted the most reasonable computer on the market today.

It's up to us to show them that we—and Atari—mean business.

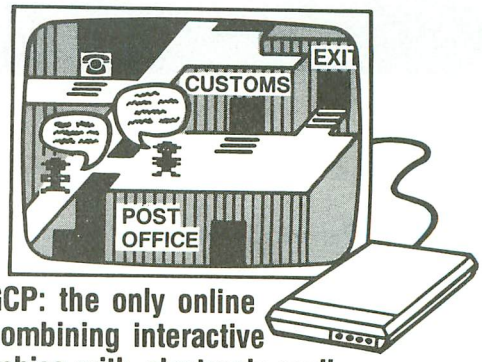
Diane L. Gaw

Diane L. Gaw
Managing Editor
ANALOG Computing



A run-of-the mill online service.

MODEM OWNERS: Tired of Text? Go for Graphics!



GCP: the only online service combining interactive graphics with electronic mail, downloads, AND games!

What is an online service?

An online service consists of a large, multiuser computer which your computer can access through the telephone lines. Since many people can access it at one time, you can interact and exchange information with other computer owners.

How is GCP different from other online services?

All other online services are out-growths of business information services. GCP was designed from the ground up to be a service for home computer owners. This means that GCP is easy to learn and fun to use. You can do everything you want with the joystick and function keys on your computer.

In order to provide all these capabilities, we have implemented the entire system using full color graphics. GCP is set up as a City, with buildings for the Post Office, GCP offices, Games and other services. You, and the other customers, are figures which you move around in the City with your joystick.

You mean the City is shown on my TV screen?

Yes, indeed. Not only the City, but the inside of the buildings and the games are shown on your screen in full color graphics. Additionally, the other customers are shown on your screen as they move around the City and buildings.

Isn't it slow downloading the graphics?

No, because we do not download the graphics. All the pictures of the City, buildings and games are supplied on disk. When you go from one building to another, the graphics are accessed at disk drive speeds.

Do I need special software?

Yes, very special. But don't worry, we provide it with your signup.

Can I download public domain programs?

Yes, GCP has a public domain archive in its Post Office with about a Megabyte of Atari programs you can download.

What games do you have?

At the moment, we have BioWar, CyberTank and CyberShip. Lords of Space is under development and may be done by the time you read this. All the games are played online against other customers, so you are matching wits with humans from all over the country.

BioWar is a multi-player adaptation of Conway's game of Life. Each player has a cell colony which he tries to expand, often at the expense of the other players, while contending with the problems of under- and over-population.

CyberTank and CyberShip are tactical design and combat games set on the CyberWorld, an artificial battleground for cybernetic machines. You design your own tank or ship and battle it out with up to 15 other players on a scrolling map.

Do the games use graphics also?

Extensively. For example, in CyberTank, when you design your tank, the hull is shown on the screen, as are all the equipment choices, in full color graphics. You select and place the items by using your joystick.

In the combat phase, your screen shows the status of your tank, the 1 mile area around your tank (only a part of the larger battlefield), and any enemy tanks inside that area.

What equipment do I need?

GCP supports any member of the 8 bit Atari line with 48K of memory. You will also need a disk drive and a modem. We support all the available modems for the Atari.

How much does it cost?

The signup kit includes the software and documentation you need, plus 5 free hours at standard rates. This kit costs $30. After the free hours are used up, the standard rates are $6 per hour (weekday evenings after 6pm local time and all day Saturday and Sunday) for either 300 or 1200 baud access. Daytime hours during the week are $15/hour.

Is it a long distance call?

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Just fill out the information requested below and send it to us with your credit card number or check/money order. For faster response, call us at:

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CIRCLE #103 ON READER SERVICE CARD

READER COMMENT

Modem queries.

I plan to buy a modem for my Atari 800XL. The Atari 835 and 1030 modems are sale priced now. Are these modems still considered acceptable by today's standards? Are there any public domain programs for these modems?

Norman Cizek
Syracuse, NY

The 835 and 1030 modems are certainly still viable choices. And yes, there are many public domain telecommunications programs on BBSs throughout the country (including **ANALOG Computing**'s *own TCS).*

If you plan on doing any downloading, you'll need one of these programs, since the software supplied with the modems doesn't support this function (a strange decision on Atari's part). However, might I suggest that you hold out for Atari's new XM301 modem? It's priced at $49.95 and comes complete with software—supports downloading, too! Quite a value. —*Ed.*

"Illegal software distributors."

I have read and reread the views on illegal software piracy by many well-known Atari programmers, including Alex Leavens and Russ Wetmore, and I feel that they are approaching the problem from the wrong direction. They seem to think that these pirates copy software because: they don't want to buy it; it's too expensive; or some other lame excuse. Well, I've seen piracy going on all around me, and I can now see that these fools come in two types:

(1) The first group (the majority) copy software for the heck of it. They don't try to come up with an excuse, they just do it. Since they have the means to illegally duplicate software, they will continue to do so—and nothing will stop them. If software developers distributed their products on nonprotected disks for $1.98, the problem would still continue. Of course, this "hobby" is illegal. Try to tell *them* that. All they do is laugh or say, "Who cares?" The part I hate the most is that they enjoy being referred to as "pirates." I've heard many a person brag that he's a pirate, with a couple hundred pirated games. It would sound far worse to say, "Hey, I'm a violator of the United States Copyright Act, which just happens to be a federal offense requiring five to ten years in the slammer and up to a $50,000 fine." So let's toss out the term "pirate." How about using "illegal software distributor" instead?

(2) The second group is not as big as the first, but is growing at an incredible rate. This is the group that is being influenced by the first group. It works like this: so many people have come in contact with illegally copied software that it has become part of owning a computer. I have not met *one* single computer owner who doesn't own any illegally obtained software. Not one. The saddest part of the whole mess is that the majority of these people do not realize that what they are doing is illegal. I have seen 3rd graders, housewives, and other everyday people becoming involved. We are bringing up a new generation of these people, and nothing is being done to prevent it.

What the heck can be done? Everything. How about a group of software companies chipping in to make a TV commercial? How about writing to government officials? With enough letters, I'm sure *some* impact could be made. I want everyone who reads this letter to swamp them with letters, thousands of them. Copy-protection is not the answer. New laws are. If these people were even slightly worried that they could be nailed by the police, software copying would drop tremendously. We must do something . . . soon . . . *now!*

This letter arrived with no name or address, but we feel that it makes some valid points. Take heed, please, before you copy a program. And, if you want to keep the industry healthy, do write to your congressman asking for legal action. Show your disdain for the theft and the thief when you meet someone with pirated software. Like drunk driving, piracy must become socially unacceptable before it can be stopped. —*Ed.*

Halley Hunter corrected.

There was a typo or two in the article **Halley Hunter**, **ANALOG Computing**'s issue 37—no surprise, considering the content. However there is a factual error that I want to clear up.

The second sentence of the third paragraph on page 67 should read: *For North America, Halley will be at its greatest morning altitude for the rest of this visit during the beginning of the third week of March.*

It'll be higher in the evening sky after April 15th or so, albeit somewhat fainter and further away from Earth. Not a colossal error, since the comet will be at its brightest during that third week, but an untruth, nonetheless.

I've been observing and photographing the comet since the 22nd of October. It's much bigger at this distance from the sun than it was in its 1910 visit, giving rise to speculation about magnitudes brighter than those predicted. It was an easy binocular object (if one knew where to look) here on the Cape last week, and I wouldn't be surprised if I spot it with the naked eye next week. Some folks have already seen it with the unaided

(continued on page 93)

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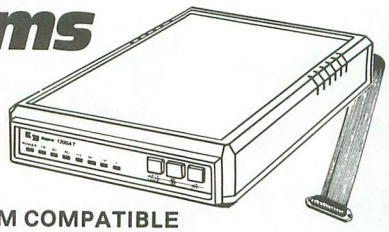

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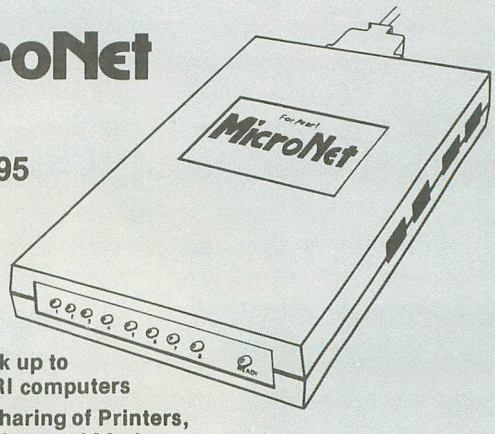

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ANALOG COMPUTING ANNOUNCES

ST Disk Subscriptions

ANALOG Computing, the first Atari-only publication, announces subscriptions on 3½-inch disks for 520ST users. Similar to the standard disk subscriptions, the ST disk will feature programs and utilities of special interest to 520ST users.

We hope this format will help to fill the need for 520ST software and show, again, our commitment to the end user. The 3½-inch disks will be out for retailers later in the year.

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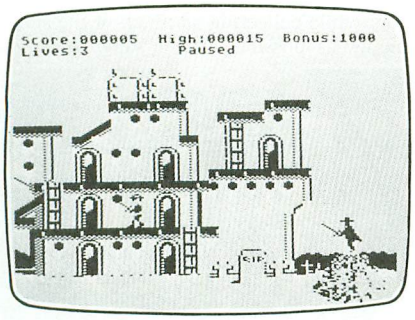
NEW PRODUCTS

THE GOONIES MEET ZORRO

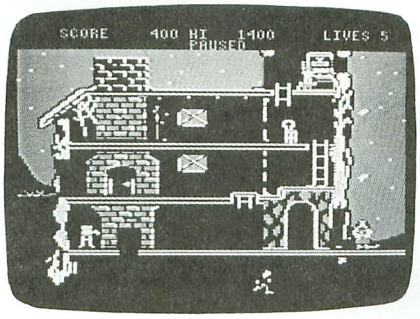
DataSoft, which was recently bought out by a larger software firm, is now shipping **The Goonies**, an eight-screen action adventure game based on the film of the same name. Features include a computerized version of the music soundtrack, multi-color animation and two-character game play.

Avoiding deadly bats, poisonous slime and flying skulls, in addition to moving **Goonies** on-screen, add up to a challenge. **Goonies** includes a treasure map and hint sheet.

In **Zorro**, you must fence your way through



Zorro.



The Goonies.

twenty scenes, traveling back and forth between the screens to ultimately reach your goal.

The objective is to rescue a senorita from the evil Sergeant Garcia. But first, as **Zorro**, you'll have to overcome many obstacles, such as: figuring out the secret to open the vault in the wine cellar, collecting the lucky horseshoe by branding the bull, navigating a maze of catacombs—and much more.

Each game retails for $29.95. For more information, contact DataSoft, 19808 Nordhoff Place, Chatsworth, CA 91311.

TOSHIBA'S 3-IN-ONE PRINTER

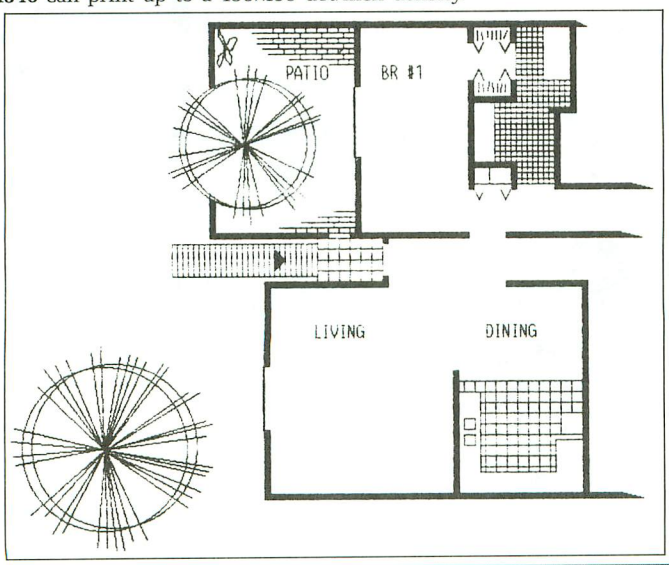
With Toshiba's P1340 Printer, you can produce great letter-quality text at three times the speed of a daisy wheel printer. The graphics are clear and sharp, via a 24-pin, fine wire print head. Moreover, the **P1340** can print up to a 180x180 dot/inch density.

Other benefits of the printer include multiple fonts, proportional spacing, line spacing and variable pitch.

A top speed of 144 characters per second is possible in regular text mode, or 54 cps for letter-quality print.

The **P1340** lists for $799 and offers many options.

For more information, please contact Toshiba America, Inc./Information Systems Division, 2441 Michelle Drive, Tustin, CA 92680 (714) 730-5000.



OTHER NEWS

Newell Industries' **256K RAM upgrade** for the 800XL gives you compatibility with the Atari 130XE, plus an additional 128K of RAM memory.

With this upgrade, you can run all of the software designed for the 130XE, including BASIC XE, RAMDISK DOS, and so on.

The product retails for $99.95 complete, or you can spend $49.95 for less memory chips. Software is also available, from Newell Industries, 602 E. Highway 78, Wylie, TX 75098 — (214) 442-6612.

■ ■ ■

Superman — The Game puts you in the boots of the man of steel himself, as you attempt to defeat Darkseid, whose evil powers threaten the entire universe.

Utilizing **Superman**'s powers of super breath, flight and super strength, you travel through several screens in this action and strategy game.

Cost is $29.95, from First Star Software, 18 East 41st Street, New York, NY 10017 — (212) 532-4666.

■ ■ ■

Sherlock's Hounds is a greyhound handicapping software package that lets the user quickly time and rate up to eight greyhounds per race, by analyzing such proven factors as time, distance, kennel, post position and running preference.

Sherlock's unique method of computing speed ratings gives a clear and accurate indication of each dog's potential performance.

Available on cassette only for $29.95. Swift Clark Marketing, P.O. Box 1562, Cambridge, MA 02238.

■ ■ ■

Fleet System 2 is touted as "simply the best word processor and built-in spelling checker for your personal computer." Its impressive spell dictionary contains an astounding over-70,000-word vocabulary, with room to add your own terms.

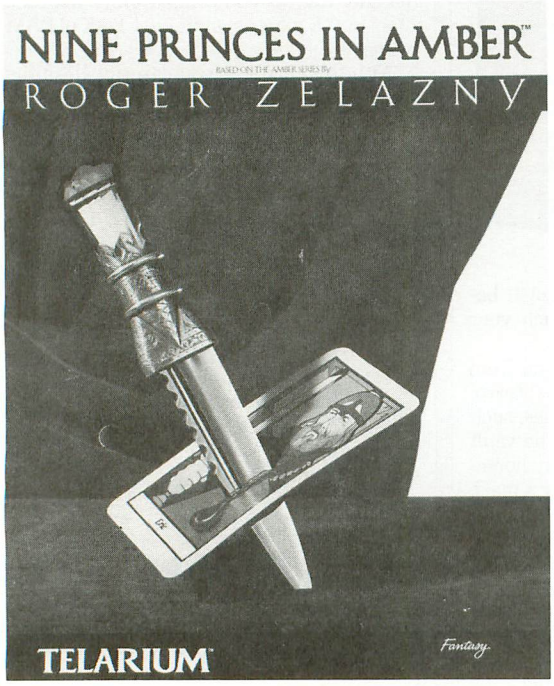
The word processor includes a tutorial and allows you to type in 40-, 80- or 120-columns. It has a built-in mail merge, text preview and math functions. Also featured are: a word counter, virtually unlimited document length and the ability to print out all of the words in its dictionary.

Retail is $79.95, from Professional Software, Inc., Consumer Division, 51 Fremont Street, Needham, MA 02194 — (617) 444-5224.

ST NEWS!

TELARIUM RELEASES TWO ST PROGRAMS

Perry Mason: The Case of the Mandarin Murder and **Nine Princes of Amber** are the first releases from Telarium Corp. Both of these are interactive graphic and text based adventures.



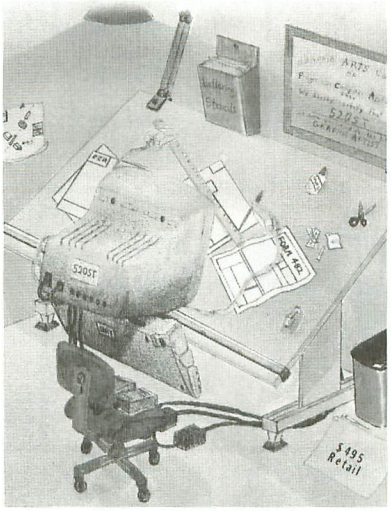
Perry Mason takes place in the courtroom, with the player taking on the role of the character made famous by the popular TV show. As **Perry Mason**, the player can do virtually everything that a lawyer could do, from cross-examining witnesses to introducing evidence. The player must also amass evidence and follow clues, plus understand characters' motives and actions—to clear the client and solve the mystery.

Nine Princes is based on the Amber series by Roger Zelazny. This award-winning story puts the player into the tale as Corwin, a prince who must fight against his brothers and sisters for the throne of the one true, perfect world—Amber. Over 40,000 different game variations are found here, culminating in over 40 different endings.

Each of these programs retails for $49.95. From Telarium Corp., One Kendall Square, Cambridge, MA 02139 — (617) 494-1200.

THE GRAPHIC ARTIST

This program is touted as having all the capabilities of a full-featured Computer Aided Design (CAD) system. Program functions include the creation of precise lines, angles, curves, symbols and designs. To assist in designing, **Graphic Artist** lets you zoom in on an image for greater detail. You can also size, rotate and enhance these details of shapes, plus pan across any portion of the design you're working on.



Hardcopy printouts of any part or all of your design are possible, including output to dot-matrix printers, plotters or even laser printers, all of which will produce images clearer than those the screen can generate.

Graphic Artist also has the capability to save a sequence of commands as a single command (a macro). For advanced needs, a graphic arts language (FiG-GAL) is available, to provide if-then logic, branching, looping, variables, etc.

Graphic Artist is $495; an additional $245 buys FiG-GAL (not needed for the basic program). For information, contact Progressive Computer Applications, 2002 McAuliffe Dr., Rockville, MD 20851 — (301) 340-8398.

SOFTWARE FROM SCOTLAND

ZKUL and **West** are two new text adventures from Talent Computer Systems. Both are on a 3½-inch disk, packaged with full instructions and a helpful "Blueprint for Adventurers." These games were previously bestsellers for the Sinclair QL.

West is a fast-paced action adventure, acting as an introduction to the more demanding **ZKUL**. In **West**, you're on the track of a notorious gang of bank robbers who've gone to ground near an abandoned mining town deep in Indian territory.

Your goal is to outgun and outwit the robbers while collecting as much of the stolen money as possible. At the same time, you

must piece together clues on how to escape. **West** is also a "real-time" game, where events occur outside your control: Indians charge, snakes abound, and robbers appear and shoot.

The **Lost Kingdom of ZKUL** puts you in the ancient dwelling place of the dwarves, where the Wizard guards the last precious secret. Also set in real time, with traps, tasks, mazes and a special notepad feature to aid you.

Talent will follow these games with **Flexfile**, a powerful but easy to use data management system, with foreign language options.

Each is $24.95 + $1.00 postage/handling. Talent Computer Systems, Curran Bldg., 101 St. James Rd., Glasgow, Scotland, G4 0NS.

Unicheck

The Universal Checksum Program

by Tom Hudson

Many of our readers currently use the **D:CHECK2** and **C:CHECK** programs to find typing errors in the programs they enter from **ANALOG Computing**. Unfortunately, these checksum programs can be cumbersome to use. In an effort to simplify checking programs for typos, I have developed **Unicheck**.

This is a program which loads into your system at power-up time as a device, allowing you to generate a checksum table with a simple keyboard command. Your BASIC program stays in memory all the time, eliminating the annoying LIST and ENTER operations.

Typing it in.

Before typing anything, look at the listings accompanying this article.

Listing 1 is the BASIC data and data checking routine. This listing is used to create both cassette and disk versions of **Unicheck**. The data statements are listed in hexadecimal (base 16) to conserve memory.

Listing 2 is the assembly language source code for **Unicheck**, created with the OSS MAC/65 assembler. You *do not* have to type this listing to use **Unicheck**! It is included for those readers interested in assembly language.

Follow the instructions below to make a cassette or disk version of **Unicheck**.

Cassette instructions.

1. Type Listing 1 into your computer, using the BASIC cartridge and use **C:CHECK** to check your typing.

2. Type *RUN* and press RETURN. The program will ask:

```
MAKE CASSETTE (0) OR DISK (1)?
```

Type *0* and press RETURN. The program will begin checking the data statements, printing the line number of each as it goes. It will alert you if it finds any problems. Fix any incorrect lines and re-RUN the program, if necessary, until all errors are eliminated.

3. When all your data lines are correct, the computer will beep twice and prompt you to *READY CASSETTE AND PRESS RETURN*. Insert a blank cassette in your recorder, press the RECORD and PLAY buttons simultaneously and hit RETURN. The message *WRITING FILE* will appear, and the program will create a boot tape version of **Unicheck**, printing each data line number as it goes. When the *READY* prompt appears, **Unicheck** is ready to use. CSAVE the BA-

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Unicheck *continued*

SIC program onto a separate tape before continuing.

4. You will want to load **Unicheck** whenever you're entering programs from **ANALOG Computing**, so you can check them for accuracy. To do this, rewind the tape created by the program to the beginning. Turn your computer OFF. If you have a 400/800/1200XL computer, be sure the BASIC cartridge is inserted. Press the PLAY button on your recorder and turn ON your computer, while pressing the START button. The computer will beep once. Hit the RETURN key, and **Unicheck** will load into your computer. The *READY* prompt will appear, and you're ready to type in your program.

Disk instructions.

Type Listing 1 into your computer, using the BASIC cartridge. If you have **D:CHECK2**, use it to check your typing.

2. Type *RUN* and press RETURN. The program will ask:

```
MAKE CASSETTE (0) OR DISK (1)?
```

Type 1 and press RETURN. The program will begin checking the data lines, printing the line number of each statement as it goes. It will alert you if it finds any problems. Fix incorrect lines and re-RUN the program, if necessary, until all errors are eliminated.

3. When all data lines are correct, you will be prompted to *INSERT DISK WITH DOS, PRESS RETURN*. Put a disk with DOS 2.0S or DOS XL into drive 1 and press RETURN. The message *WRITING FILE* will appear, and the program will create an AUTORUN.SYS file on the disk, displaying each data line number as it goes. When the *READY* prompt appears, **Unicheck** is ready to use. Be sure the BASIC program is SAVEd before continuing.

4. You will want to load **Unicheck** whenever you're entering programs from **ANALOG Computing**, so you can check them for accuracy. To do this, place the disk containing the AUTORUN.SYS file in drive 1. Turn your computer OFF. If you have a 400/800/1200XL computer, be sure the BASIC cartridge is inserted. When you turn on your computer, **Unicheck** will load automatically. (Note: **Unicheck** will only work as an AUTORUN.SYS file. Do not try to load it with the Binary Load function.) The *READY* prompt will appear, and you're ready to type in your program.

Checking your typing.

Once **Unicheck** is loaded into your computer, it's ready to check the typing of your programs—anytime you want. After the program is typed in, just enter:

```
LIST "U:"
```

This will print a checksum data on your screen. If you have a printer, you can enter:

```
LIST "U2:"
```

This will print the checksum data on your printer. Let's see how to interpret the checksum data. Figure 1 shows a typical checksum data table.

```
10 DATA 34,455,234,22,55,38,93,45,114,
285,633,442,453,23,31,2957
160 DATA 82,94,64,73,347,199,287,84,15
6,368,59,40,98,9,342,2302
310 DATA 65,356,101,25,547
```

Figure 1.

Each line of the program being checked has its own checksum value. If any characters in the line are incorrect, the checksum for that line will differ from the corresponding magazine checksum. The checksum data is organized so that there are fifteen checksum values in each line, with the sixteenth value containing the total of the checksums.

The line number of the checksum line tells which line number is first in the checksum group. In Figure 1, the first line checked in the first checksum line is 10. The checksum for Line 100 is 34. The checksum of the line after Line 10 is 455, and so on. The total of the checksums in the first group is 2957. The first line checked in the second checksum line is 160, and its checksum is 82. The first line checked in the third checksum line is 310, and its checksum is 65.

Let's assume that the checksum data in Figure 1 was listed in the magazine, and you typed in the program and checked it with **Unicheck**. Figure 2 shows an example of what the **Unicheck** output may look like if you have typing errors.

```
10 DATA 34,455,234,22,55,38,244,45,114
,285,633,442,453,23,31,3108
160 DATA 82,94,64,73,347,199,287,84,15
6,368,59,40,98,9,342,2302
310 DATA 65,101,34,200
```

Figure 2.

The first thing to do is look at the total of the values in the first line. If there are any mistyped lines, it is easiest to spot here. This value should be 2957, as shown in Figure 1. However, in the results in the **Unicheck** output, the total is 3108. This means that there is an error in the fifteen checksum values in this line. Comparing the individual **Unicheck** checksum values to the magazine values, we find that the seventh checksum is 244 in the **Unicheck** output, but should be 93. This means that the sixth line after Line 10 has an error that must be fixed. Note the error and continue checking. The rest of the line is correct, so we go on to the second line.

Now we check the total of the second line. The total of 2302 in our **Unicheck** output matches the total in the magazine, so we can go on to the third checksum line.

The third checksum line is different from the others in that it only checks four lines. This is because it is at the end of the program, and the program did not have an even multiple of fifteen lines. The line is checked the same way as the others. As you can see, the checksum line total should be 547, but is only 200 in the **Unicheck** output. Looking at the **Unicheck** output, you will notice that there is one less checksum value (the 356 in the magazine checksum data). This means that the first line in the program after Line 310 is missing. The last checksum in this line

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

*Times in seconds. Sieve with register variables.

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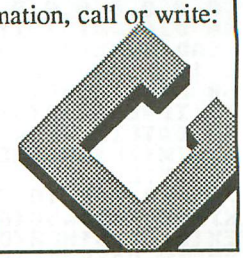

CIRCLE #106 ON READER SERVICE CARD

is also incorrect. It is a 34 and should be 25. This means that the third line after Line 310 in the program is incorrect.

To summarize, there were three errors in the program we checked. Two errors were caused by typos, and the third appeared because of a missing line.

After all errors have been noted, make the necessary changes, re-LIST the program to "U:" or "U2:" and compare the **Unicheck** output to the magazine checksum data again. Simply repeat this process until all errors are eliminated. When you're finished, you'll have an error-free program!

Some final notes.

I feel sure that users of **ANALOG Computing**'s **D:CHECK2** and **C:CHECK** will find **Unicheck** a much easier program to work with. There a few things to remember when using it, however.

Unicheck takes up about 400 bytes of memory. Some programs may be too large to load into memory with **Unicheck** present, and you'll get an ERROR-19. In these rare cases, you should use the less convenient **C:** or **D:CHECK** programs.

Don't worry about pressing RESET when **Unicheck** is loaded. It will remain safely installed until you turn your machine off (or type *DOS* in a disk system—see below).

For disk users, typing *DOS* will remove **Unicheck** from memory. This is a necessary precaution with DOS 2.0S. The first time you type *DOS*, the computer will perform a system reset and remove **Unicheck**. Typing *DOS* again will take you to the DOS menu, as usual. If you return to BASIC, however, **Unicheck** will no longer be present.

Unicheck only works with programs from issue 10 or later. If it is used with programs before issue 10, incorrect checksum values will result.

Listing 1.
BASIC listing.

```
10 REM *** UNICHECK ***
20 TRAP 20:? "MAKE CASSETTE (0), OR DI
SK (1)";:INPUT DSK:IF DSK>1 THEN 20
30 TRAP 40000:DATA 0,1,2,3,4,5,6,7,8,9
,0,0,0,0,0,0,10,11,12,13,14,15
40 DIM DAT$(91),HEX(22):FOR X=0 TO 22:
READ N:HEX(X)=N:NEXT X:LINE=990:RESTOR
E 1000:TRAP 120:? "CHECKING DATA"
50 LINE=LINE+10:? "LINE:";LINE:READ DA
T$:IF LEN(DAT$)<>90 THEN 220
60 DATLIN=PEEK(183)+PEEK(184)*256:IF D
ATLIN<>LINE THEN ? "LINE ";LINE;" MISS
ING!":END
70 FOR X=1 TO 89 STEP 2:D1=ASC(DAT$(X,
X))-48:D2=ASC(DAT$(X+1,X+1))-48:BYTE=H
EX(D1)*16+HEX(D2)
80 IF PASS=2 THEN PUT #1,BYTE:NEXT X:R
EAD CHKSUM:GOTO 50
90 TOTAL=TOTAL+BYTE:IF TOTAL>999 THEN
TOTAL=TOTAL-1000
100 NEXT X:READ CHKSUM:IF TOTAL=CHKSUM
 THEN 50
110 GOTO 220
120 IF PEEK(195)<>6 THEN 220
130 IF PASS=0 THEN 170
140 IF  NOT DSK THEN 160
150 PUT #1,224:PUT #1,2:PUT #1,225:PUT
 #1,2:PUT #1,154:PUT #1,50:CLOSE #1:EN
D
160 FOR X=1 TO 66:PUT #1,0:NEXT X:CLOS
E #1:END
170 IF  NOT DSK THEN 200
180 ? "INSERT DISK WITH DOS, PRESS RET
URN";:DIM IN$(1):INPUT IN$:OPEN #1,8,0
,"D:AUTORUN.SYS"
190 PUT #1,255:PUT #1,255:PUT #1,0:PUT
 #1,48:PUT #1,176:PUT #1,51:GOTO 210
200 ? "READY CASSETTE AND PRESS RETURN
";:OPEN #1,8,128,"C:":RESTORE 230:FOR
X=1 TO 13:READ N:PUT #1,N:NEXT X
210 ? :? "WRITING FILE":PASS=2:LINE=99
0:RESTORE 1000:TRAP 120:GOTO 50
220 ? "BAD DATA: LINE ";LINE:END
230 DATA 0,8,243,47,158,50,169,60,141,
2,211,24,96
1000 DATA 000000000E0600000E060E064C3E
07A00160A20FB5209DD206CA10F8A9018DC206
60A20FBDD2069520CA10F860,623
1010 DATA A5CF8DCE06A5CE8DCF06A5CD8DD0
0620E206A99BAED106E002F014A20B8E4203A2
008E48038E49032056E48CC2,922
1020 DATA 0660AEB9069D0001EEB906AEB906
E026F004C99BD0EBA20BBDAD069D0003CA10F7
A9008DB906A99B8D26012059,938
1030 DATA E48CC206A227A9209D0001CA10FA
60ADF006850AADF106850BADF206850CADF306
850D4C74E440015780000130,639
1040 DATA 0028004E0000204154414400000
00010A6401100000000100000000000000000
00000000000000000000000,200
1050 DATA 004CFFFF3D5F735D019A01000000
00000000000000000000000000000020FF
FFD8ADEC068DE7028580ADED,524
1060 DATA 068DE8028581ADF406850AADF506
850BA000B91A03C900F005C8C8C8D0F4A90099
1B03A906991C03A955991A03,320
1070 DATA 4C00A008201206A9008DCD0685CD
85CE85CF85D085D1A9028DC1068DCC06A5218D
D106D00C08201206ADCC06D0,132
1080 DATA 03202D0620220628ACC206600885
D485D5201206A9008DBF068DC006A202D8A5D5
DDC306901D38FDC30685D5F8,856
1090 DATA ADBF06187DC6068DBF06ADC0067D
C9068DC0061890DBCA10D8AECC06F020A5D420
4106A5D4C920D015A9008DCC,269
1100 DATA 06A90485CCA6CCBDBA06204106C6
CC10F4AEC106F8ADBF061865D085D0A5D16DC0
06290F85D1CAD0ECEEC106AD,301
1110 DATA C106C904D005A9018DC106A5D4C9
9BF00820220628ACC20660A5D01865CD85CDA5
D165CE85CEA5CF690085CFD8,83
1120 DATA A9008DCE06A5D18DCF06A5D08DD0
0620E206A92C204106A90085D085D1A9028DC1
06EECD06ADCD06C90FD0B820,477
1130 DATA 2D06A90085CD85CE85CF8DCD06A9
018DCC06D0A3A90085CB85CCA4CCB9CE064A4A
4A4AD004A6CBF007E6CB0930,179
1140 DATA 204106A4CCB9CE06290FD008C002
F004A6CBF007E6CB0930204106E6CCA5CCC903
D0CA60A9018509A90685CEA9,474
1150 DATA 3085CCA90085CB85CD8D4402A8B1
CB91CD88D0F9ADE70285CDADE80285CEA93185
CCA201A000B1CB91CD88D0F9,95
1160 DATA E6CEE6CCCA10F0ADE70285CD186D
E5068D0006ADE80285CE69008D0106A5CD186D
E6068D0206A5CE69008D0306,195
```

```
1170 DATA A5CD186DE7068D0606A5CE69008D
0706A5CD186DE8068DE306A5CE6DE9068DE406
A5CD186DEA068DEC06A5CE6D,533
1180 DATA EB068DED06A5CD1869038DEE06A5
CE69008DEF06A509C901D030A002A50D8DF306
91CD88A50C8DF20691CDA50A,846
1190 DATA 8DF006A50B8DF106A5CD850CA5CE
850DA9968DF406A9068DF5066CEE06A0028409
A90691CD88A91191CDA5CD85,461
1200 DATA 02A5CE8503A9718DF406A9E48DF5
066CEE0600000000000000000000000000000
0000000000000000000000,784
```

●

CHECKSUM DATA.

(see page 13)

```
10 DATA 732,351,496,811,423,729,200,60
3,555,573,694,613,29,205,202,7216
160 DATA 760,198,962,645,494,30,155,40
7,655,57,943,792,477,479,749,7803
1070 DATA 809,718,135,156,208,0,195,99
3,307,36,295,113,135,995,5095
```

●

Assembly listing.

```
        .OPT NO LIST
;UNICHECK
;Universal Checksum Program (V2.0)
;
;by Tom Hudson, June 1985
;ANALOG Computing
;
;page zero equates
;
LEAD0   =   $CB     ;leading 0 flag
PRTIX   =   $CC     ;0 print index
TOTLO   =   $CD     ;BCD chksum total
TOTMD   =   $CE
TOTHI   =   $CF
CHKLO   =   $D0     ;BCD checksum
CHKHI   =   $D1
BYTE    =   $D4     ;incoming char
BYTE2   =   $D5     ;incoming char
;
;zero-page setup pointers
;
FROM    =   $CB
TO      =   $CD
;
;Program equates
;
CASINI  =   $02     ;cass init vector
BOOT?   =   $09     ;boot device
DOSVEC  =   $0A     ;DOS run vector
DOSINI  =   $0C     ;DOS init vector
ZIOCB   =   $20     ;zero page IOCB
ICDNOZ  =   $21     ;device # 1/2
LOMEM   =   $80     ;BASIC lo memory
PRTBUF  =   $0100   ;my print buffer
COLDST  =   $0244   ;cold start flag
MEMLO   =   $02E7   ;low memory ptr
DDEVIC  =   $0300   ;SIO device #
HATABS  =   $031A   ;handler tables
ICCOM   =   $0342   ;IOCB command
ICBLEN  =   $0348   ;CIO buf length
CIOV    =   $E456   ;CIO vector
SIOV    =   $E459   ;SIO vector
WARMSV  =   $E474   ;warm start
;
;This code is placed at $3000
;then moved to page 6 for easy
;subroutine access
;
        *=  $0600
;
;UNICHECK entry table
;
UHTBL   .WORD $00   ;open file
UC      .WORD $00   ;close file
        .WORD NOHAN-1
UW      .WORD $00   ;write file
        .WORD NOHAN-1
        .WORD NOHAN-1
        JMP OPEN    ;init vector
NOHAN   LDY #1      ;operation OK
MYRTS   RTS         ;return!
SAVE    LDX #15
SZIOCB  LDA ZIOCB,X ;save the
        STA ZIOBAK,X ;calling IOCB
        DEX         ;data
        BPL SZIOCB
        LDA #1      ;set up good...
        STA MYSTAT  ;return status
        RTS         ;and exit
RESTOR  LDX #15
RZIOCB  LDA ZIOBAK,X ;restore the
        STA ZIOCB,X ;calling IOCB
        DEX         ;data
        BPL RZIOCB
        RTS         ;and exit
;
;print checksum line total
;
PLTOTL  LDA TOTHI   ;set up chksum
        STA TOT0    ;print area with
        LDA TOTMD   ;total
        STA TOT1
        LDA TOTLO
        STA TOT2
        JSR JTOTL   ;print the amount
        LDA #155    ;get CR...
;
;print char in A reg
;
PBYTE   LDX OUTPUT  ;get output unit
        CPX #2      ;printer?
        BEQ PRINTR  ;yes!
        LDX #$0B    ;output mode
        STX ICCOM
        LDX #0      ;zero buffer
        STX ICBLEN  ;length (char in
        STX ICBLEN+1 ;accumulator)
        JSR CIOV    ;print to screen
        STY MYSTAT  ;save status
PRTXIT  RTS         ;and exit
PRINTR  LDX PBUFIX  ;get buf index
        STA PRTBUF,X ;put char in buf
        INC PBUFIX  ;next buf index
        LDX PBUFIX  ;get index
        CPX #38     ;end of buffer?
        BEQ PRNTIT  ;yes!
        CMP #$9B    ;carriage return?
        BNE PRTXIT  ;no!
PRNTIT  LDX #$0B    ;copy printer...
SPLP    LDA PCOMND,X ;commands...
        STA DDEVIC,X ;to SIO area
        DEX         ;more bytes?
        BPL SPLP    ;yes!
        LDA #0      ;zero out...
        STA PBUFIX  ;buffer index
        LDA #$9B    ;set up CR
        STA PRTBUF+38 ;in buffer
        JSR SIOV    ;print the line!
        STY MYSTAT  ;save status
        LDX #39     ;now clear...
        LDA #32     ;print buffer
CPBUF   STA PRTBUF,X
        DEX
        BPL CPBUF
        RTS         ;and exit!
MYDVEC  LDA DVSAVE  ;restore...
        STA DOSVEC  ;DOS vector
        LDA DVSAVE+1
        STA DOSVEC+1
        LDA DISAVE  ;restore...
        STA DOSINI  ;DOS init vector
        LDA DISAVE+1
        STA DOSINI+1
        JMP WARMSV  ;system reset!
;
;miscellaneous data
;
PCOMND  .BYTE $40   ;printer
        .BYTE $01   ;unit #1
        .BYTE $57   ;"W" = write
        .BYTE $80   ;output
        .WORD PRTBUF ;buffer address
        .WORD $30   ;timeout
        .WORD $28   ;buffer length
        .BYTE $4E   ;normal print
        .BYTE $00   ;unused
PBUFIX  .BYTE 0
PDATA   .BYTE " ATAD"
BCDBYT  .BYTE 0,0
X       .BYTE 0
MYSTAT  .BYTE 0
DECTBL  .BYTE 1,10,100
BCDADL  .BYTE $01,$10,$00
BCDADH  .BYTE $00,$00,$01
LFLAG   .BYTE 0
LCOUNT  .BYTE 0
TOT0    .BYTE 0
TOTT1   .BYTE 0
TOOT2   .BYTE 0
OUTPUT  .BYTE 0
ZIOBAK  .BYTE 0,0,0,0,0,0,0,0
        .BYTE 0,0,0,0,0,0,0,0
;
;JMP vector for subroutine
;
JTOTL   JMP $FFFF   ;to PTOTAL
;
;Relocation factors
;
OPNDLO  .BYTE  <OPEN-START-1
CLODLO  .BYTE  <CLOSE-START-1
WRTDLO  .BYTE  <WRITE-START-1
TOTDLO  .BYTE  <PTOTAL-START
TOTDHI  .BYTE  >PTOTAL-START
CENDLO  .BYTE  <CODEND-START
CENDHI  .BYTE  >CODEND-START
NEWMLL  .BYTE  0        ;new MEMLO...
NEWMLH  .BYTE  0        ;address
JMPDVL  .BYTE  0        ;device load...
JMPDVH  .BYTE  0        ;address
DVSAVE  .BYTE  0,0      ;DOSVEC save
DISAVE  .BYTE  0,0      ;DOSINI save
MYDOS   .BYTE  0,0      ;my DOSVEC
FILLER  .BYTE  0,0,0,0,0,0,0,0
        .BYTE  0,0
;
;This section is placed at $3100
;then moved down to the old
;MEMLO location.
;
;install U: device handler
;
START   JSR $FFFF   ;init DOS
DEVICE  CLD         ;no decimal mode
        LDA NEWMLL  ;alter the...
        STA MEMLO   ;low memory...
        STA LOMEM   ;pointers
        LDA NEWMLH
        STA MEMLO+1
        STA LOMEM+1
        LDA MYDOS   ;re-point DOSVEC
        STA DOSVEC
        LDA MYDOS+1
        STA DOSVEC+1
        LDY #0      ;look for slot
UINSLP  LDA HATABS,Y ;get entry
        CMP #0      ;open?
        BEQ GOTLOC  ;yes!
        INY         ;point to...
        INY         ;next...
        INY         ;entry
        BNE UINSLP  ;and keep looking
GOTLOC  LDA # <UHTBL ;set up...
        STA HATABS+1,Y ;handler...
        LDA # >UHTBL ;in the...
        STA HATABS+2,Y ;device table
        LDA #'U     ;call it U:
        STA HATABS,Y
        JMP $A000   ;go to BASIC!
;
;UNICHECK 'OPEN' code
;
OPEN    PHP
        JSR SAVE    ;save proc stat
        LDA #0      ;zero out...
        STA LCOUNT  ;line counter
        STA TOTLO   ;checksum total
        STA TOTMD
        STA TOTHI
        STA CHKLO   ;checksum
        STA CHKHI
        LDA #2      ;init...
        STA X       ;multiplier
        STA LFLAG   ;new line flag
        LDA ICDNOZ  ;get U1/U2 #
        STA OUTPUT  ;1=scrn 2=printer
        BNE ALLDUN  ;OPEN done!
;
;UNICHECK "CLOSE" code
;
CLOSE   PHP
        JSR SAVE    ;save proc stat
        LDA LFLAG   ;new line?
        BNE ALLDUN  ;yes!
        JSR PLTOTL  ;print last tot.
ALLDUN  JSR RESTOR  ;restore proc
        PLP
        LDY MYSTAT  ;set status
        RTS         ;all done!
;
;UNICHECK "WRITE" code
;
WRITE   PHP         ;save proc stat
        STA BYTE    ;save incoming
        STA BYTE2   ;byte in 2 places
        JSR SAVE    ;save IOCB stuff
        LDA #0      ;clear out...
        STA BCDBYT  ;BCD byte value
        STA BCDBYT+1
        LDX #2      ;this routine
BCDLP   CLD         ;converts the
        LDA BYTE2   ;binary byte
        CMP DECTBL,X ;value to BCD
        BCC NXTDIG  ;for easier
```

Unicheck *continued*

```
          SEC             ;handling
          SBC DECTBL,X    ;the BCD value
          STA BYTE2       ;is in BCDBYT
          SED             ;and BCDBYT+1
          LDA BCDBYT
          CLC
          ADC BCDADL,X
          STA BCDBYT
          LDA BCDBYT+1
          ADC BCDADH,X
          STA BCDBYT+1
          CLC             ;force branch,
          BCC BCDLP       ;loop back!
NXTDIG    DEX             ;BDC conv done?
          BPL BCDLP       ;no, loop back!
          LDX LFLAG       ;new line?
          BEQ NOTNEW      ;no!
          LDA BYTE        ;print byte to
          JSR PBYTE       ;output device
          LDA BYTE        ;get byte again
          CMP #32         ;space?
          BNE NOTNEW      ;no!
          LDA #0          ;reset new line
          STA LFLAG       ;flag
          LDA #4          ;now print the
          STA PRTIX       ;word DATA to
PDATLP    LDX PRTIX       ;the output unit
          LDA PDATA,X     ;get byte,
          JSR PBYTE       ;print it!
          DEC PRTIX       ;more bytes?
          BPL PDATLP      ;yup!
NOTNEW    LDX X           ;get multiplier
          SED             ;go to decimal
CKADLP    LDA BCDBYT      ;add the BCD
          CLC             ;byte value to
          ADC CHKLO       ;the checksum
          STA CHKLO       ;amount
          LDA CHKHI       ;the AND #$0F
          ADC BCDBYT+1    ;is a modulo
          AND #$0F        ;1000 operation,
          STA CHKHI       ;so chksum < 1000
          DEX             ;add it again?
          BNE CKADLP      ;yes!
          INC X           ;inc multiplier
          LDA X           ;get mult value
          CMP #4          ;=4?
          BNE XOK         ;no, it's less.
          LDA #1          ;>3, reset it
          STA X           ;to 1
XOK       LDA BYTE        ;get byte again
          CMP #155        ;end of line?
          BEQ EOL         ;yes!
EXIT      JSR RESTOR      ;restore IOCB
          PLP             ;restore proc.
          LDY MYSTAT      ;set status
          RTS             ;exit!
;
;end of line, print checksum
;
EOL       LDA CHKLO       ;add checksum
          CLC             ;to checksum
          ADC TOTLO       ;total
          STA TOTLO
          LDA CHKHI
          ADC TOTMD
          STA TOTMD
          LDA TOTHI
          ADC #0
          STA TOTHI
          CLD             ;no more decimal
          LDA #0          ;put checksum in
          STA TOT0        ;print work area
          LDA CHKHI       ;(TOT0-TOT2)
          STA TOT1
          LDA CHKLO
          STA TOT2
          JSR JTOTL       ;print checksum
          LDA #$2C        ;get a comma
          JSR PBYTE       ;print it
          LDA #0          ;reset checksum
          STA CHKLO       ;to zero
          STA CHKHI
          LDA #2          ;reset multiplier
          STA X           ;to 2
          INC LCOUNT      ;1 more line
          LDA LCOUNT      ;get # of lines
          CMP #15         ;done 15?
          BNE EXIT        ;no, leave!
          JSR PLTOTL      ;print cksum tot
          LDA #0          ;zero out
          STA TOTLO       ;checksum total
          STA TOTMD
          STA TOTHI
          STA LCOUNT      ;and line count
          LDA #1          ;set lflag to 1
          STA LFLAG       ;(new cksum line)
          BNE EXIT        ;and exit!
;
;print checksum to screen,
;with zero-suppression
;
PTOTAL    LDA #0          ;reset leading 0
          STA LEAD0       ;indicator
          STA PRTIX       ;and print index
PTLP      LDY PRTIX       ;get index
          LDA TOT0,Y      ;and work byte
          LSR A           ;shift over
          LSR A           ;the upper
          LSR A           ;BCD digit
          LSR A
          BNE GOTP1       ;it's not zero
          LDX LEAD0       ;print leading 0?
          BEQ DIGIT2      ;no!
GOTP1     INC LEAD0       ;cancel 0 supp.
          ORA #$30        ;convert to ASCII
          JSR PBYTE       ;and print it!
DIGIT2    LDY PRTIX       ;get print index
          LDA TOT0,Y      ;get the byte
          AND #$0F        ;get low BCD
          BNE GOTP2       ;it's not zero
          CPY #2          ;last digit?
          BEQ GOTP2       ;yes, print it!
          LDX LEAD0       ;suppress zero?
          BEQ NXTPT       ;yes!
GOTP2     INC LEAD0       ;cancel 0 supp.
          ORA #$30        ;conv to ASCII
          JSR PBYTE       ;print it!
NXTPT     INC PRTIX       ;next byte
          LDA PRTIX       ;get pointer
          CMP #3          ;done all 3?
          BNE PTLP        ;no!
          RTS             ;yes, return!
;
;1-shot vector changer
;(erased after use)
;
CODEND    ;               new MEMLO here!
DISKIN    LDA #1          ;disk entry, set
          STA BOOT?       ;BOOT flag
CASSIN    LDA #$06        ;move code...
          STA TO+1        ;to $0600
          LDA #$30        ;from $3000
          STA FROM+1
          LDA #0
          STA FROM
          STA TO
          STA COLDST      ;clear cold start
          TAY             ;put 0 in Y reg
MOVE1     LDA (FROM),Y    ;move code!
          STA (TO),Y
          DEY
          BNE MOVE1
          LDA MEMLO       ;move rest...
          STA TO          ;of code...
          LDA MEMLO+1     ;to old MEMLO
          STA TO+1
          LDA #$31        ;from $3100
          STA FROM+1
          LDX #1          ;move 2 pages
          LDY #0          ;move loop
MOVE21    LDA (FROM),Y
MOVE22    STA (TO),Y
          DEY
          BNE MOVE22
          INC TO+1        ;next page
          INC FROM+1
          DEX             ;all done?
          BPL MOVE21      ;no!
          LDA MEMLO       ;ge old MEMLO,
          STA TO          ;save it,
          CLC             ;add OPEN offset
          ADC OPNDLO      ;and save in
          STA UHTBL       ;handler table
          LDA MEMLO+1     ;also hi byte
          STA TO+1
          ADC #0
          STA UHTBL+1
          LDA TO          ;now relocate
          CLC             ;CLOSE vector
          ADC CLODLO      ;and put in
          STA UC          ;handler table
          LDA TO+1
          ADC #0
          STA UC+1
          LDA TO          ;now relocate
          CLC             ;WRITE vector
          ADC WRTDLO      ;and put in
          STA UW          ;handler table
          LDA TO+1
          ADC #0
          STA UW+1
          LDA TO          ;now relocate
          CLC             ;total print
          ADC TOTDLO      ;address and
          STA JTOTL+1     ;put in JMP
          LDA TO+1        ;vector (JTOTL)
          ADC TOTDHI
          STA JTOTL+2
          LDA TO          ;now relocate
          CLC             ;code end
          ADC CENDLO      ;address and
          STA NEWMLL      ;save in the
          LDA TO+1        ;new low memory
          ADC CENDHI      ;hold area
          STA NEWMLH      ;(NEWMLL&H)
          LDA TO          ;now set up
          CLC             ;handler install
          ADC #3          ;vector and save
          STA JMPDVL      ;in JMPDVL&H
          LDA TO+1
          ADC #0
          STA JMPDVH
          LDA BOOT?       ;get boot flag
          CMP #1          ;disk?
          BNE CASSET      ;no!
          LDY #2          ;DOS loaded
          LDA DOSINI+1    ;get DOS init
          STA DISAVE+1    ;save it,
          STA (TO),Y      ;put in my JSR
          DEY             ;repeat for
          LDA DOSINI      ;hi byte
          STA DISAVE
          STA (TO),Y
          LDA DOSVEC      ;get old DOSVEC
          STA DVSAVE      ;and save it
          LDA DOSVEC+1
          STA DVSAVE+1
          LDA TO          ;get my start
          STA DOSINI      ;address and put
          LDA TO+1        ;in DOS init!
          STA DOSINI+1
          LDA # <MYDVEC   ;replace DOSVEC
          STA MYDOS       ;with my routine
          LDA # >MYDVEC   ;to remove
          STA MYDOS+1     ;the U: handler
          JMP (JMPDVL)    ;go install U:
CASSET    LDY #2          ;cass loaded
          STY BOOT?
          LDA # >MYRTS    ;get RTS address
          STA (TO),Y      ;& put in my JSR
          DEY
          LDA # <MYRTS
          STA (TO),Y
          LDA TO          ;get my start
          STA CASINI      ;address and put
          LDA TO+1        ;in cass init!
          STA CASINI+1
          LDA #$71        ;point DOSVEC...
          STA MYDOS       ;to memo pad
          LDA #$E4
          STA MYDOS+1
          JMP (JMPDVL)    ;go install U:
```


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Super

by Gary S. Domrow

A couple of weeks ago, as I sat around with several other Atari owners, I realized that—to the best of our knowledge—no version of the once-popular **Pong** was available for the Atari computers. Apparently, everyone thought that Atari was above **Pong**, or that players were tired of the home computer's predecessor. Well, being an assembly language *aficionado*, I set out to change the situation. A couple weeks later, I impressed my friends with this program.

Super Pong should function on any system with at least 16K of memory. Also, the game requires one pair of paddle controllers and at least one willing friend (or enemy). A one-player "practice" option is available, but I won't claim that it's as exciting as the two-player games.

Typing it in.

Before typing anything, look at the listings accompanying this article.

Listing 1 is the BASIC data and data checking routine. This listing is used to create both cassette and disk versions of **Super Pong**. The data statements are listed in hexadecimal (base 16), so the program will fit in 16K cassette systems.

Cassette instructions.

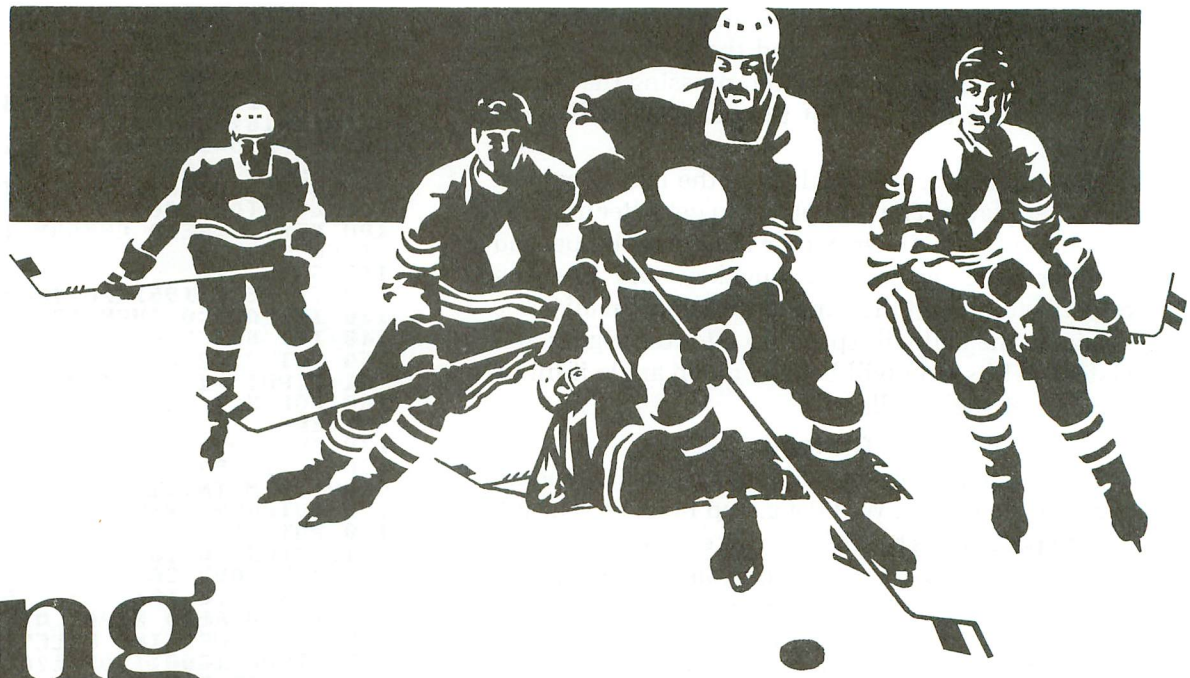
1. Type Listing 1 into your computer, using the BASIC cartridge and verify your typing with **Unicheck** (see page 11).

2. Type *RUN* and press RETURN. The program will begin and ask:

```
MAKE CASSETTE (0), OR DISK (1)?
```

Type *0* and press RETURN. The program will begin checking the data statements, printing the line number of each as it goes. It will alert you if it finds any problems. Fix any incorrect lines and re-RUN the program, if necessary, until all errors are eliminated.

3. When all of your data lines are correct, the computer will beep twice and prompt you to *READY CASSETTE AND PRESS RETURN*. Now, insert a blank cassette in your recorder, press the RECORD and PLAY buttons simultaneously and hit RETURN. The message *WRITING FILE* will appear, and the program will create a machine language boot tape version of **Super Pong**, printing each data line number as it goes. When the *READY* prompt appears, the game is recorded



Pong

and ready to play. CSAVE the BASIC program onto a separate tape before continuing.

4. To play, rewind the tape created by the BASIC program to the beginning. Turn your computer OFF and remove all cartridges. Press the PLAY button on your recorder and turn ON your computer while holding down the START key. If you have a 600 or 800XL computer, you must hold the START and OPTION keys when you turn on the power. The computer will "beep" once. Hit the RETURN key, and **Super Pong** will load and run automatically.

Disk instructions.

1. Type Listing 1 into your computer, using the BASIC cartridge and verify your typing with **Unicheck** (see page 11).

2. Type *RUN* and press RETURN. The program will ask:

```
MAKE CASSETTE (0), OR DISK (1)?
```

Type *1* and press RETURN. The program will begin checking the data lines, printing the line number of each statement as it goes. It will alert you if it finds any problems. Fix incorrect lines and re-RUN the program, if necessary, until all errors are eliminated.

3. When all the data lines are correct, you will be prompted to *INSERT DISK WITH DOS, PRESS RETURN.* Put a disk containing DOS 2.0S into drive 1 and press RETURN. The message *WRITING FILE* will appear, and the program will create an AUTORUN.SYS file on the disk, displaying each data line number as it goes. When the READY prompt appears, the game is ready to play. Be sure the BASIC program is SAVEd before continuing.

4. To play the game, insert the disk containing the AUTORUN.SYS file into drive 1. Turn your computer OFF, remove all cartridges and turn the computer back ON. **Super Pong** will load and run automatically.

The game.

After **Super Pong** loads, the title screen will appear, with the credits scrolling across the top. To begin, press either of the paddle buttons. The playfield will appear, and one of the available game types will be printed across the top.

To change the game type, slowly rotate first pad-

paddle in either direction. Pressing the button again will select the game type, and the beginning score will appear. From this point on, pressing the button of the paddle that will hit the ball first will serve the ball.

One point is scored each time the ball goes past the other player. The first player to get fifteen points is declared the winner. **Super Pong** may be paused and resumed by pressing any key, and pressing START will restart the game at any time. In all game versions, the ball will speed up after the eighth and sixteenth hits, and will bounce on an angle if hit by the end of the paddle.

Options.

Four different game options are available: Standard Pong, Hockey Pong, Wall Pong, and Practice. The following paragraphs briefly describe each type of game.

Standard — Each player controls one paddle on the screen. The direction of the serve alternates, beginning with the player on the right.

Hockey — Each player controls two paddles on the screen. The serve alternates as in Standard Pong. However, the ball will pass through the centermost paddles if it's already moving toward that player's goal.

Wall Pong — In this game, the two players hit the ball against the wall. The players must alternate hits. The paddle of the player who must hit the ball will be brighter until the ball is hit. Also, the player who misses will receive the next serve.

Practice — This is a one-player version of Wall Pong, and is included for practice. Obviously, neither serve nor hits alternate.

I hope that you enjoy the challenge of a good game of **Super Pong** as much as I enjoyed the challenge of writing the program.

Gary Domrow is a third-year computer science student at the Fort Wayne, Indiana extension of Purdue University. He has worked with Ataris for over four years, learned assembly language two years ago, and now spends much of his free time learning and experimenting with FORTH.

Listing 1.
BASIC listing.

```
10 REM *** PONG ***
20 TRAP 20:? "MAKE CASSETTE (0), OR DI
SK (1)";:INPUT DSK:IF DSK>1 THEN 20
30 TRAP 40000:DATA 0,1,2,3,4,5,6,7,8,9
,0,0,0,0,0,0,0,10,11,12,13,14,15
40 DIM DAT$(91),HEX(22):FOR X=0 TO 22:
READ N:HEX(X)=N:NEXT X:LINE=990:RESTOR
E 1000:TRAP 120:? "CHECKING DATA"
50 LINE=LINE+10:? "LINE:";LINE:READ DA
T$:IF LEN(DAT$)<>90 THEN 220
60 DATLIN=PEEK(183)+PEEK(184)*256:IF D
ATLIN<>LINE THEN ? "LINE ";LINE;" MISS
ING!":END
70 FOR X=1 TO 89 STEP 2:D1=ASC(DAT$(X,
X))-48:D2=ASC(DAT$(X+1,X+1))-48:BYTE=H
EX(D1)*16+HEX(D2)
80 IF PASS=2 THEN PUT #1,BYTE:NEXT X:R
EAD CHKSUM:GOTO 50
90 TOTAL=TOTAL+BYTE:IF TOTAL>999 THEN
TOTAL=TOTAL-1000
100 NEXT X:READ CHKSUM:IF TOTAL=CHKSUM
 THEN 50
110 GOTO 220
120 IF PEEK(195)<>6 THEN 220
130 IF PASS=0 THEN 170
140 IF  NOT DSK THEN 160
150 PUT #1,224:PUT #1,2:PUT #1,225:PUT
 #1,2:PUT #1,7:PUT #1,40:CLOSE #1:END
160 FOR X=1 TO 7:PUT #1,0:NEXT X:CLOSE
 #1:END
170 IF  NOT DSK THEN 200
180 ? "INSERT DISK WITH DOS, PRESS RET
URN";:DIM IN$(1):INPUT IN$:OPEN #1,8,0
,"D:AUTORUN.SYS"
190 PUT #1,255:PUT #1,255:PUT #1,0:PUT
 #1,40:PUT #1,80:PUT #1,49:GOTO 210
200 ? "READY CASSETTE AND PRESS RETURN
";:OPEN #1,8,128,"C:":RESTORE 230:FOR
X=1 TO 40:READ N:PUT #1,N:NEXT X
210 ? :? "WRITING FILE":PASS=2:LINE=99
0:RESTORE 1000:TRAP 120:GOTO 50
220 ? "BAD DATA: LINE ";LINE:END
230 DATA 0,19,216,39,255,39,169,0,234,
234,234,169,60,141,2,211,169,0,141,231
,2,133,14,169,56,141,232,2
240 DATA 133,15,169,7,133,10,169,40,13
3,11,24,96
1000 DATA A514C514F0FC60A91B850CA92885
0DA9008D4402A901850920B62CA2FF9A20E22B
A9008D05D485828583858F8D,979
1010 DATA 08D2A93C8D3002A9318D3102A903
8D0FD22000282058B2DA9018584A907A22BA0FA
205CE420C92DA208BDE7309D,456
1020 DATA C002CA10F7A900858F8585858620
432D20E02820392F20AC28A900858420042 9A5
85CD4830F011A586CD4830F0,168
1030 DATA 0620AC284C7328A20CD002A203A0
00B9E1309D7431E8C8C006D0F4AD7C022D7D02
D0F8F0A820282EAD5930F013,242
1040 DATA A205A585202B2F9D7431E8A58520
342F9D7431AD5830F013A20EA586202B2F9D74
31E8A58620342F9D743160A9,870
1050 DATA 808D05D0A21AA9048587A005A587
1D80219D8021E888D0F4A58749048587E07090
E860A900A8B9802129FC9980,484
1060 DATA 21C810F520BB2920712 98D1ED020
00282020 2A20662B20EA298D1ED0A900854DAD
4430C926900AC9DCB00620A2,702
1070 DATA 2B4C1829ADF930F00BADF930C901
F009C902F011AD4430300CF818A58669018586
D84C6929F818A58569018585,661
1080 DATA D8A5894DF8308589602 0AC28AD0A
D2293F1869288D4530A9008D4930A589100CAD
4B3020E4298D46304C9A29AD,147
1090 DATA 4B308D4630AD0AD22903C903F0F7
8D4730AD0AD23009AD473020E4298D4730A97F
8D4430D02FAD5830D004A201,712
1100 DATA D015AD5930D003AAF00DADF930F0
05AACA4CD929A689E8BD7C02D0FBBD7C02F0FB
6049FF1869016018AD453069,490
1110 DATA 08AABD7D2129FC9D7D21CAEC4530
D0F2BD802109039D8021BD8121090 39D8121AD
44308D04D060486830CA6048,322
1120 DATA 6810C560A58FF015AD4630201 62A
858B38A58FE58B858F1004A900858FAD00D08D
5C30AD08D08D5B30AD5C3029,121
1130 DATA 01F00B20B12AA9308583A90E8582
AD5C302902F00B20DA2AA9308583A90E8582AD
5C30D042A58FD03EAD5B30F0,94
```

```
1140 DATA 39ADF930F01CAD5B302903F007AD
F930C901F00EAD5B30290CF01FADF930C902D0
1820032BA9508583A90E8582,996
1150 DATA ADF930F008ADF93049038DF93060
AD4530C91CB00AAD473020162A8D473060C96E
900AAD4730201B2A8D473060,457
1160 DATA AD473020E4298D473060AD4430C9
35B00AAD463020162A8D463060C9C8900AAD46
30201B2A8D463060AD463020,502
1170 DATA E4298D463060ADF930D013AD5B30
2903F007AD46303007100EAD46303009AD4630
20E4298D4630202D2BA90885,431
1180 DATA 8FD04EAD5B302903F006AD42304C
3D2BAD433038ED453020E429A8C818AD473079
4C308D4730300AC903900FA9,707
1190 DATA 028D473060C9FEB005A9FE8D4730
6018AD44306D46308D443018AD45306D47308D
453060EE4930AD4930CD4A30,153
1200 DATA D017A9008D4930AD46302016AC9
03F008AD46303004EE463060CE463060ADFC02
C9FFF019A90185B4A9FF8DFC,269
1210 DATA 02ADFC02C9FFF0F9A9008584A9FF
8DFC0260A9AF8580A9318581A000A22BA9AA91
8018A580691485809002E681,262
1220 DATA CAD0EE60A9748580A9318581A206
A900A89180C8D0FBE681CAD0F660A9088D1FD0
AD1FD0C906D0034C74E4A584,684
1230 DATA F0034C62E4AD7002A00020D02C85
8CAD58308D5A30CE5A30AD5A303017AC423020
E52CAC5A30BE3E30A48CAD5A,415
1240 DATA 3020142D4C202CA58C8D4230AD71
02A00120D02C858CAD59308D5A30CE5A30AD5A
30301D186902AC433020E52C,322
1250 DATA AC5A30BE4030A48C18AD5A306902
20142D4C542CA58C8D4330A582F002C682A582
09A08D01D2A5838D00D2ADF9,292
1260 DATA 30F01EADF9302902AAA9DA9DC002
9DC102ADF93049032902AAA9D69DC0029DC102
4C62E4A90AA22A9D4631CA10,507
1270 DATA FAA9418D7131A93C8D7231A9318D
7331604A38E9073004C91AB004A91AD006C966
9002A9656048848AA9008580,271
1280 DATA A9228581682001 2DA48AA209A900
9180C8CA10FA60A888300E18A5806980858090
F4E6814C022D60848A48A88A,388
1290 DATA 9900D0A9008580A9228581682001
2DA209A903A48A9180C8CA10FA60A955A2139D
9C319DF834CA10F760A9208D,665
1300 DATA 07D4A92E8D2F02205B2DA9038D1D
D0A9118D6F0260A20CA9009D00D0CA10FAA920
8581A9008580A204A89180C8,419
1310 DATA D0FBE681CAD0F66020E22B200028
20282EA9008D05D4A5880A0A0A0AAAA000BDFC
30997431E8C8C010D0F4205B,700
1320 DATA 2D20352D20E028A588C904F00AA9
9C8D4431A9318D4531A5880AAABDF030858DE8
BDF030858E6C8D00AD3F3109,746
1330 DATA 108D3F3120352DA95D8D4031A930
8D4131A26EA9088D04D4858F200028AD7C022D
7D02F01EC68FA58F100CA907,881
1340 DATA 858FEE4031D003EE4131A58F8D04
D4D0DCCAD0D9F0B9A90F8D04D4A9748D4031A9
318D4131AD3F3129EF8D3F31,587
1350 DATA 60A900A2279D7431CA10FA60A901
8D58308D5930A92E8D3E30A9C88D4030A9008D
F930A9018D4B30A9088D4A30,233
1360 DATA A9FF8DF83060A9018D5830A9008D
5930A95A8D3E30A9018D4B30A9088D4A30A900
8DF93020C32BA9008DF83060,47
1370 DATA A9028D58308D5930A92C8D3E30A9
9C8D3F30A9C68D4030A9588D4130A9018D4B30
A9088D4A30A9008DF93020DD,679
1380 DATA 2EA9FF8DF83060A9018D58308D59
308D4B30A9088D4A30A95A8D3E30A95E8D4030
A9018DF93020C32BA9008DF8,573
1390 DATA 3060A9B08580A9318581A209A000
A9809180A013A902918018A5806914858090 02
E681CA10E618A58069B88580,850
1400 DATA A5816901858 1A209A000A9809180
A013A902918018A5806914858090 02E681CA10
E6604A4A4A4AF00209D06029,680
1410 DATA 0F09D060AD7C022D7D02F0F8A900
85888589207B2DA9158D4830A9008DFB308584
200028A9018584AD70028DFA,385
1420 DATA 3018A5146903858F200028AD7C02
2D7D02F062A58FC514D0EFAD7002CDFA30F0DA
B011ADFB3030C5EEFB30ADFB,998
1430 DATA 30C903D0C9F01FCEFB30ADFB3010
B1C9FDD0BBC688A5881004A903858820223020
0F304CC72FE688A588C904D0,656
1440 DATA 04A900858820E42F20FA2FA203A9
D69DC002CA10FA207B2D4C4F2FAD7C022D7D02
F0F8A900858F60A5880A0A0A,334
1450 DATA 0AAAA000BDFC30998831E8C8C010
D0F460A900858FA58F8D05D4200028E68FA58F
C910D0F060A90F858FA58F8D,223
1460 DATA 05D4200028C68FA58F10F260A588
0A0A0A0AAAA000B97431998831BDFC30997431
E8C8C010D0EE600000000000,863
1470 DATA 00000000000000000FDFEFEFFFF
0000010102020300000000000000000000000000
0000000000000000000000,143
1480 DATA 000000030002F002E002700000000
0000000000000000000000000000A2B980A7A1
B2B980A4AFADB2AFB780AFA6,134
1490 DATA 80B4A8A580B3B5ADADA9B480B3AF
A6B4B7A1B2A580A7B2AFB5B000666F7200616E
616C6F6700636F6D70757469,200
1500 DATA 6E6700000000000000000000000
0000000000000000037292E2E2532D4D4D4D4
9494940A00332E812EB52E5A,579
1510 DATA 2E0000000000000003334212E2421
322400302F2E2700000000282F232B25390030
2F2E27000000000000037212C,713
1520 DATA 2C00302F2E2700000000000000000
303221233429232500007070706774310 74A9C
3100000000000000000000000,158
1530 REM * 2385 BYTES
```

●

CHECKSUM DATA.

(see page 11)

```
10 DATA 458,351,496,811,423,729,200,60
3,555,573,694,613,29,205,224,6964
160 DATA 136,198,962,777,491,30,155,46
8,172,884,718,512,770,704,766,7743
1060 DATA 612,803,845,691,11,737,741,9
68,827,752,629,626,767,785,954,10748
1210 DATA 968,8,845,760,921,970,657,71
5,729,810,949,794,734,126,798,10784
1360 DATA 55,871,933,489,560,773,71,96
5,41,996,677,787,304,61,106,7689
1510 DATA 906,780,655,2341
```

●

For those readers who are interested in seeing the assembly language listing of this program, it is given on the disk version of the magazine and is available on the *ANALOG Computing* TCS.

SMARTDOS
THE PROGRAMMER'S WORKSHOP
by John Chenoweth and Ron Bieber
5230 Clark Avenue, Suite 19
Lakewood, CA 90712
24K Disk $39.00

by Robert Opitz

SmartDOS is a recent addition to the Atari disk operating system market. It's menu driven, like Atari DOS 2.0S, and user friendly. The menu is sensibly chosen, so that the letter for a function is the first letter of that function. For instance, *F* is the command to format a disk, while *C* will copy a file.

To get a disk directory, all that's needed is the number of the drive: *1*, *2*, etc. To print the directory, just hold down the OPTION key while pressing the numbers. Easy? Yes, but. . .

SmartDOS is meant to be an improvement over Atari DOS 2.0S, and is fully compatible with files created by the latter. The manual states that it's "the finest, most friendly Disk Operating System available for Atari computers!" It works in single or double density, so it can be used on many of today's Atari-compatible disk drives. Density switching can be done at the DOS menu. It's also done automatically, if necessary, whenever a disk is accessed (even when you open a file from BASIC). Nice touch? Yes, but. . .

SmartDOS uses counter screens and different color backgrounds to help the user. The main menu is dark blue. When doing a whole-disk copy (menu selection *W*), a blue counter screen tells you what sector is being read, how many sectors have been read and written, and how many were empty or bad. When writing to the disk, the screen turns red. Informative? Yes, but. . .

SmartDOS has a number of nice features. It can look for bad sectors, check the speed of your disk drive, or allow up to nine autorun files to load upon booting. It can copy sectors, allowing you to partially recover crashed files. It even allows you to easily create an autorun file that will run a BASIC program on booting up. Impressive? Yes, but. . .

But what, skeptic? Well, the manual states, "If you are familiar with other Disk Operating Systems, you will appreciate the power of **SmartDOS** along with its elegant simplicity." Simple, yes, but hardly elegant.

As for power, sorry, but no. **SmartDOS**, although nice, flashy and friendly, seems somewhat behind the times. Sure, it's an improvement over Atari DOS 2.0S, but the latter has been around, virtually unchanged, for five years. **SmartDOS** would have been a reasonable upgrade a few years ago, but not now.

One problem is that this isn't a DOS for the future at all. While it works with single or double density, it won't handle double-sided drives, 8-inch drives, etc. True, I don't have one of these, and neither do most Atari owners. But disk drive prices are still falling, there are reports of new higher-density drives coming, and competing disk operating systems do allow this upgrade.

While **SmartDOS** touts its user-friendliness, this can be an impediment at times. Take that easy disk directory, for instance. It can't put a directory listing into a file, such as DIRECT.LST. (Why would anyone *want* to do this? It's the only way I know to get a directory on drive 2 with **AtariWriter**.) It can't list just the files ending in, for example, *DTA*. Even Atari DOS 2.0S can do that. And some of the friendly menu choices had to be obscure to fit. How about KOPY SECTORS? Or OBVERT RESIDUP (which switches the DUP.SYS part of **SmartDOS** into or out of memory when you use a cartridge).

Having seen some competing versions of DOS, I find a number of other things missing. These include command files, startup files, provisions for user-written commands, subdirectories, an undelete command, user-controlled directory formatting (i.e., alphabetization, etc.), or advanced memory management on XL computers. No DOS has all of these features, but most (except **SmartDOS**) have some.

SmartDOS does have some unique features, such as the disk drive speed check. But it fails to live up to its promise as the finest DOS available. It's priced in the same range as competing versions of DOS, but it gives less for your money. Users in the market for a new DOS would be smart to look elsewhere.

Robert Opitz is a chemist working in Rochester, New York. He has owned an Atari for three years. He became interested in microcomputers five years ago, when he discovered word processing while writing his thesis.

SPARTA DOS
ICD, INC.
1220 Rock Street, Suite 310
Rockford, IL 61101-1437
(815) 229-2999
Set alone $39.95
Set with US Doubler $69.95

by Matthew J.W. Ratcliff

Sparta DOS or **Sparta DOS Construction Set** (**SDCS**) coupled with the US Doubler is a hardware-software package that's hard to beat. **Sparta DOS** can be run on any Atari-compatible disk drive. If you have a 1050 with the US Doubler, files can be transferred in Ultra-Speed™—three times faster than normal, in single or true double density. **Sparta DOS** provides flexible ramdisk support and many other extra features for XL/XE machines.

When I first booted **Sparta DOS**, I was disappointed to find that it did not *seem* to be Atari DOS compatible, despite all its nice frills. I couldn't look at anything on an Atari DOS disk. After a few minutes of frustration, I got out the manual (which is excellent) and did some reading. **Sparta DOS** version 1.1 is designed for the Atari 400/800 computers, and 2.3 is for the XL/XE's. Both versions come with the construction set package.

The major difference between **Sparta DOS** 1.1 (which is what I had booted first) and 2.3 is the *built-in* Atari DOS handler. **Sparta DOS** 1.1 would just take too much RAM on an old 400/800 machine if the Atari DOS handler were added. You can easily transport files between **Sparta DOS** 1.1. and Atari DOS disks, with an excellent file copy utility called SPCOPY.

I booted **Sparta DOS** 2.3 on my 130XE and gave it a test run. It was quite easy to use, since I'm familiar with OSS DOS/XL. The two DOSs are very similar in command formats. I put in every disk I had, Atari DOS 2, 2.5, OSS DOS XL single and double densities. No matter what disk I put in, **Sparta DOS** 2.3 could read it!

With this DOS, I can read from and write to any DOS in any density—without any special utilities. This single feature makes **Sparta DOS** the most powerful disk operating system I've ever seen for the Atari XL/XE computer.

Sparta DOS 2.3 is nearly two times as large as most other DOSs (over 10700 bytes), yet it gives you more working RAM in BASIC than any other, as you can see in the table below.

DOS Version	? FRE(0)
Atari DOS 2.0,2.5	32274
OSS DOS XL	30990
(using DOSXL.SYS)	35214
Sparta DOS 1.1	30734
Sparta DOS 2.3	36176

It does this by hiding much of itself in the RAM that "shadows" the operating system ROMs in the XL/XE machines. Like OSS DOS/XL, **Sparta DOS** remains in RAM at all times. Note that **Sparta DOS** cannot read or write an Atari DOS 3 disk, however. If you are unfortunate enough to be using this defunct version of Atari DOS, I suggest that you scout around for a good DOS 3-to-DOS 2 conversion utility. Then make the transition to **Sparta DOS** after converting your files.

Sparta DOS is command oriented. Rather than selecting an item from a menu, you enter a command (such as *DIR*) for a disk directory. A menu utility file is provided for those who prefer it. It's unlike the Atari DOS menu, but easy to learn and use. The twenty-five most common **Sparta DOS** commands are available from this menu. This utility releases the RAM it uses when you return to BASIC.

One of the most frustrating features of the XL/XE machines is the OPTION key control of built-in BASIC. You have to remember to press it at power-up time if you want to go directly to DOS. Not so with **Sparta DOS** 2.3. You have complete control over the built-in BASIC, with the commands BASIC ON, and BASIC OFF. You may execute BASIC OFF so the RAM under BASIC will be used when copying files. You can just as easily turn it back on to return to programming.

When initialized, you can create one of two different types of **Sparta DOS** 2.3 disks. "XC" DOS gives control priority to the cartridge (if any) and looks for an AUTORUN.SYS file at boot time. (Use this configuration for **AtariWriter** and your printer driver.) The "XD" version gives control to DOS, after looking for a STARTUP.BAT batch command file. I'll cover more on batch files later.

A feature unique to **Sparta DOS** is the system clock function. Use the SET command to set the date and time. The current time and date will then be "stamped" on every file you write to a **Sparta DOS** disk. This is superb for helping you keep track of the latest version of your programs under development.

Use the TIME command to enable a clock display. This function gives you a twenty-fifth line at the top of the screen that continuously shows time and date.

(continued on next page)

This feature works flawlessly with Atari BASIC, OSS BASIC XL, and MAC/65 (no conflicts with DDT, either).

When you execute a *DIR* command from **Sparta DOS**, you get a list of files with time and date stamps, and file size in bytes—not sectors. The *DIRS* (directory short) command lists the files in the more traditional format. **Sparta DOS** even supports subdirectories, something IBM PC users may be accustomed to.

Sparta DOS provides a logomenu utility, which makes use of subdirectories. With your machine language game files organized under topical subdirectories (adventure, arcade, etc.), the logomenu (in the form of an autorun file) program provides access to as many as 1024 different game files on one disk—if you have the space. This is the perfect utility for organizing all your machine language games from **ANALOG Computing**.

Spcopy and xcopy are the slickest file copy utilities I've ever seen. Spcopy, for 400/800s, has the Atari DOS 2 handler built in, for moving files between it and **Sparta DOS** disks. These copy utilities can transport files between any DOSs, at any density supported.

You can easily set up source and destination parameters and then get a directory of the source file disk on the screen. Files to be moved can be SELECTed and tagged or untagged with the SPACE BAR. Pressing START moves all tagged files, prompting for disk swamps for a single-drive copy. This copy function buffers as many files in memory as possible. With UltraSpeed™, this copy function is extremely fast!

Atari DOS 2.5 supports ramdisk for the 130XE as drive D8: only. OSS DOS/XL does not support a ramdisk at all. **Sparta DOS** supports not one, but two ramdisks on the 130XE! You may use the RD130 command to specify any drive in the system (that doesn't conflict with a floppy) as a 507-sector ramdisk for the 130XE.

The RDBASIC command creates a ramdisk for the 130XE or the 800XL under the built-in BASIC, which is fifty-nine sectors. This is rather small for a ramdisk, but it can come in handy as a working disk buffer with the COPY command, as you'll see below. **Sparta DOS** provides ramdisk utilities for expanded memory Atari 800s.

Unlike OSS DOS/XL, the **Sparta DOS** COPY command is built in. Version 2.3 can move from/to any other DOS disk with the COPY command, with no special utilities required. (Both source and destination disks can be non-**Sparta DOS** types.) Here's where you'll find one of the *few* limitations of **Sparta DOS**. The built-in COPY function doesn't support single-drive copying. This is no problem if you have a two-drive system, or a 130XE with the ramdisk for intermediate transfers. The spcopy, xcopy, and menu command utilities all support single-drive copying, however.

I must point out two minor, but important, *caveats* with **Sparta DOS**. As the manual specifies, separate filenames in the copy command with a space character ( ), not a comma (,). If you use a comma, **Sparta DOS** thinks it's some sort of wild card or subdirectory specifier. This may give you an error, but I've even destroyed a file this way. Future versions of **Sparta DOS** may allow the comma separator.

Write protect disks until you're accustomed to **Sparta DOS**. Underline characters are legal in **Sparta DOS** filenames, such as D1:FILE_1A. Take care that you don't copy files with such names from a **Sparta DOS** disk to an Atari DOS disk, since the underline character is illegal under Atari DOS.

Sparta DOS can execute a series of commands from a batch file. When booted ("XD" version), it will search for a file called STARTUP.BAT and execute the commands therein, if found. I use the following batch file to set up for work with my MAC/65 assembler:

```
;RAMDISK D3: Setup in progress
RD130 D3:
;Moving Source Files now
Copy D:*.M65 D3:
;Date and Time Please
SET
TIME
CAR
```

The lines that begin with a semicolon (;) are "comment" or REM lines. **Sparta DOS** just prints them to the screen, so you know what's happening. Batch files can be executed from DOS by preceding the batch command filename with a minus (-) character, like -BACKUPS. A PAUSE command is built into **Sparta DOS**. It prints a prompt to the screen, *Press any key to continue*, and waits for a keypress. This allows your batch files more control over the system. Your batch files may even call BASIC and run a program for you.

Files may be erased and, with some limitations, unerased. Individual files may be protected from overwriting. The entire disk may be "soft" protected with the LOCK function. You may initialize an Atari DOS 2 format disk with the AINIT command, or a **Sparta DOS** disk with the XINIT function.

Directories, subdirectories, and two formatting types are accessible from Atari BASIC with new XIO commands—well documented in the manual. The text goes into great detail about the technical aspects of the "command processor" for advanced programmers who wish to write their own **Sparta DOS** command files. **Sparta DOS** even provides a keyboard buffer utility that allows you to type up to thirty-two characters ahead.

By the time you read this, there will be a version of **Sparta DOS** that will run with BASIC XE. The 1200XL computer will also be supported. **Sparta DOS** fully supports the ATR8000. Many other utilities are in the works, such as a sector copier, to make **Sparta DOS** even more useful. With this DOS "construction set," you can easily create a system disk with all your favorite command files, specific to any hardware you might own.

I'm hooked on **Sparta DOS**. If you have an XL/XE machine, I highly recommend it. If you have a 1050 drive as well, then I think you'll find the ICD doubler and **Sparta DOS** the ultimate DOS system for your Atari. This is a good DOS for Atari 400/800 users, too, but you'll have to put a little more effort into moving files between Atari and **Sparta DOS** disks.

Matthew J.W. Ratcliff is an Electrical Engineer in St. Louis, Missouri. He has been programming in BASIC and assembly language on the Atari since 1982. He's also active in telecommunications and is a remote Sysop on the Gateway BBS, (314) 647-3290.

High Noon

The 520ST vs. Amiga Showdown

by Tom Hudson

For months, denizens of the microcomputing world (particularly Atari and Commodore fans) have been awaiting the arrival of two high-powered computing machines.

On the Commodore side, there's the Amiga, a colorful system that promises to give its users "a creative edge." On the Atari side, there's the 520ST, which Jack Tramiel and company claim gives you "power without the price."

Which one's for you? Which is the "best" computer? Should the machines even be compared at all?

A little background.

In 1983, rumors were flying fast and furiously about a new machine being developed in Silicon Valley by a company called Amiga, which produced, among other things, video game joysticks.

Originally dubbed the "Lorraine," this computer was said to be a masterpiece of spage-age hardware, complete with its super-microchips designed by Jay Miner, who had created those custom chips used in the Atari 400 and 800 computer systems.

"Wow!" everyone at **ANALOG Computing** cried, "The next generation Atari computer—the 800's big brother!" There was only one problem. Could Amiga pull off what the folks at Mindset hadn't been able to manage?

The personal computer industry was a madhouse in 1983, with the cutthroat competition between Texas Instruments, Atari and Commodore. Could Amiga succeed where Mindset had failed? (The Mindset computer, a graphics-oriented PC, is still being sold, although it never acquired a very large share of the market. Today, it's mainly marketed to the higher-end graphics designers, in very small numbers.)

We had to find out for ourselves. After a few calls to Amiga, I was on a plane to California to see this machine firsthand. Arriving at Amiga, I was introduced to Jay Miner himself, as well as to the rest of the Amiga technical staff. I was informed that the term "Lorraine" was out, and that the machine was now to be referred to as the "Amiga PC."

I was then shown the working prototype of the Amiga, which was a stack of circuit boards about 6 inches high, with wires winding all over the place. Mr. Miner explained that three of these boards were going to be reduced to a custom graphics chip, while others were to be similarly squeezed into further chip packages, for sound, animation, and so forth.

There was no operating system in the computer at that time, but it was connected to a minicomputer, which shipped programs, picture data and such into the Amiga's memory for execution.

The famous "bouncing ball" demo was running even then, and I was frankly astounded at the graphics capability of the machine. But no matter how powerful it was, deep down inside I knew that if Amiga couldn't market the Amiga PC, it'd die a slow death, just as the Mindset did.

Here comes Jack.

In late 1983 to mid-1984, the computer industry just wasn't a happy place. Atari was in serious trouble, and, with the demise of the Texas Instruments personal computer, everyone was wondering who was next. Atari? Commodore?

As it turned out, Jack Tramiel, formerly of Commodore, took over the helm of Atari, Inc., changing it to "The new Atari Corp." Rumors began to circulate about a 16-bit Macintosh work-alike at an incredibly low price. I was skeptical about Atari's new machine—would the hardware be high quality or junk? Would it be as advanced as the Amiga?

Amiga had been bought by Commodore for a whopping price of over $25 million, apparently in a last ditch effort

to take over the high-end personal computer market, save Commodore from falling profits and get rid of arch-rivals Tramiel and Atari in one fell swoop. It was a big risk for Commodore.

In January of 1985, at the Consumer Electronics Show, Tramiel announced Atari's new machine: the 520ST, a 512K micro based on the Motorola 68000 microprocessor. Not only did it have the same processor as the famed Apple Macintosh, but it would have a color display and come with GEM, Digital Research's icon-based user interface.

The ST was instantly dubbed the "Jackintosh," and more people began to scrutinize Atari. The stage was set for the "Great Commodore vs. Atari Showdown."

Most people, including myself, were doubtful that the Atari machine could succeed. Atari was strapped for cash, the one mandatory item in developing a new computer. Would Tramiel cut corners to get the computer to market?

Many software development firms, sobered by the decline of the personal computer industry in the past few years, sat back and took a "wait and see" attitude toward the ST. They didn't want to take any chances.

Knowing the specs of the Amiga, I was initially disappointed that the ST didn't have the same number of colors or the same color resolution as the Commodore machine. This disappointment vanished as I began to work with the ST extensively in June of 1985.

The ST worked, and it did the job well. For $999, one could have the ST, disk drive and fantastic color monitor (or the whole system with a high-resolution monochrome monitor for $200 less). Never before had a computer with the sheer power and features of the ST been available for under $1000. The ST was truly a breakthrough.

Interestingly, Atari's lack of cash for advertising didn't hurt the ST's sales. By the end of October, Atari claimed that over 50,000 computers had been sold worldwide. With these numbers, many of the "doubting Thomas" developers began work on software for the Jackintosh.

With a $20-million advertising budget, Commodore/Amiga was now ready to introduce their 68000-based machine. By mid-November, they claimed to be exceeding sales and dealer projections.

Atari vs. Amiga.

It's interesting to see that the Amiga-specific computing magazine compares the Amiga to every computer under the sun *except* the 520ST. And there's a good reason. Have you ever seen a defense lawyer ask the prosecution's witness a question that will damage his client's case? Of course not.

The Amiga-specific magazine is afraid to compare the Amiga to the 520ST because the ST is a better value. It's that simple. Don't take my word for it—let's look at the facts.

Figure 1 is a comparison chart listing the respective features of the 520ST and the Commodore Amiga. It shows the features I feel are the most important when shopping for a personal computer, taking into account the nature of the computers being compared.

From this comparison chart, you can see that the ST and Amiga are fairly evenly matched on a feature-by-feature basis. What one machine lacks in one area is usually made up for by an advantage in another area.

The processors.

A quick look at Figure 1 will tip you off to the fact that, internally, the ST and the Amiga have the same heart—the high-speed Motorola 68000 microprocessor. This processor, with the ability to crunch numbers in 16- or 32-bit form, makes the 6502 processors of the older 8-bit Atari and Commodore machines look as if they were made in the stone age.

FEATURE	ATARI 520ST	COMMODORE AMIGA
Processor	Motorola 68000	Motorola 68000
Clock speed (MHz)	8	7.16
Standard RAM	512K	256K
Standard ROM	192K*	192K
Maximum RAM	16MB**	8.5MB
Multiprocessing built in?	No	Yes
Disk Drive	3½ inch	3½ inch
Disk capacity (supplied drive)	360K	880K
Mouse?	Yes	Yes
Highest color resolution	640 x 200	640 x400
Numbers of colors available	512	4096
Maximum colors at one time	16	32
Number of sound voices	3	4
Stereo sound?	No	Yes
Speech synthesizer built in?	No	Yes
MIDI music interface?	Yes	No
Hard disk (DMA) port?	Yes	No
RS-232 serial port?	Yes	Yes
Parallel printer port?	Yes	Yes
Operating system	GEM/TOS	Intuition/AmigaDOS
Price with color monitor and disk	$999	$1795
**Starting December, 1985*	***With 1MB DRAMS — Possible to address up to 16MB with 68000*	

Figure 1.

Interestingly though, the ST's 68000 works at its full potential of 8 megahertz (MHz), while the 68000 of the Amiga is slowed down somewhat, to around 7.16 MHz. This means that the ST can perform raw calculations and execute instructions slightly faster than the Amiga, an important advantage when handling serious real-time calculations.

While the Amiga's processor is slower than the ST's, in some applications its advanced support hardware makes up for this. Since the Amiga was designed with graphics in mind, it has a special chip for manipulating graphics information. This chip, known as the "blitter," handles all the dirty work when movement of pixels on-screen is required.

According to Commodore, this feature allows the 68000 to operate on other things while the blitter is moving the graphics data, though the blitter can be programmed to stop the 68000 completely when operating. In the ST, the 68000 must perform all data manipulation operations itself, without relying on other chips.

Because it's a custom piece of hardware devoted to moving memory, the blitter can do the job more quickly than the 68000 processor. This is an advantage of the Amiga.

In an effort to see if the ST could perform a demanding graphics manipulation operation as fast as the Amiga, I wrote a demonstration program similar to the Amiga's "bouncing ball" trademark. The results were less than satisfactory, because I used generalized data manipulation routines. The software engineers at Atari borrowed my idea and wrote their own version, actually making it operate faster than the same demo on the Amiga! The power of the unbridled 68000 came through.

The memory.

The Amiga comes with 256K of Random Access Memory (RAM) standard and is expandable to 512K internally, with a simple plug-in card. With an external memory expansion module, it can be enlarged to address an additional 8 megabytes (MB) of RAM. Unfortunately, this extra RAM is limited in its usage—only the lower 512K may be accessed by the system's custom graphics chips.

The 520ST comes with 512K of RAM and, according to Atari, may be expanded to 4MB of RAM internally, when 1MB DRAMs become available. There have been no announcements of RAM expansions past the 4MB capacity, but third-party hardware vendors could conceivably boost RAM to the 68000's limit of 16MB. Right now, several companies have simple, low-cost 1MB expansions available, and the hobbyist can easily increase memory to 1MB for under $50.

Both the Amiga and 520ST have 192K of Read Only Memory (ROM), used to hold the basic instructions needed to operate the system, as well as for useful subroutines to perform common operations so the programmer can work more quickly and efficiently. In early models, both machines used portions of RAM to hold the operating system, so that the bugs could be worked out before committing them to an expensive ROM installation.

The graphics.

It's no secret that the Amiga has wonderful graphics capabilities. In fact, it was initially designed as an ultra-high-end game machine, back when the computer video game craze was at its peak. In intervening years, the Amiga made its way to being a general purpose computer, with its excellent graphics as the main attraction.

The Amiga sports graphics resolution up to 640 x 400, in 32 colors from a possible palette of 4096, as well as hardware sprites (individual graphic elements, independent of screen memory) and animated objects. All of these items are handled by the custom graphics chips.

The 520ST, while it doesn't have the custom hardware of the Amiga, has the ability to process animated objects and sprites, by using its 68000 microprocessor. This puts additional demand on the 68000, but the results look the same on the screen. The ST's graphics range from a resolution of 320 x 200 in 16 colors to 640 x 200 in 4 colors, to 640 x 400 in monochrome mode. In color modes, the ST has a palette of 512 possible hues.

Disk storage.

Both the ST and the Amiga come with 3½-inch micro floppy disk drives. The ST's standard disk drive can hold about 360,000 bytes, and the double-sided ST drive can hold about 720,000.

The Atari ST can accommodate two floppy disk drives, in any combination of single- or double-sided units, as well as a hard disk drive, which can hold 10 or 20 million bytes. The ST is ready to add the hard disk at any time, thanks to the built-in hard disk port on the rear of the computer.

This port will also be able to connect with the upcoming Compact Disk (CD) ROM unit, which can hold well over 500 million bytes of fixed information, such as encyclopedias, dictionaries, and so on. The built-in hard disk controller eliminates the need for controllers to be purchased with the drive, allowing lower prices for the peripherals.

The Amiga's floppy drive, which is built into the computer's case, can hold 880,000 bytes, and the system can accommodate three more external drives. Hard disk drives (and, presumably, CD ROM units) may be attached to the Amiga by plugging the appropriate controller board into one of the computer's expansion slots.

Sound and music.

Both the Amiga and ST have the capability to produce sound. The 520ST uses a dedicated General Instrument sound chip to do the job, while the Amiga uses another custom chip.

The ST can produce three voices at a time, the Amiga four. The latter has the added ability to produce stereo sound, which should enhance games. The Amiga also has a built-in voice synthesizer for adding voice output to programs.

The 520ST has one thing that the Amiga doesn't in the area of sound generation—a set of MIDI (Musical Instrument Digital Interface) ports. These allow you to connect the ST to any musical instrument that has MIDI capability.

There are many instruments, including synthesizers and electronic drum units, which can be connected in this manner, enabling you to compose professional-sounding music on your computer. Several companies, like Rising Star Industries, are working on MIDI software, which will include music editors and sequencers.

GEM vs. Intuition.

Perhaps the most important difference between the 520ST and Amiga lies with the operating system (OS) used by each. The OS is responsible for the way the user sees the computer. It oversees the various functions of the system, including disk access and file management, graphics, and program loading and execution.

Amiga uses a user interface called Intuition, which runs under AmigaDOS, a disk operating system created especially for the Amiga. Intuition is an icon-based user interface, similar to that of the Apple Macintosh in appearance.

Intuition is capable of running several programs at once, using a technique known as "multitasking." In this mode,

the computer divides its processing time between several programs. If three programs (called A, B and C) are running in multitasking mode, Intuition will run program A for a specified time, then program B, then C. It then goes back to repeat the process.

Multitasking is fine for programs that don't use the system resources heavily and can be quite helpful, under certain circumstances. However, while experimenting with the Amiga at a local computer store, I found that the multitasking mode on the Amiga can slow down the primary program (the one that the user is currently working with), to the point that it's virtually unusable.

On the other hand, the 520ST uses GEM, Digital Research's user interface, also similar to that of the Macintosh. GEM has icons similar to those of the Amiga, and the general "feel" of the user interface is close to that of the Amiga.

This is one good thing about the icon-based user interface: it's providing a common ground for computer users. Fairly soon, changing from one computer to another will be like switching from one car to another. They may be slightly different, but the basics of using them will be the same.

The operating systems of these computers may be the make-or-break factor in whether or not they succeed. GEM is already being used on the IBM PC. Its compatibles (and any application written for one machine in GEM) can be run on another system's GEM with very little modification.

The Amiga doesn't have this advantage. Intuition is a nonstandard user interface. Developers writing in GEM for the 520ST know that their applications can be transported to the IBM PC for a limited cost, and vice versa. This will encourage development for the ST.

The Amiga is hoping to boost its sales by offering compatibility with the IBM PC. This is done with a software-based emulator, in which each IBM instruction is examined by the Amiga and executed as if it were on the IBM. The 68000 is, in effect, "pretending" to be the IBM's 8088 microprocessor.

The process of examining every instruction is extremely slow, and the Amiga can be slowed down to about half the speed of the IBM in certain mathematical operations. The emulator is, however, much cheaper than buying hardware to perform the emulation.

It will be interesting to see how many people buy the Amiga to get the IBM emulation capability. Even more interesting will be watching ST developers, to see if they follow this example and develop such a software emulator for the Atari's ST.

Also, multiprocessing capability is a real possibility for the 520ST, although I don't see it as an important feature, given the performance degradation. The 68000, even with its high-speed operation, isn't a mainframe processor, and any attempt to force it to do too much work will be a disappointment.

The bottom line.

I've spoken to literally hundreds of people, including computer industry experts, about the relative merits of the Atari 520ST and the Commodore Amiga. These people have ranged from blue collar workers to expert programmers. Some ordinary users seem to feel that even the ST's price (roughly $800 less than the Amiga) is too much for their budgets.

The general impression I've received from industry insiders is that the Amiga's operating system was rushed, so the computer could be introduced on time, and, at this writing, it still contains numerous serious flaws.

In contrast, the ST GEM/TOS operating system was shipped on disk to preliminary users, in order to iron out any last minute bugs in the software.

At the COMDEX show in Las Vegas in November (see the article on page 76), Atari showed the world how much software was under development, via their huge display, while Commodore/Amiga was nowhere to be found. The company explained to developers that they didn't have enough software yet to make a good impression; others speculated that Commodore's creditors would not approve the expenditure.

Atari has used word of mouth promotion for the ST and, so far, it seems to be working. Their operation has been based on cost-saving measures. And, rather than meeting deadlines by producing substandard equipment, they have sometimes delayed products for better results.

Commodore spent over $25 million acquiring the Amiga, plus $20 million on the flashy ad campaign to promote it. With this kind of outlay, they have to sell a lot of Amigas to make their creditors happy. Atari's low-overhead approach may turn out to have been the best way to market computers in 1985.

It's high noon.

Many people say that the Atari 520ST and the Commodore Amiga should not be compared. "They aren't aimed at the same market," is the reason given. I often wonder if they say this because there is such a great difference in the prices of the ST and Amiga, rather than a difference in capabilities.

The hard fact is, for most general and graphics computing uses, the Atari ST can do the job as well as or better than the Amiga. And, in today's world of limited budgets, this means that the ST, at almost $800 less than the Amiga, is a realistic alternative.

It truly gives you power at a lower price. In some ways, the ST has advantages over the Commodore machine. In other ways, the Amiga is better. If you must have 32 colors on-screen at once without special software, and have the extra money available, the Amiga is your choice. But, if you're like I am (on a budget), you'll agree that, in terms of sheer computing value, the 520ST is the winner.

The next few months are going to be extremely interesting, watching what happens with the Atari and Commodore computers. Both could find their respective niches; one or both could fail. Anything can happen. Still, like John Dvorak of *InfoWorld*, I'm putting my money on the Atari 520ST.

*We at **ANALOG Computing** hate to see a showdown between the Amiga and 520ST. . .We'd prefer to include in the group all of the home/small business computers, those that Commodore compares with the Amiga, plus the ST. Bearing this in mind, though, it seems that the Atari ST at least deserves recognition in journals, wherever the Amiga is mentioned.*

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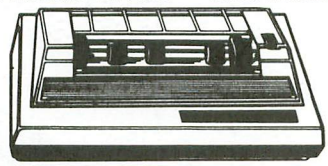

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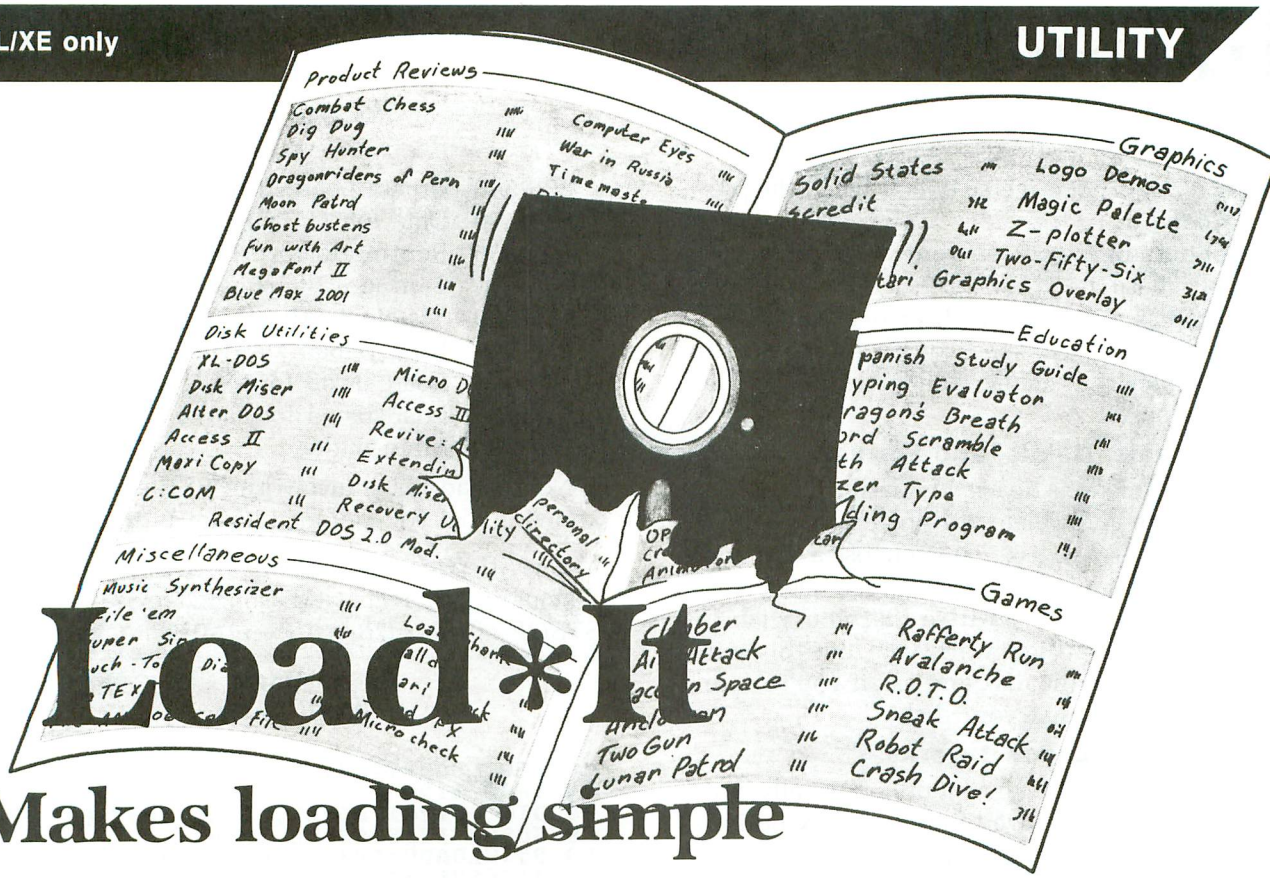

by Karl Stiefvater

Imagine this: you've just downloaded a new program from your favorite bulletin board. Quickly you reboot with the BASIC cartridge in, and begin to LOAD your file. After a second or two, the friendly beeping noise stops and *ERROR 21* appears on your screen. That's right, it's a binary load game, isn't it?

Okay, you reboot, this time without BASIC. After the menu comes up, you type *L* and begin the LOAD again. But again the beeps stop short, and the message *BAD LOAD FILE* shows up. Hmmm, there's only one more choice: try to ENTER it. We reboot once more, with BASIC back in, and ENTER the file.

Let's see, we rebooted three times, switched BASIC three times, and loaded DUP once. That's quite a bit of time. That may never happen to anyone, but still, there should be a better way—shouldn't there?

Now there is. With **Load*It**, you can load anything you want, just with the touch of a few keys. **Load*It** checks to see what kind of file it is and, if you have a XL, it will automatically shut BASIC off for you.

Using Load*It.

First type in **Load*It**, making sure to be careful with Lines 550, 560, 570 and 1220. All these include machine language, and one little mistake can prove fatal. (Be sure to SAVE it before testing, so that you don't lose it.)

Next, RUN the program. A menu with five choices should come up. Choose number 5—Create **Load*It** disk. Now insert a disk with at least 96 sectors on it. This will be your master copy of **Load*It**. After asking if you want to format your disk, the analysis will begin. It will check to see if you have enough sectors and if DOS.SYS is already on the disk. If not, it will ask if you want to write the DOS file. Then it will check to see if there's an AUTORUN.SYS or LOADIT.BAS on the disk. If there is, it will ask if you wish to abort or just write over them. When all the questions are answered, it will begin the write, creating a **Load*It** disk.

Using the load function.

Now that you have a **Load*It** disk, you can use the program for its original purpose—loading. Back at the menu, press 1 for Load. The program will then enter the directory and display it on the screen. An arrow will appear in the top left-hand corner. This will be the pointer you use to tell the program which file you chose to load.

Move the arrow, using the up (↑) and down (↓) keys on the computer. The CTRL key is not needed. Place it next to your choice and press the asterisk key (*). The program will now identify the file type and begin LOADing. If it is in binary format, it will first ask if you want to disable BASIC. *Note: this is only for the XL/XE computers. If you use it on a 400, 800,*

or 1200, you might get adverse effects when the program is loaded.

At the bottom of the screen you will notice extra commands. These are: *New Disk*, *Abort*, and *Lck/Unlck*. New disk will read the directory from a new disk inserted. Abort will send you back to the main menu. Lck/Unlck will change the status of the file, locked or unlocked.

Rename, Delete, and Format.

These three functions do exactly what their names suggest. Rename and Delete will load up the directory (just like Load) and ask you to choose a filename with the arrow. Rename will then ask for a new name. Delete will ask if you're positive that you wish to erase this file. Format will warn you that this will remove all data from the disk and ask if you're sure. If so, it will then format your disk.

How Load*It works.

Most files, whether you know it or not, usually have some kind of identifier. Saved files are no exception. They begin with two ATASCII *0*s (along with other symbols, but **Load*It** doesn't check those). Binary files start with two ATASCII *255*s. Although listed files don't have identifiers, the first byte in ATASCII must be from 0-9, because it's a line number for the first line.

Load*It checks these numbers to see what kind of file it is. If none of them match, it goes back to the main menu. If it's in saved format, it simply does a RUN"D:filename.ext".

But listed and binary files are more tricky. A listed file, when ENTERed, will merge the existing program, and there's no command to get it to automatically RUN. To do this, I used a trick called "RETURN key mode." In this mode, the Atari presses RETURN on every line below the cursor. So, all we have to do is PRINT a NEW command, an ENTER command, and a RUN command. You can see this in Line 990.

The binary file takes a little more knowledge of how DOS initializes. But, basically, an OPEN to the file and an USR call to 5576 ($15C8) will load it. Lines 920 and 930 have this routine.

Program take-apart.

Lines	Functions
10-40	Initialize program and GOSUB 1010.
50-110	First part of load routine. Checks to see what kind of file it is.
120-170	Rename routine.
180-220	Delete routine.
230-280	Format routine.
290-540	Create **Load*It** disk routine.
550-570	Data for AUTORUN.SYS.
580-830	Routine for printing directory and getting a filename.
840-860	Yes/No routine.
870-930	Binary load.
940-960	Load saved format.
970-1000	Load listed format.
1010-1200	Main menu.

Now, head for your favorite BBS and download, knowing that you can load whatever it gives you.

Karl Stiefvater is a sophomore at St. Dominic High School in St. Peters, Missouri. He is the remote SYSOP of the AURA BBS, (314) 928-0598.

Listing 1.
BASIC listing.

```
10 REM LOAD*IT BY KARL STIEFVATER
20 TRAP 1190
30 DIM A$(20),B$(6),C$(40),P$(16)
40 GOSUB 1210:GOSUB 1010
50 B$="LOAD":SETCOLOR 4,7,0:SETCOLOR 2
,7,4:GOSUB 580
60 CLOSE #2:OPEN #2,4,0,C$
70 GET #2,B1:GET #2,B2:CLOSE #3:CLOSE
#2:CLOSE #1
80 IF B1=255 AND B2=255 THEN 870
90 IF B1=0 AND B2=0 THEN 940
100 IF B1>47 AND B1<58 THEN 970
110 RUN
120 SETCOLOR 2,9,4:SETCOLOR 4,9,0:B$="
RENAME":GOSUB 580
130 POSITION 2,20:? "■What should I":
? "rename it as? ";:INPUT A$
140 FOR T=LEN(C$) TO 1 STEP -1:IF C$(T
,T)<>" " THEN POP :GOTO 160
150 NEXT T
160 C$(T+1)=",":C$(T+2)=A$
170 POSITION 2,20:? "■  Renaming!":CL
OSE #3:XIO 32,#3,0,0,C$:RUN
180 B$="DELETE":SETCOLOR 2,4,4:SETCOLO
R 4,4,0:GOSUB 580
190 POSITION 2,20:? "■Delete ";C$:? "
are you sure? ";:GOSUB 840
200 Q=1^1:Q=1^1:IF  NOT AN THEN RUN
210 POSITION 2,20:? "■";"Deleting ";C
$
220 CLOSE #3:XIO 33,#3,0,0,C$:RUN
230 GRAPHICS 0:SETCOLOR 0,0,15:SETCOLO
R 2,14,4:SETCOLOR 4,14,4:POKE DL+8,7:P
OKE DL+9,6:POSITION 6,3:? "FORMAT!"
240 SETCOLOR 1,0,15:? "WARNING: This w
ill erase all data on          this d
isk!"
250 ? :? "Are you positive? ";:GOSUB 8
40
260 Q=1^1:Q=1^1:IF  NOT AN THEN RUN
270 CLOSE #3:XIO 254,#3,0,0,"D:*.*"
280 RUN
290 SETCOLOR 2,8,4:SETCOLOR 4,8,4:? "■
   create■"
300 ? :? "Insert the new Load*It disk
and":? "press ■Return■":GET #1,Y
310 ? :? "Format this disk?";:GOSUB 84
0:IF AN THEN CLOSE #3:XIO 254,#3,0,0,"
D:*.*"
320 ? :? "Analyzing disk...":CLOSE #3:
OPEN #3,6,0,"D:*.SYS"
```

```
330 INPUT #3,C$:IF C$(2,2)<>" " THEN 3
60
340 IF C$(3,5)="DOS" THEN DS=1
350 GOTO 330
360 IF  NOT DS THEN ? "Write DOS to th
is disk?";:GOSUB 840:IF  NOT AN THEN D
S=1
370 SEC=VAL(C$(1,3)):IF SEC>94-DS*39 T
HEN 420
380 ? "Sorry, Load*It needs ";94-DS*32
;" sectors"
390 IF  NOT DS THEN ? " with DOS";
400 ? "This disk only has ";SEC;" sect
ors":FOR T=1 TO 900:NEXT T:RUN
410 END
420 TRAP 460
430 CLOSE #3:OPEN #3,4,0,"D:AUTORUN.SY
S"
440 ? :? "This disk already has an AUT
ORUN.SYS  on it. Should I write over i
t?";:GOSUB 840:IF AN THEN 460
450 FOR T=1 TO 500:NEXT T:RUN
460 TRAP 490:CLOSE #3:OPEN #3,4,0,"D:L
OADIT.BAS"
470 ? :? "This disk already has a LOAD
IT.BAS    on it. Should I use it anywa
y?";:GOSUB 840:IF AN THEN 490
480 FOR T=1 TO 500:NEXT T:RUN
490 TRAP 1190:? :? "Beginning the writ
e..."
500 IF  NOT DS THEN ? "Writing DOS.SYS
":CLOSE #3:OPEN #3,8,0,"D:DOS.SYS":CLO
SE #3
510 ? "Writing the AUTORUN.SYS":CLOSE
#3:OPEN #3,8,0,"D:AUTORUN.SYS":RESTORE
 550
520 READ A:IF A=-1 THEN 540
530 PUT #3,A:GOTO 520
540 ? "Writing main program...":CLOSE
#3:SAVE "D:LOADIT.BAS":RUN
550 DATA 255,255,0,6,81,6,216,24,173,4
8,2,105,4,133,204,173,49,2,105,0,133,2
05,24,160,0,177,204,105,162,133,212
560 DATA 160,1,177,204,105,0,133,213,1
60,32,185,49,6,145,212,136,208,248,169
,13,141,74,3,96,0,48,47,43,37,0,24
570 DATA 20,18,12,17,18,26,50,53,46,0,
2,36,17,26,44,47,33,36,41,52,14,34,33,
51,2,0,226,2,227,2,0,6,-1
580 MY=0:L=0:TRAP 1190:? "K";:? "
";B$:POSITION 2,2
590 CLOSE #1:OPEN #1,6,0,"D:*.*"
600 INPUT #1,A$:IF A$(4,5)=" F" THEN 6
30
610 MY=MY+1:? A$;"   ";:INPUT #1,A$:IF
 A$(4,5)=" F" THEN 630
620 ? A$:GOTO 600
630 POSITION 10,20:? A$:POSITION 0,21:
? "S=";B$;"  N=NEW DISK  A=ABORT  L=LC
K/UNLCK":POSITION 0,2:? "->"
640 Y=2:X=0:XX=X:YY=Y:CLOSE #1:OPEN #1
,4,0,"K"
650 GET #1,C:Y=Y+(C=61)-(C=45)
660 IF Y<2 THEN Y=MY+1:X=1-X
670 IF Y>MY+1 THEN Y=2:X=1-X
680 IF Y<>YY OR X<>XX THEN POSITION X*
20,Y:? "->":POSITION XX*20,YY:? "  ";:
YY=Y:XX=X
690 IF C=78 THEN GOTO 580
700 IF C=65 THEN RUN
710 IF C=42 THEN 740
720 IF C=43 THEN L=1:GOTO 740
730 GOTO 650
740 FOR B=X*20+1 TO X*20+15
750 LOCATE B,Y,Z:A$(B-X*20)=CHR$(Z):NE
XT B
760 C$="D:":C$(3)=A$(4,11)
770 FOR B=10 TO 4 STEP -1:IF C$(B,B)<>
" " THEN POP :GOTO 790
780 NEXT B
790 C$(B+1)=".":C$(B+2)=A$(12)
800 IF C$(3,3)=" " AND C$(5,5)=" " THE
N 650
810 IF  NOT L THEN RETURN
820 TRAP 830:CLOSE #3:OPEN #3,12,0,C$:
CLOSE #3:XIO 35,#3,0,0,C$:GOTO 580
830 CLOSE #3:XIO 36,#3,0,0,C$:GOTO 580
840 CLOSE #1:OPEN #1,4,0,"K":GET #1,Y:
IF Y=78 THEN ? "No!":AN=0:RETURN
850 IF Y=89 THEN ? "Yes!":AN=1:RETURN
860 GOTO 840
870 GRAPHICS 0:SETCOLOR 2,7,2:SETCOLOR
 0,0,15:SETCOLOR 4,7,2:POKE DL+9,7:POK
E DL+11,6:POSITION 0,4
880 ? "BINARY LOADING":POSITION 31-LEN
(C$)/2,5:? C$;
890 ? :? :? " Turn off BASIC? (XL/XE o
nly!) ";:GOSUB 840
900 CLOSE #1:OPEN #1,4,0,C$
910 IF AN THEN 930
920 X=USR(5576):RUN
930 X=USR(ADR(P$)):RUN
940 GRAPHICS 0:SETCOLOR 2,7,2:SETCOLOR
 0,0,15:SETCOLOR 4,7,2:POKE DL+9,7:POK
E DL+11,6:POSITION 6,4:? "LOADING"
950 POSITION 31-LEN(C$)/2,5:? C$;
960 RUN C$
970 GRAPHICS 0:SETCOLOR 2,7,2:SETCOLOR
 0,0,15:SETCOLOR 4,7,2:POKE DL+9,7:POK
E DL+11,6:POSITION 6,4:? "ENTERING"
```


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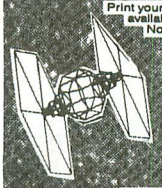

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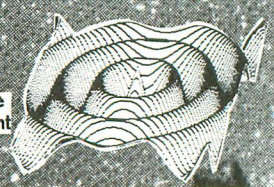

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```
980 SETCOLOR 1,0,2:POSITION 31-LEN(C$)
/2,5:? C$;
990 POSITION 2,8:? "NEW":? :? :? :? "E
NTER";CHR$(34);C$:? :? :? :? "GR.0:POK
E 842,12:RUN"
1000 POSITION 2,6:POKE 842,13:STOP
1010 GRAPHICS 0:POKE 752,1:DL=PEEK(560
)+PEEK(561)*256
1020 SETCOLOR 2,0,0:SETCOLOR 4,0,0:SET
COLOR 1,0,15:SETCOLOR 0,0,15
1030 POKE DL+3,64+7:POKE DL+6,6:POKE D
L+26,48
1040 POSITION 6,0:? "load▙it▟"
1050 ? "          By Karl Stiefvater":?
 :? :? :?
1060 ? "                              "
1070 ? "                              "
1080 ? "                              "
1090 ? "                              "
1100 ? "                              "
1110 ? "                              "
1120 ? "                              "
1130 ? "                              "
1140 ? "                              "
1150 ? :? :? "                Choose one:
"
1160 CLOSE #1:OPEN #1,4,0,"K":GET #1,Y
1170 IF Y<49 OR Y>53 THEN 1160
1180 ON Y-48 GOTO 50,120,180,230,290
1190 GRAPHICS 0:? "System error ";PEEK
(195)
1200 END
1210 RESTORE 1220:FOR X=1 TO 16:READ A
:P$(X)=CHR$(A):NEXT X:RETURN
1220 DATA 104,169,255,141,1,211,24,165
,106,105,32,133,106,76,200,21
```

1 Load!
2 Rename!
3 Delete!
4 Format!
5 Create a Load*It Disk!

●

CHECKSUM DATA.

(see page 11)

```
10 DATA 774,687,516,150,873,119,79,763
,563,827,95,287,179,643,765,7320
160 DATA 905,914,283,717,952,816,246,6
8,68,232,970,843,118,634,462,8228
310 DATA 964,774,738,659,715,273,574,5
10,802,538,35,726,370,451,93,8222
460 DATA 97,893,102,771,655,89,445,753
,441,356,193,285,676,633,716,7105
610 DATA 929,53,529,47,641,942,947,409
,421,813,433,559,729,206,317,7975
760 DATA 696,224,750,308,661,392,686,4
22,694,20,741,617,697,616,358,7882
910 DATA 416,661,2,61,105,575,410,0,52
3,395,442,327,461,924,338,5640
1060 DATA 410,944,329,330,381,458,877,
694,436,573,334,662,86,351,259,7124
1210 DATA 630,91,721
```

●

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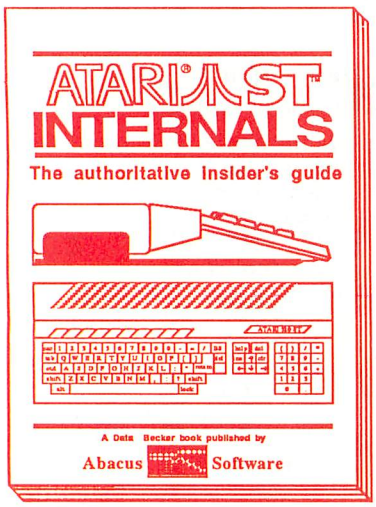

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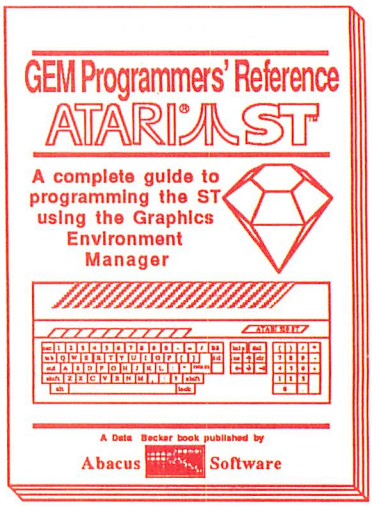

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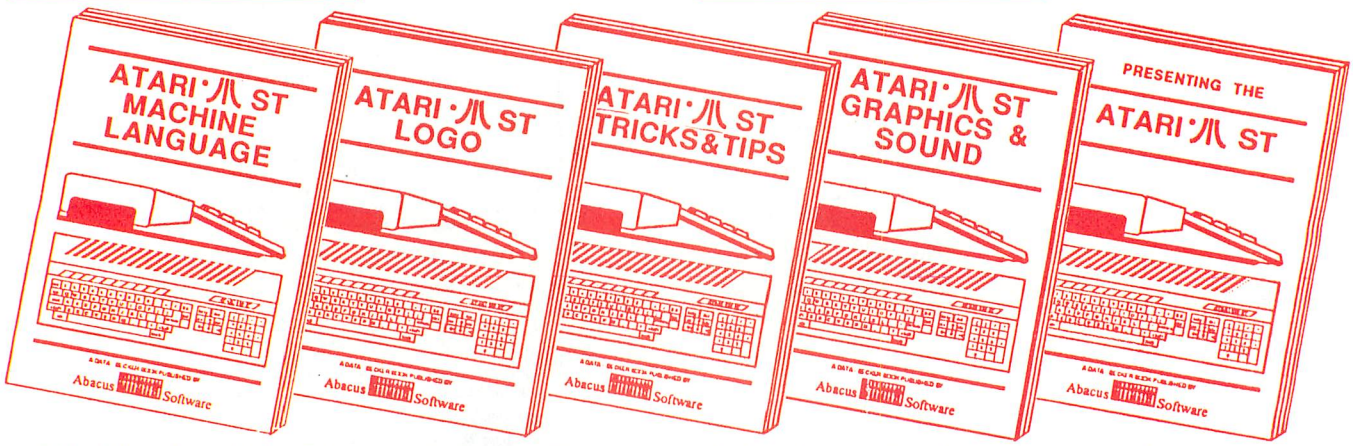

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CIRCLE #113 ON READER SERVICE CARD

Adventurous Programming

by Clayton Walnum

At a user group meeting, a guy came up to me and said, "Hey, they told me you wrote that text adventure, **Nightshade**." (See **ANALOG Computing**, issue 36.)

I turned and smiled, prepared to accept his adulation. Phrases queued up in my mind: "thank you very much," "glad you enjoyed it," "yeah it was tough to write". . .the usual utterances that display my boundless modesty. This guy was smiling so much, I was even going to give him my "Aw, shucks" blush!

"It was all right," he said, "but I have a *good* idea for an adventure."

The prepared phrases slunk back into my befuddled brain, and my tongue executed an error 12, "line not found." Recovering, I searched the old database for the wittiest reply. "Uh. . .what?"

"Yeah, the plot goes like this," he continued, oblivious to my distress. "There's this guy in Hawaii who goes crazy when he discovers his girlfriend's been seeing a Lithuanian cottage cheese taster. So he gets this axe. . ."

What followed was the usual warped tale that one might expect from a creature whose brain cells were manufactured by Play-Doh. There were beheadings and flayings and devourings. Real family stuff, a lot like a David Cronenberg movie interpreted by a delirious Roger Ebert.

"So, what do you think?" he asked.

"I think you've got a lot of programming to do."

He looked confused (not a difficult feat, I assure you). "No, man. You don't understand. I want *you* to write it!"

I should have known. It was fairly obvious he'd never be able to learn the difference between a GOTO and a PRINT.

"I'd do it myself," he rambled, "but I've never been able to figure out that GOTO and PRINT stuff. Besides, I don't have the time. A project like that would probably take a whole afternoon!"

Confessions.

Those of you who believe the above should drop me a note. I have some swampland in Florida you might be interested in.

Yes, it's all a lie, but one with a point. There are a lot of people out there who've got great ideas for text adventures, but who just don't know how to go about getting the job done. If you're one of them, I've got good news. Over the next few issues, I'm going to guide you through the complete process of designing and writing a text adventure game. We'll cover everything from outlining a plot to playtesting the final program. If you stick with me, I'll provide you with the basic knowledge you'll need to get that adventure out of your mind and into playable form.

Course prerequisites.

Since BASIC is practically the universal language of Atari users, we'll use it to construct a sample mini adventure. Needless to say, it's suggested that you have a good understanding of BASIC programming. I will, from time to time, supply short machine language subroutines to help speed up the BASIC code. It's not necessary, however, that you understand machine language programming.

The only other thing that you must bring to class is a willingness to work. Creating a text adventure is a truly time-consuming task. Those of you with a tendency toward laziness are never going to graduate.

Okay, that's the bell. Everyone to your seats. Time for class to begin.

Lesson One—Plot.

Adventure games are stories. You must do the same brainstorming and planning that authors like Stephen King do, before penning their next bestseller. A good adventure writer will spend as much time planning a story as writing it.

It's just not good enough to have your players wandering aimlessly through caves, gathering treasures and fighting strange creatures. All that stuff has been done to death. You want to find an idea that will be both original and appealing. Your future players expect your game to give them the same satisfaction that they get from a good short story—and then some!

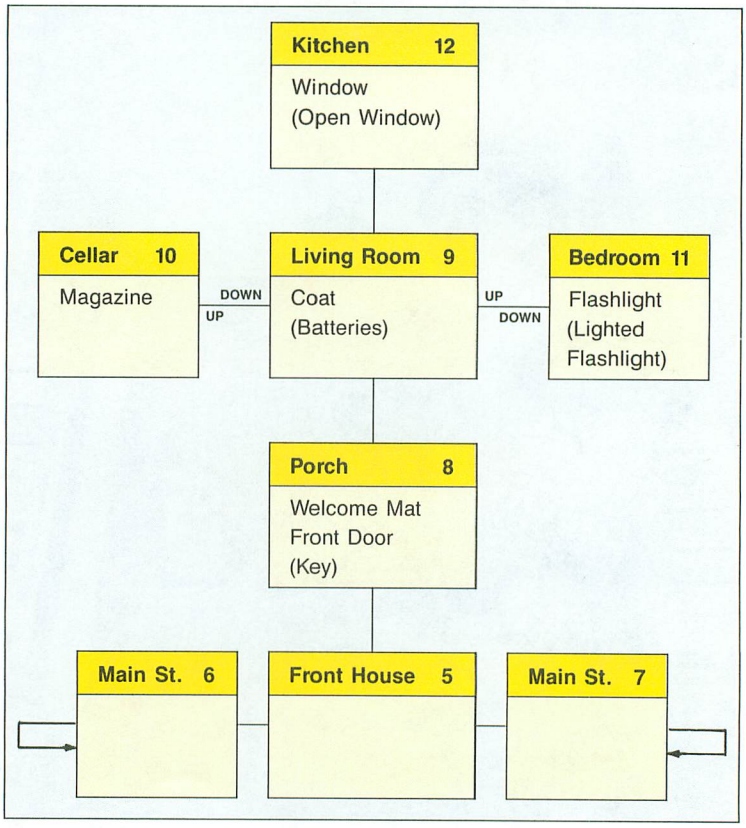


Figure 1.

After all, *your* story is going to have to be flexible enough to allow "readers" to choose their own pathways. You're going to have to provide a certain amount of guidance, in the form of textual clues and logical solutions to logical problems.

The first thing you have to come up with is a plot idea. It must be something that stimulates your imagination and something that will be exciting to players. Things that are *not* going to be exciting are stories that have already been done a dozen times. *Be as original as you can!* If you have any imagination at all, you should be able to come up with something fairly quickly.

Sit down at the table with a paper and pencil and *think*. When you get an idea, jot it down. Once you have several possibilities, look them over. Pick the one you think will be most workable and enjoyable.

Our story.

To get things going, I'll supply the idea for the mini-adventure we'll be writing. It's going to be a bit silly, since we don't have time to write a full-size adventure, but bear with me.

Though at the beginning of the game it's standard practice to tell the player what he must accomplish in order to win, we're going to try something different. We are going to turn things inside out and (we hope) end up with a demo adventure that's original, if short.

We're not going to tell the player his "mission." The only thing we're going to tell him is that the action to be accomplished is hidden within the game, and that it's his job to figure out what it is.

And what is the solution to be? Hmmm . . . I think I'll leave you in suspense for a while. I will tell you this, though, There's a certain magazine hidden away in a house, and the solution to the adventure will be found if the player reads the right page.

A course of action.

Now that we have something to work with (if you don't like my idea, use one of your own), we can start to develop an outline.

All stories, whether they be printed in a book or displayed on a screen, are really nothing more than a series of actions, each advancing the plot another notch toward a logical ending.

When writing a text adventure, however, there is one extra complication. The actions take place in an order which is going to be pretty much under the control of the player. You don't have the luxury of putting everything in a rigid framework and saying, "Here! Read it!"

As we design our game, we are going to have to allow the player alternative ac-

tions and let him find his own route to the solution. We'll have to second-guess him. . .*What* is he going to do?. . .*How* is he going to do it?. . .*When* is he going to do it?

Enough preaching. Let's get to work. Get some paper and a pencil. As we design our new game, we're going to take a lot of notes.

The game begins.

The first thing we must do is put the player at the starting location. Let's start him off standing in front of the house, shall we?

Near the bottom of one piece of paper, draw a one-inch square, and, inside it, write "Front of house 5." The 5 is the room number (we call all locations "rooms," even if they happen to be outside).

Why didn't we start with room 1? Well, we could have, but the way I've designed the BASIC code requires that we leave the numbers 1 through 4 available for another purpose. I'll explain in greater depth, once we start the actual programming.

This paper is the beginning of our map. The map is an important tool, in both designing and playing a text adventure. The designer uses it to keep track of all locations and to be sure the pathways between the rooms make some sense. It's also a convenient way to keep tabs on what items can be found where.

Now we start to compose the game's actions step by step, building our map as we go. What's the first thing we want the player to accomplish? Well, he's got to get into the house, so we'll focus our first puzzle on that.

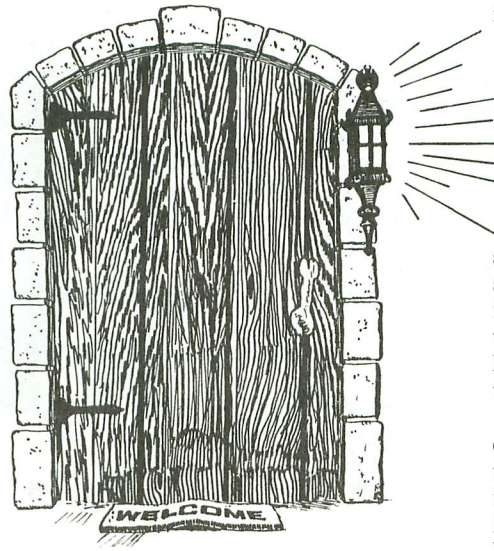
The front door will be north of where we are now, so draw another box above the first, connecting them with a line (see Figure 1 to create the map).

1) Welcome Mat
2) Key
3) Coat
4) Batteries
5) Flashlight
6) Magazine
7) Window
8) Front Door
9) Lighted Flashlight
10) Open Window

Figure 2.

Remember what I said about alternatives? Let's also add a west and east direction from our starting point. Draw two more boxes in the appropriate positions and connect them to the original. On the westernmost square, add an arrow leading west, that curves back to the room. This indicates that, if the player moves west, he'll end up back in the same location. But *he* doesn't know that (unless he's been clever enough to drop an item, to check for a loop). To him, it will seem that he can move west forever. On the easternmost room, draw the same type of arrow, heading east.

Label the east and west rooms *MAIN STREET 6* and *MAIN STREET 7*, respectively. Label the northernmost room *PORCH 8*.



Room 8 will also contain a few objects. Below the room name, write *WELCOME MAT, FRONT DOOR*, and, in parentheses, *KEY*. The reason we put *KEY* in parentheses is that it's not visible to the player when he enters the room. It's hidden beneath the mat.

On another sheet of paper, start a numbered item list (see Figure 2). It's important that we keep track of all items in the game, by associating them with a number. It'll make our programming task much simpler.

Puzzles vs. nervous disorders.

Now, let's leave the map for a minute and concentrate on the game's actions. Get yet another piece of paper, and we'll start making a command list.

To get into the house, the player will have to find the key and unlock the door. It's up to us, the game's designers, to come up with a logical series of actions that will allow the player to do this. But we can't make things *too* easy. We want to create little puzzles that the player must solve. After all, that's half the fun. We all like to think we're clever, don't we?

How difficult should these puzzles be? That's a tough one to answer. What's extremely simple for one person, may be the cause of a nervous breakdown for another, and vice versa. There have been many times during the design of a game when I came up with a puzzle that was sadistic in the extreme.

During testing, I'd hover over the player grinning and rubbing my hands together, watching in glee for the cold sweat my ruthless program was sure to invoke upon the brow of the unfortunate gamer. Thirty seconds later, puzzle solved, he would look up and say, "Is this supposed to be a beginner's game?"

We all think differently and approach problems in our different ways. The simplest of problems can stump us forever, if we happen to start off on the wrong track. As you design a game, keep a particular audience in mind (beginner, intermediate or advanced) and tailor it to those abilities. How well you succeed can only be determined through repeated playtesting.

Okay, off the soapbox and back to the command list. The series of commands that will get our player into the house is: *N, MOVE MAT, GET KEY, UNLOCK DOOR*, and *GO DOOR*. (Note that we'll be using one-letter commands for all directions.) Keep track of all commands by listing them on your command sheet.

The puzzle here is fairly simple (I think). When the player tries to get into the house, he'll be told that the door is locked. Where is he going to find a key? It shouldn't take too much brainpower for him to realize that there may be a key hidden under the mat.

N	D
Move Mat	D
Get Key	Get Magazine
Unlock Door	Look Magazine
Go Door	Open Magazine
Get Coat	Read Magazine
U	U
Get Flashlight	N
Look Coat	Open Window
Get Batteries	Yell ANALOG is great
Insert Batteries	

Figure 3.

Remember that I said we're going to have to be flexible? What happens if the player tries to "GO DOOR" before he unlocks it? We're going to have to cover that

possibility when we write the program, by giving the player a clue—such as *IT'S LOCKED!* if he should try to open the door without the key. We'll talk more about that in another installment.

Got it?

I don't think it's necessary to go through each command in the game with you. I'm sure you've got the idea. We just continue on as above, planning the adventure command by command, trying to anticipate the player's thoughts, and steering him in the direction we want him to take.

Figure 3 shows the complete command list we'll be using in the creation of our game. Take a good look at it. Keep in mind that this is only the game's solution, *not* every possible command the player may use.

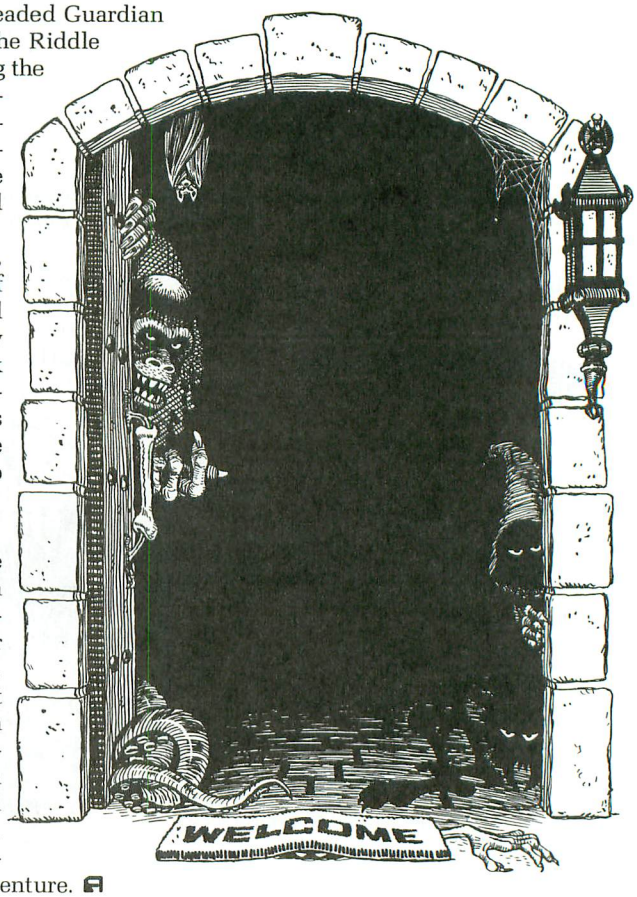
As we get further into the design of our adventure, we'll have to provide enough commands and computer responses to give our player a good sense of interaction. It's this interaction that will keep him playing. Once the player begins to feel isolated from the story, he'll have very little incentive to continue and will relegate all our hard work to the back of his disk file.

The player must feel that he's an integral part of the unfolding story, that it is *he* who tracked his way through endless desert, tricked the dreaded Guardian of the Gates, and solved the Riddle of the Pyramid, thus gaining the hand of the beautiful princess and the undying respect of a nation. This "suspension of disbelief" is the cornerstone upon which all stories are built.

Once a reader (or player, in our case) snaps out of that carefully woven spell and realizes that he's only flipping the pages of a book or typing words on the keyboard, he's lost to us. What's the point in writing a game that nobody will want to play?

Class dismissed.

By now, you should have a good idea of how to plan an adventure game. Next issue, we'll start to turn our ideas into program code. Until then, take that great adventure idea that's been in your mind and start planning it. Make a map with exits and items noted, and compose a command list. That done, you've really begun writing your first adventure. A



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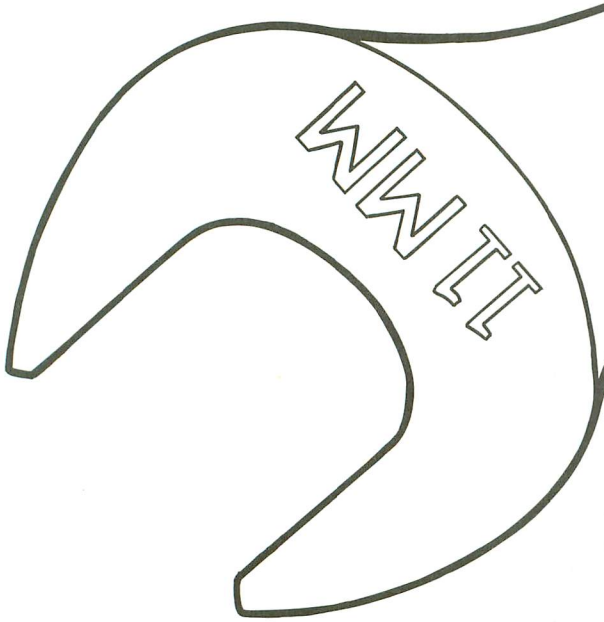

Utilities for the Atari 520ST

by Arthur Leyenberger

Utility programs are a very important part of making your Atari easy to use. They run the gamut from disk repair programs to font editors, to printer drivers, to file format converters. Many are extremely useful and can save you hours of tedious work or frustration.

This article will briefly describe some of the utilities currently available for the Atari 16-bit computer: the 520ST. Naturally, not every utility program ever made will be mentioned here. My apologies if I left out your favorite. However, the programs mentioned here have either been used by me or are generally recognized as useful programs.

Although the 520ST has been available for a relatively short time, there have been numerous utility programs created for it. First, I'll cover the commercially available programs, then mention a few available public domain programs.

As you probably already know, the Atari 520ST uses what's called a "desktop metaphor." This means that the computer screen resembles something you're already familiar with: a desktop. When TOS is booted up, two disk icons appear as file drawers, and a trash can icon is available to "throw out" your unused files. All this comes together via the mouse. Files are pointed at, dragged, "clicked on" and otherwise manipulated by rolling the mouse around on your "real" desk.

This is wonderful for the first-time user, who doesn't want to be burdened by having to know a bunch of difficult-to-remember operating system commands. If you want to copy a disk, simply drag one disk icon on top of another, instead of typing something like *COPY A:*.*b:*.

Well, all this pointing and clicking actually gets to be a nuisance for the experienced user. The experienced user (who did start out as a novice), wants a command processor, or a way to type in commands without having to come near that rodent. The experienced user wants something like **Micro C-Shell**.

Micro C-Shell, written by David Beckemeyer of Beckemeyer Development Tools, is a Unix-like shell that provides a command processor, a C compiler and a linker. The C compiler and linker are meant to be used with the Allcyon C language provided by Atari in the developer's kit. What I'm most excited about is the **C-Shell**. Regardless of your feelings about Unix, Beckemeyer's shell environment is excellent.

What makes it so useful is the power available to you. Directory listings can easily be made for entire disks, individual subdirectories (folders) or all subdirectories on a disk. One of the many useful features of the shell is redirection, which means sending the output of a command to some place other than its usual destination.

For example, you may want to create a file on your disk to contain a listing of all the files on that disk. This is easy with **C-Shell**. Simply issue the directory listing command and redirect the output (list of files) to a file, rather than to the screen.

Another very powerful feature is the ability to use command synonyms. The Unix command for a directory listing is *ls*, but you may find that difficult to remember. To create a synonym for the command, you would type *alias dir ls*, if you'd like *dir* to be your directory listing command.

As many synonyms as you like can be created and, placed in a special file, they're automatically loaded when the shell is executed. The author provides two synonym files on the disk: an MS-DOS and CP/M group of synonyms.

Other useful commands include: *CP* (copy), *MV* (for moving or renaming files), *RM* (remove, delete a file), *CAT* display file contents), *DF* (disk free, amount of available space on disk), *GREP* (search one or more files for a specific string), *HISTORY* (lists the last fifty commands issued), *MORE* (a filter for displaying the contents of a file, one screen at a time), PR and LPR (print commands) and *WC* (for counting the number of characters, words or lines in a file). The **C-Shell** also contains commands for creating, removing and changing directories.

Micro C-Shell (from David Beckemeyer Development Tools, 592 Jean Street, #304, Oakland, CA 94610—(415) 658-5318 evenings) lists for $50 and comes

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ST Utilities *continued*

with a reference guide and tutorial. A nondeveloper's version of the program is available for $25. It's similar, but lacks the C language utilities. There are additional documentation files on the disk. Fortunately, the disk is not copy protected, so you can place the shell on every TOS disk you own.

I haven't mentioned all of the features of **Micro C-Shell**, due to space limitation. However, I do think that the more you use it, the more you'll find uses for it.

Overall, I highly recommend **Micro C-Shell** as an alternative to the GEM desktop, and as a way for experienced (or soon-to-be-experienced) ST users to get more out of their computers. David Beckemeyer has not only authored an excellent product, but has also provided a true value for the ST user.

There's a relatively new company making utility programs for the 520ST, a company called MichTron. Although they've been around for a couple of years making software for the Sanyo computer, few Atari users know of them. With the introduction of several useful programs for Atari, MichTron will no longer be an uncommon name. The first of their utility programs is called **M-Disk**.

M-Disk is a ramdisk for the ST. Like other ramdisk programs, it takes a portion of your computer memory and uses it to simulate a disk drive. You can write to or read from the ramdisk just as you would with a real hardware disk drive. The major benefit of a ramdisk is that the "electronic" disk drive is much faster, almost instantaneous. The only *caveat* is that, if your computer loses power, whatever you had in the ramdisk will be lost.

The maximum theoretical size of the **M-Disk** ramdisk is 800K of memory, if that much is available. However, with TOS on disk, the maximum ramdisk you can use is about 100K if you *don't* use the GEM desktop accessories (control panel, VT52 terminal emulator, and the printer and RS-232 configure programs). If you do have the VT52 terminal program and the control panel accessories on the disk at boot time, 62K of memory is available. Of course, when TOS is put in ROM, you will be able to use as much memory as the computer has available.

M-Disk's instructions tell you how to set up your disk for automatic installation, using the AUTO folder. With this procedure performed once for each disk, you'll be asked to select the size of the ramdisk (up to the maximum available) each time TOS is booted up.

If you decide not to use the ramdisk for any particular ST session, answering *0* bytes will cancel the installation. The instructions also include information on how to create a "disk C:" icon, to be saved as part of the desktop and appear each time TOS is loaded.

M-Disk costs $40 and is a handy utility program. A ramdisk is particularly useful when you download files from information services and bulletin boards. It's faster and gives you a chance to decide where you want to put the file after you've downloaded it. **M-Disk** is sold by MichTron, 576 S. Telegraph, Pontiac, MI 48053—(313) 334-5700.

MichTron doesn't copy protect **M-Disk** (or their other utility programs). Therefore, you can put it in on as many disks as you want. Not copy protecting the program makes it all the more useful.

MichTron Utilities is a full-featured disk editor with additional utilities built in. **MichTron Utilities** gives you complete access to your computer's memory, its disk and file contents, and it lets you display data in either hex or ASCII format on the screen. It also allows you to recover erased files and fix disk errors. A sector copier is included with the program, too. The copy program is also available separately for $30 and is called **Mi-Dup**.

MichTron Utilities has even more capability. A high-speed disk copier, Super Backup, allows you to back up any disks, even those copy-protected. Disk volume labels or data and time stamps can also be changed with the program. Finally, a double-sided boot disk sector is supplied, so that you can copy the program to any double-sided disk, add the TOS files, and have a double-sided boot disk. **MichTron Utilities** is $60 and is not copy protected.

MichTron also produces **Soft Spool**, a software print spooler that lets you continue to use your computer, even as it is sending output to the printer. Instead of waiting for your printer to finish getting its output from the computer, **Soft Spool** allows you to resume normal activity, by creating a buffer located in RAM. The buffer accepts all output destined for the printer, returns the computer to normal operation and slowly feeds the data to the printer. **Soft Spool** costs $40 and is not copy protected.

MichTron also has a fast disk duplicator program for $80. Called **Mi-Copy**, this program reads the disk you wish to copy and determines how many tracks are being used. It then formats and copies only what's necessary to the new disk, dramatically improving the speed of disk duplication. As long as TOS is on disk and must reside in RAM memory, **Mi-Copy** will only copy programs that use less than 187K.

MichTron deserves a lot of credit, not only for being the first company with utility programs out for the ST, but also for having quality programs. In addition, their policy of not copy protecting their utility programs is laudable and should be honored—by not giving, lending or receiving their software. The utilities are reasonably priced, offer good value and show MichTron's commitment to the Atari ST.

Mirage Concepts has a new utility program called **Holmes and Duckworth Tool Box Volume One**. In addition to being quite a mouthful to pronounce, **H&D Tool Box** is a group of programs that let you recover deleted files, save a directory listing to a file, access and change any area of RAM, change information on any disk sector or file, and perform a fast disk copy.

The disk copy program formats and copies a complete disk in a little less than two minutes, when used with two disk drives. This compares to about two and one-half minutes for the normal procedure (first formatting a disk, then copying another disk to it).

Data can be displayed in ASCII, hex, decimal or binary. You can print the contents of the screen in either hex or ASCII. In file mode, a string search can also be performed, to locate specific contents of the file.

Unlike the ill-fated **Express** letter processor, also from Mirage, **H&D Tool Box** has been thoroughly tested and completely thought out before its release. The programs work as advertised, and they have a professional feel. Further, since the disk isn't copy protected, and the various programs are separate, you can copy whichever programs you want to work disks, as your needs dictate. Having the fast format and copy program on every disk you own will make copying chores much easier.

What don't I like about **H&D**? First, the programs work only on single-sided disk drives. This is because Mirage didn't have double-sided drives when the program was being developed. However, by the time you read this, an upgrade will be available (for under $10) that will work with double-sided drives.

The other problem I have with **H&D Tool Box** is that, in the disk file/sector editor there is no undo function. As you change the file or sector contents, it happens immediately. If your elbow happens to rest on the keyboard, it will change the contents. Clearly, an undo function or definite "end edit" command should be available, to undo what you just did.

Holmes and Duckworth Tool Box retails for $40, from Mirage Concepts, 4055 W. Shaw, #108, Fresno, CA 93711—(209) 227-8369. A seven-page manual is included on the disk, as a file. With this program, Mirage has demonstrated that they can write decent code. The programs were written in their own version of FORTH, which will be available as a separate product shortly.

Hippopotamus Software has produced a number of programs for the ST. These range from moderately to somewhat useful. Unfortunately, Hippo Software has decided to copy protect all of their products. Their method of doing so requires that the original disk always be used to boot up, and that it be placed in drive A. Supposedly, once the program has been executed, and you have used one of the functions, you can swap out your original disk with a backup copy.

I've gotten "bullish" on copy protection in my old age. I find it a royal nuisance to have to do all of this disk swapping with the key disk system used by Hippo. I'm also extremely paranoid about using the original copy of a program for regular, day-in and day-out use. If the disk drive eats the disk, or the cat messes on it, I'm out of luck.

However, I have nothing against copy protecting games. If a game disk happens to join that great arcade in the sky, I can get along without that game until I get another copy from the manufacturer. But for application software or utilities, there's no excuse for copy protection. Copy protection on this kind of software severely limits the usefulness of the program. Another problem with copy protected software is that it cannot be transferred to a double-sided disk to save disk usage.

Anyway, on to the Hippo utilities. **Hippo Spell** is a spelling checker which works with every type of file currently used by word processors on the 520ST. It's compatible with **HabaWriter, ST-Writer, Express, Regent Word 1** and **Final Word**. It accepts files in each of these word processor file formats, or in ASCII format.

Hippo Spell contains a 30,000-word dictionary, allows you to create your own dictionary and costs $40. Since it's the only currently available spelling checker for the ST, I won't be too critical. However, in case one or two others become available by the time you read this, let me make a few observations.

Hippo Spell is relatively fast. If you're used to using a spelling checker like **Spell Perfect** on the Atari 800, you will be pleased with the speed of the ST program. If you're familiar with a program like **CorrectStar** on the IBM PC (or compatibles), you'll be disappointed with **Hippo Spell**, for a number of reasons. First, it's not as fast. Second, it doesn't show the word in the context of the sentence, so you have no idea how a particular word was used—unless, of course,

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you already have a hard copy of your document to refer to. Third, although **Hippo Spell** uses the features of GEM (drop-down menus and dialog boxes), the choices in the dialog boxes are absurd.

Most GEM applications for the ST will present a dialog box with two choices: *OK* and *CANCEL*. Regardless of the current function, these two choices make sense. But **Hippo Spell** and the other Hippo utility products use *YES* and *NO*. If you saw a dialog box on your ST screen that read *No Errors Detected: YES, NO*, what would you think it meant? It beats me, too. Only by trial and error can you figure this stuff out. A real knucklehead user interface, if you ask me.

Hippo Spell won't let you abort the spelling check, either. I, at least, couldn't find out how to do it in the skimpy 2-page documentation file on the disk. On the right side of the ledger, **Hippo Spell** offers some additional features. Not only can you get a word count of the file you're checking, but you also get a list of how many words start with each letter of the alphabet (a feature of dubious value).

Next, a tally of words of different lengths is given. This may be useful if you want to compute the readability index of your document, although it's not discussed in the "manual." You also get a word frequency list, showing the least common, most common and variety of words in your file. **Hippo Spell** costs $40.

A final note: in the process of using **Hippo Spell**, I somehow trashed the disk. Now, whenever I try to run the spelling checker program, I get a message saying the disk in the drive is damaged. It wasn't until I got another original copy of the disk (not the backup the instructions told me to make) and copied the first sector off the good disk, that I got the program to work again.

Hippo also publishes disk utilities for the ST (**DUST**). **DUST** provides a number of features, including the ability to examine and modify the contents of a file, disk or computer memory. The contents of each of these is displayed in both hexadecimal and ASCII.

A familiar GEM window contains a vertical slider, to enable you to move throughout the data. In addition, portions of the data can be saved to a scrap buffer, then copied to another disk.

DUST file commands include: recovery, find, copy, rename, delete, show, print and wipe. Since a file that's deleted can sometimes be recovered, the wipe command completely clears out the entire contents of the file—so that it can never be recovered, by you or anyone else.

I was told by another ST user that I could have the sector copy command create a double-sided boot disk, by taking the first track of a single-sided boot disk and copying it onto a double-sided disk. Then, all I had to do was copy the TOS files over to the new disk, and I would be all set. After spending hours trying to accomplish this, I still couldn't do it.

The documentation consists of eight files on the disk, covering commands, the track and sector editor, disk structure and memory map. Unfortunately, the files aren't very complete. For example, the disk structure information was interesting, but it lacked the technical detail to be truly useful. **DUST** sells for $50, from Hippopotamus Software, Inc., 985 University Avenue, Suite 12, Los Gatos, CA 95030—(408) 395-3190.

The **Hippo Ramdisk** (see the review, page 63) sells for $35 and is similar to the ramdisk offered by MichTron. It, like all of the Hippo software, is copy protected, and the documentation consists of one file on the disk. One of the things I don't like about this ramdisk is that you have to do a lot of work each time you want to initiate the ramdisk.

Using drop-down menus, you choose which drive has the necessary files, how big to make the ramdisk (which only comes in increments of the powers of 2) and put up with those knucklehead dialog boxes. If you choose a ramdisk size that's too large, you won't find out until you try to run another program. This requires a trial and error approach— unacceptable.

In contrast, MichTron's **M-Disk** program automatically installs itself, tells you how much memory is available for a ramdisk, and allows you to specify any integer size you want. If you're in the market for a ramdisk (and they *are* useful), I would definitely recommend the MichTron product over the Hippo product.

Hippo's disks are copy protected and somewhat "buggy." For example, using the **Disk Utility** program and trying to write to a write-protected disk results in the *Disk Error #14, YES/NO*. To clear the error, you have to click on the NO box eight times. This happens consistently. And what is *Error #14*, anyway? I suggest you seriously consider the problems that these bugs may cause you —before you buy the program. Perhaps, by the time you read this, Hippo will have the bugs worked out.

Another source of utility programs for the ST is on information services: **ANALOG**'s TCS, CompuServe, Delphi and The Source, and on bulletin boards across the country. Two particularly useful or interesting programs can be found on CompuServe and on the ***ANALOG*** TCS. **Print** lets you print any file to an Epson or Epson-compatible printer, in a neater format than the GEM print command provides.

The format of the output can be left-aligned, with a left margin of 1. The format can also be in "book" form, with a wide left margin, condensed print and paginated with top and bottom margins. The **Print** utility also offers a page eject command.

Another program available through a number of sources is a calculator program. Although not a desk accessory, this handy 4-function calculator is used with the mouse. It was written by Robert Birmingham of the Dade Atari User Group in Miami, Florida. Thanks, Robert, for a nice program.

SQ and **UNSQ** are a pair of programs that can also be found on the **ANALOG** TCS bulletin board and others. These programs squeeze your files to about one-half of their original size.

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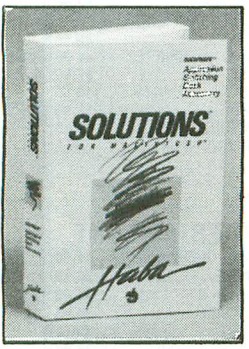

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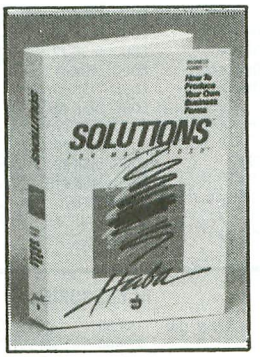

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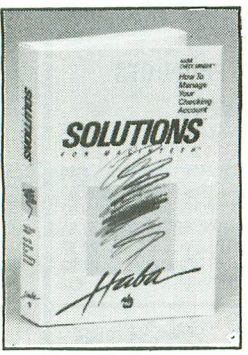

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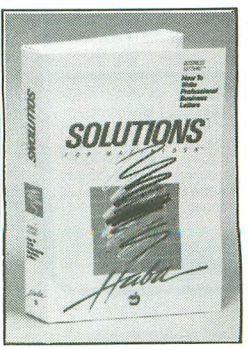

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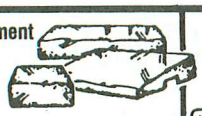

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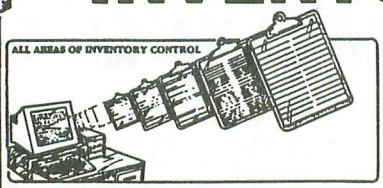

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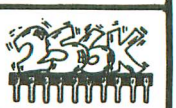

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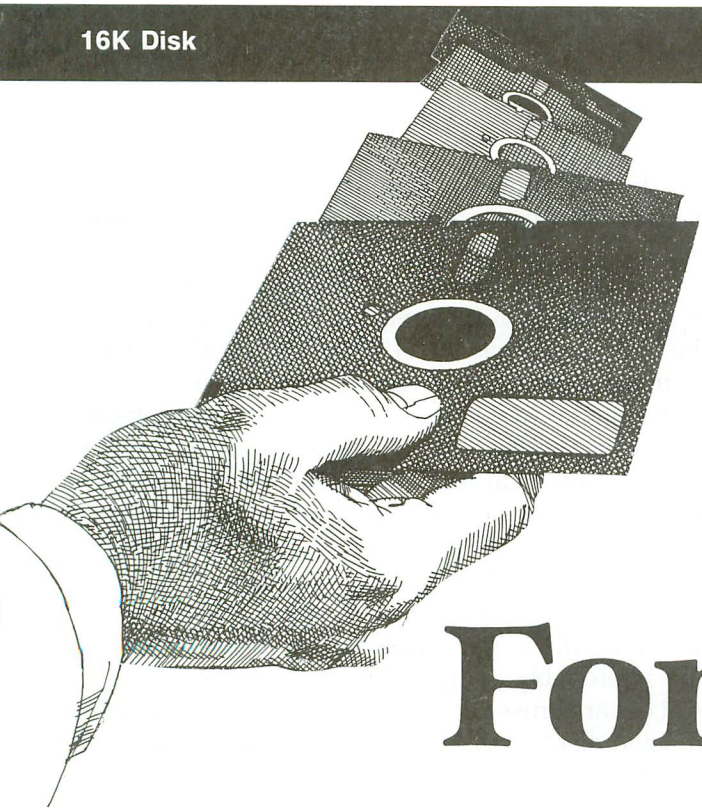

Formatter

by Rich Moore

You just sat down at your Atari to do some serious disk management work. You have two boxes of brand new disks which need to be formatted (both sides, of course), a half-dozen or so disks which have now useless files on them, and a couple of disks with bad sectors which you intend to salvage.

Rather than go through the multiple queries usually encountered when initializing disks, you load FMT.COM and do each operation with a single CTRL-key combination. Already-formatted disks are "cleared" by simply clearing their directories, and disks with bad sectors are reformatted for DOS files with the bad sectors masked out. Disks without DOS.SYS are given a special boot sector routine which eliminates the boot error messages and repeating coldstarts that the OS normally gives when you attempt to boot up an unbootable disk.

Using Formatter.

Formatter was created for use with DOS XL—hence the name FMT.COM for the object code file. It works just as well with standard Atari DOS and OSS A/+, and may be renamed as desired. To use it, simply perform a binary load of the program and press the desired keys. All functions except drive selection and quit (which are "safe" functions), require a CTRL-key combination as a means of prevent ing accidents. After the program is loaded, the following prompt appears:

```
1 Fmt XDOS Both Zero Clr Quit
```

The first character of each word in the prompt is highlighted in inverse video, to indicate the key which initiates the corresponding function. Place the desired disk into your working drive, then proceed:

(1) press 1-4 to change the working drive; (2) CTRL-F DOS-formats the disk; (3) CTRL-W writes DOS.SYS (but not DUP.SYS) to the disk; (4) CTRL-B both formats and writes DOS to the disk; (5) CTRL-Z formats all zero sectors (except sector one); (6) CTRL-C clears the disk directory; and (7) Q or CTRL-Q quits to DOS.

The routine will give an audio buzz, to prompt you that it's ready for another command.

Creating FMT.COM from BASIC.

Listing 1 is a BASIC program which will create the object code file FMT.COM. Type it in and save it to disk before RUNning it. RUN the program, and it will first check to ensure that it was properly entered, then prompt you to insert the disk on which you want the object code file. It will then write out FMT.COM for you to use. Any typing entry errors will be identified by a message referencing the data statement wherein the error occurs.

Listing 2 is assembly source code for the Atari Mac-

ro Assembler (AMAC). My apologies to those who like hexadecimal numbers.

Drive selection.

Press one of the number keys 1-4 to select which drive you want to use with **Formatter**. The prompt will change to indicate the active drive.

General initialization.

CTRL-F formats a disk for DOS 2.0S and any compatible file management system. CTRL-W writes DOS.SYS for whatever file manager is resident in the computer at the time. DUP.SYS for Atari DOS 2.0S is *not* written out by this routine. CTRL-B will first format a disk for DOS, then write out DOS without an intervening keystroke. CTRL-Z formats the disk, but leaves sector 360 (the Volume Table of Contents) alone, so that all sectors (except sector one) contain all zeroes as a result of formatting via SIO. Both types of formatting are insensitive to bad sectors and will display bad sector numbers on the screen if they're encountered. CTRL-C writes zero sectors to sectors 361-368 and resets all bytes in sector 360 to the same values they have when just formatted for DOS. CTRL-Q or Q returns the user to DOS or DUP, as appropriate. **Formatter** begins at address 13312 (hex $3400) and may be re-entered by electing to RUN AT ADDRESS from DOS/DUP.

Formatting disks with bad sectors.

The major feature of **Formatter** is its ability to format disks with bad sectors, similar to Charles Bachand's **Burp!**, which appeared in **ANALOG Computing**'s issue 9 and the **ANALOG Compendium**. It uses the bad sector data returned by the disk drive to clear corresponding bits in the Volume Table of Contents (VTOC) map of used/available sectors, effectively removing them from use by DOS. An inverse video file "bad sectors" is set up in the disk directory, with a length equal to the number of bad sectors on the disk. When the disk is formatted, a list of bad sectors encountered will be displayed on the screen.

Unlike **Burp!**, **Formatter** does not consider errors in formatting sectors 1-3 (DOS boot sectors) or 360-368 (VTOC and directory) as fatal to the use of the disk. Loss of sectors 1-3 doesn't prohibit you from using the disk strictly for files, including nonbooting software. Loss of sectors 360-368 doesn't affect the disk's ability to handle boot software, which usually requires less than the first 100 or so disk sectors and rarely extends above 200 sectors.

Loss of sectors 362-368 doesn't preclude the use of a disk for up to eight DOS files for each contiguous directory sector, beginning with 361. Since the bad sectors are printed out, you may judge for yourself how best to use the disk.

Loss of sector 360 (VTOC) *will* preclude the use of a disk for DOS files. Should this occur, reformat the disk. Bad areas on a disk are physically located on tracks, but are otherwise independent of the "soft-sectoring" of the drive—which writes sector headers on the disk beginning at (more or less) random locations on each track, each time it is formatted. Reformatting the disk will almost always give you a different set of "bad sectors," providing a *means of* recovering use of most disks.

A bit of philosophy: when bad sectors start showing up on disks, something is very likely going bad and is probably going to get worse. Drive problems will occur across all disks; disk problems on just the affected disks. A disk which is going bad should not be used for anything important, or you risk losing it.

Clearing disk directories.

It isn't necessary to either reformat a disk or to Delete/ERAse all disk files, to regain all the space on a disk for DOS files. DOS uses the VTOC on sector 360 and flags in the directory entries in sectors 361-368, to determine what sectors are available for files. It's only necessary to set these nine sectors to their "freshly formatted" states to effectively clear the disk. While this doesn't actually clear the files themselves from a disk, it makes them inaccessible by all but the most extraordinary techniques. You should consider a disk with a cleared directory as empty.

Note: a disk with bad sectors should *not* have its directory cleared with this routine. It should either have all files deleted by the file management system, or be reformatted with CTRL-F; otherwise, the bad sectors on the disk won't be masked out in the VTOC.

Boot Sector.

Whenever a disk is booted by the computer, sector one is read and processed according to data in the first 6 bytes of that sector, which usually include reading additional sectors as part of the initial boot process. When DOS.SYS is written to a disk, it sets up sector 1 so that sectors 1-3 are read in, and the remainder of DOS in the file DOS.SYS is loaded and executed.

If a bootable program is not present on the disk, you get the repeating *boot error* message on the screen, as the computer continually attempts to boot the disk. **Formatter** eliminates this problem by writing a single-sector routine to sector one whenever the disk is formatted (DOS format or all zero sectors),

or the disk directory is cleared. This program will wait for the user to press SYSTEM RESET after it displays the following prompt:

```
No DOS.SYS: press [RESET] to re-boot
```

Error messages.

Errors other than formatting bad sector errors are displayed on the screen and the prompt reprinted. Errors are accompanied by a buzz to draw your attention to them.

Rich Moore is a Naval Flight Officer and Data Manager for the Naval War College's computer wargaming system in Newport, Rhode Island. His principal computer interests are systems and utilities programming.

Listing 1.
BASIC listing.

```
10 REM --- FMT.COM ---
30 TOTAL=0:PASS=0:DATA 0,1,2,3,4,5,6,7
,8,9,0,0,0,0,0,0,0,10,11,12,13,14,15
40 DIM DAT$(91),HEX(22):FOR X=0 TO 22:
READ N:HEX(X)=N:NEXT X:LINE=990:RESTOR
E 1000:TRAP 120:? "CHECKING DATA"
50 LINE=LINE+10:? "LINE:";LINE:READ DA
T$:IF LEN(DAT$)<>90 THEN 220
60 DATLIN=PEEK(183)+PEEK(184)*256:IF D
ATLIN<>LINE THEN ? "LINE ";LINE;" MISS
ING!":END
70 FOR X=1 TO 89 STEP 2:D1=ASC(DAT$(X)
)-48:D2=ASC(DAT$(X+1))-48:BYTE=HEX(D1)
*16+HEX(D2)
80 IF PASS=2 THEN PUT #1,BYTE:NEXT X:R
EAD CHKSUM:GOTO 50
90 TOTAL=TOTAL+BYTE:IF TOTAL>999 THEN
TOTAL=TOTAL-1000
100 NEXT X:READ CHKSUM:IF TOTAL=CHKSUM
 THEN 50
110 GOTO 220
120 IF PEEK(195)<>6 THEN 220
130 IF PASS=0 THEN 180
150 RESTORE 995:FOR I=1 TO 6:READ B:PU
T #1,B:NEXT I:END
180 ? "INSERT DISK WITH DOS, PRESS RET
URN";:DIM IN$(1):INPUT IN$:OPEN #1,8,0
,"D:FMT.COM"
190 RESTORE 990:FOR I=1 TO 6:READ B:PU
T #1,B:NEXT I
210 ? :? "WRITING FILE":PASS=2:LINE=99
0:RESTORE 1000:TRAP 120:GOTO 50
220 ? "BAD DATA: LINE ";LINE:END
990 DATA 255,255,0,52,176,55
995 DATA 224,2,225,2,0,52
1000 DATA A2E4A036A9298DF00220D7836A0FF
8CFC02ADFC028DDD36C9B8F066C9AEF041C995
F05EC997F05AC992F038C9AF,847
1010 DATA F020C92FF01CA205CAF0D9DDDE36
D0F88A8DE3361869308D0E3709808DE6364C00
34A9008DF0028CFC02A217A0,342
1020 DATA 37A9024C78364C1436A07FA90099
01148810FAA9702098362OC836CE0A03AD0A03
C968D0F3F032A647A448A900,898
1030 DATA 209C36A9218D0203A9408D0303A9
A08D06032059E41015C090D00EA001A9FFC147
D009D147D005A0904C4936A0,517
1040 DATA 7FA90091458810FBA063A9FF9145
88C00AD0F9A207BC3F37BD47379145CA10F5A0
008C3C378C3B378CDE36A906,849
1050 DATA 8D3A37ADDD36C992D0034CB835B1
47C9FFD00AC8B147C9FFD0034C9A35ADDE36D0
0CA226A037A9108DDE362078,580
1060 DATA 36EE3C37A920A2039D3637CA10FA
CE3A37D00EA2E4A036A901207836A90A8D3A37
AC3B37B14785D48D3D37C8B1,554
1070 DATA 4785D58D3E3720AAD920E6D8A0FF
C8B1F399363710F8297F993637A236A037A904
207836A900A0034E3E376E3D,625
1080 DATA 376A88D0F62A2A2A2AA8A9FF186A
8810FC48AD3D3718690AA86831459145A003B1
4538E9019145AC3B37C8C88C,513
1090 DATA 3B374CEE34AD3C37F012A201AD3A
37C90AF001E88AA226A037207836ADDD36C997
F04DA645A446A968209C3620,564
1100 DATA C836AD3C37F035A07FA900990114
8810FAA00FB923370980990114810F5A9608D
0114AD3C378D0214A9008D03,780
1110 DATA 148D04148D0514A96920983620C8
36ADDD36C995F00FA24FA037A901209C3620C8
364C0034208E36A9039D4203,890
1120 DATA A90D9D4403A9379D4503A90B9D48
03A9009D49039D4B03A9089D4A032056E48CDD
36208E36ACDD3630034C0034,828
1130 DATA 84D4A90085D520AAD920E6D8A002
A9209920378810FAC8B1F399203710F8297F99
2037A217A037A90E2078364C,986
1140 DATA 00348E44038C45038D4803A2008E
4903A90B8D42034C56E4A270A90C9D42034C56
E4A201A0148E04038C0503A2,712
1150 DATA 808E0803A2008E09038D0A03C901
F001E88E0B03A9078D0603A9318D0003ADE336
8D010360AD79078D0203A980,421
1160 DATA 8D03032059E410EF68684C49362F
001F1E1A18019B20B12020C66D742020D7444F
532020C26F74682020DA6572,188
1170 DATA 6F2020C36C722020D17569749B1C
1CFD44313A444F532E5359539B9B4572726F72
202331323B9BFDFD9B9B4261,749
1180 DATA 642073656374 6F7273203A202020
2020060000000000010203040A373802C302C3
020F007F0001800477E4ADC6,428
1190 DATA 028DC802A90B85548DF002A9098D
4203A9B28D4403A9048D4503A9288D4803A200
8E49032056E44CAF044E6F20,513
1200 DATA 444F532E5359533A207072657373
20A0D2C5D3C5D4A020746F2072652D626F6F74
FD9BE002E107003400000000,970
```

●

CHECKSUM DATA.

(see page 11)

```
10 DATA 921,3,811,423,729,556,603,555,
573,694,613,30,120,549,649,7829
210 DATA 30,155,401,81,273,14,808,614,
46,61,973,924,995,905,551,6831
1110 DATA 660,753,728,524,606,616,761,
150,706,531,6035
```

●

(Assembly listing starts on next page)

Listing 2.
Assembly listing.

```
;
;                FMT.COM
;
;     Copyright 1984  H.R. Moore II
;          All rights reserved
;
;     can format bad-sectored disks
;     for DOS 2.0s, OSS A/+, DOS XL
;
;      Format, Zero and Clear all
;    write special boot to sector one
;
;-----------------------------------
;
;  Ctrl/F  to Format (with DOS VTOC)
;  Ctrl/W  to Write DOS.SYS
;  Ctrl/B  to Format and Write DOS
;  Ctrl/Z  to format all Zero sectors
;  Ctrl/C  to Clear disk directory
;  Ctrl/Q  to Quit
;
;-----------------------------------
;
;       EQUATES
;
VTOC    =   69      ;ZDRVA
FDAT    =   71      ;ZSBA
BUFFER  =   5121    ;file dir buffer
CIO     =   58454
SIO     =   58457
CRSINH  =   752
CH      =   764
KF      =   56
KW      =   46
KB      =   21
KZ      =   23
KC      =   18
KQ      =   47
CTRL    =   128
DDEVIC  =   768
DUNIT   =   769
DCMND   =   770
DSTAT   =   771
DBUFL   =   772
DTIML   =   774
DBYTL   =   776
DAUX1   =   778
DAUX2   =   779
ICCOM   =   834
ICBAL   =   836
ICBAH   =   837
ICBLL   =   840
ICBLH   =   841
FR0     =   212
IFP     =   55722   ;integer to FP
FASC    =   55526   ;FP to ASCII
INBUF   =   243
;
  ORG 13312
;
LOOP            ;print command list
  LDX #LOW MSG
  LDY #HIGH MSG
  LDA #LOW (DMSG-MSG)
  STA CRSINH
  JSR PRINT
;
  LDY #255
  STY CH
GETKEY
  LDA CH
  STA SAVE
  CMP #CTRL+KF  ;'F'ormat
  BEQ ZERO
  CMP #CTRL+KW  ;'W'DOS
  BEQ JWD
  CMP #CTRL+KB  ;'B'oth
  BEQ ZERO
  CMP #CTRL+KZ  ;'Z'ero
  BEQ ZERO
  CMP #CTRL+KC  ;'C'LR
  BEQ CLR
  CMP #CTRL+KQ  ;'Q'uit
  BEQ QUIT
  CMP #KQ
  BEQ QUIT
;
  LDX #5        ;set up for drive #
D1              ;change check
  DEX
  BEQ GETKEY    ;no table entry
  CMP DRNO-1,X  ;match A with table, X
  BNE D1        ;indexes drive
  TXA           ;X is requested drive
  STA DRV       ;save for SIO
  CLC
  ADC #48       ;convert to ASII
  STA DMSG+1    ;update Dx:DOS.SYS
  ORA #128      ;inverse video for
  STA MSG+2     ;screen line
  JMP LOOP
;
QUIT
  LDA #0        ;turn off cursor
  STA CRSINH
  STY CH
  LDX #LOW EMSG  ;skip two lines for
  LDY #HIGH EMSG ;return to DOS
  LDA #2
  JMP PRINT
;
JWD
  JMP WDOS
;
CLR
  LDY #127      ;zero buffer
  LDA #0
C1
  STA BUFFER,Y
  DEY
  BPL C1
;
  LDA #LOW 368 ;set up and write zero
  JSR SETFD     ;buffer to sectors 361
C2              ;through 368
  JSR WSIO
  DEC DAUX1
  LDA DAUX1
  CMP #LOW 360
  BNE C2
  BEQ SETV      ;write "empty" VTOC
;
ZERO            ;format all zero sectors
  LDX FDAT
  LDY FDAT+1
  LDA #0
  JSR SETUP
  LDA #33       ;Format
  STA DCMND
  LDA #64       ;SIO receive data
  STA DSTAT
  LDA #160      ;timeout for format
  STA DTIML
  JSR SIO
  BPL SETV      ;continue if no error
  CPY #144      ;device done error?
  BNE JERR      ;no - show error
  LDY #1
  LDA #255      ;check for bad sectors
  CMP (FDAT)    ;write VTOC if bad
  BNE SETV      ;sectors - else pass
  CMP (FDAT),Y  ;error
  BNE SETV
  LDY #144
JERR
  JMP ERROR
;
SETV            ;set up standard VTOC
  LDY #127      ;clear VTOC bytes
  LDA #0
V1
  STA (VTOC),Y
  DEY
  BPL V1
;
  LDY #99       ;set all sector map
  LDA #255      ;bits to "free" state
V2
  STA (VTOC),Y
  DEY
  CPY #10
  BNE V2
;
  LDX #7        ;set type, MSN, NSA
V3              ;and reserve
  LDY SPEC,X    ;boot/directory
  LDA SPEC+8,X  ;sectors
  STA (VTOC),Y
  DEX
  BPL V3
;
  LDY #0        ;initialize bad sector
  STY NBAD      ;counter and pointer
  STY BSPTR
  STY BFLG
  LDA #6        ;and bad sector print
  STA PC        ;counter
  LDA SAVE
  CMP #CTRL+KC  ;direct write if Clear
  BNE BADCHK    ;Directory command
  JMP W1A
;
BADCHK
  LDA (FDAT),Y ;check for bad sectors
  CMP #255      ;two "255" bytes mark
  BNE BAD       ;end bad sector data
  INY
  LDA (FDAT),Y
  CMP #255
  BNE BAD
  JMP WVTOC
;
BAD
  LDA BFLG      ;print initial message
  BNE PRB       ;for bad sectors
  LDX #LOW BMSG
  LDY #HIGH BMSG
  LDA #16
  STA BFLG
  JSR PRINT
;
PRB
  INC NBAD      ;increment counter
  LDA #' '      ;blank out sector
  LDX #3        ;number buffer
P1
  STA BSB,X
  DEX
  BPL P1
;
  DEC PC         ;if bad sector list
  BNE P2         ;at end of line, then
  LDX #LOW MSG   ;go to next line and
  LDY #HIGH MSG  ;reset counter
  LDA #1
  JSR PRINT
  LDA #10
  STA PC
P2
  LDY BSPTR      ;list bad sectors to
  LDA (FDAT),Y   ;screen and place in
  STA FR0        ;SECNO to mark VTOC
  STA SECNO
  INY
  LDA (FDAT),Y
  STA FR0+1
  STA SECNO+1
  JSR IFP
  JSR FASC
  LDY #255
P3
  INY            ;move ASCII to
  LDA (INBUF),Y ;output buffer
  STA BSB,Y
  BPL P3
  AND #127
  STA BSB,Y
  LDX #LOW BSB
  LDY #HIGH BSB
  LDA #4
  JSR PRINT
;
MARKV           ;mark bad sectors
  LDA #0
  LDY #3
M1              ;divide sector number
  LSR SECNO+1   ;by 8, leaves quotient
  ROR SECNO     ;(byte offset) in SECNO
  ROR A         ;and remainder (bit
  DEY           ;offset) left-justified
  BNE M1        ;in A
;
  ROL A         ;"right-justify"
  ROL A         ;remainder in A
  ROL A
  ROL A
  TAY           ;remainder is counter
  LDA #255      ;set up mask to clear
  CLC           ;VTOC bit ("in use")
M2
  ROR A         ;move "0" bit
  DEY
  BPL M2
;
  PHA           ;save mask
  LDA SECNO
  CLC
  ADC #10       ;add VTOC offset to
  TAY           ;byte use as index
  PLA           ;retrieve mask
  AND (VTOC),Y  ;clear VTOC bit
  STA (VTOC),Y
;
  LDY #3        ;decrease number free
  LDA (VTOC),Y ;sectors in VTOC by 1
  SEC
  SBC #1
  STA (VTOC),Y
  LDY BSPTR
  INY
  INY
  STY BSPTR
  JMP BADCHK
;
WVTOC
  LDA NBAD      ;skip if no bad
  BEQ W1        ;sectors
  LDX #1        ;set up to print 1 EOL
  LDA PC        ;check if just put EOL
  CMP #10
  BEQ W0
  INX           ;else print 2 EOLs
W0
  TXA
  LDX #LOW BMSG
  LDY #HIGH BMSG
  JSR PRINT     ;print EOL(s)
;
W1
  LDA SAVE
  CMP #CTRL+KZ ;if 'Z'ero, then skip
  BEQ NODOS     ;VTOC to write sector 1
W1A
  LDX VTOC
  LDY VTOC+1
  LDA #LOW 360
  JSR SETUP
  JSR WSIO      ;write VTOC: sector 360
;
  LDA NBAD      ;skip if no bad sectors
  BEQ W4
  LDY #127      ;clear buffer for bad
  LDA #0        ;sector entry
W2
  STA BUFFER,Y
  DEY
  BPL W2
  LDY #15
W3
  LDA BMSG-3,Y ;move filename to buffer
  ORA #128      ;set inverse video
  STA BUFFER,Y
  DEY
  BPL W3
  LDA #96       ;mark file as locked
  STA BUFFER
  LDA NBAD      ;number bad sectors
  STA BUFFER+1
  LDA #0
  STA BUFFER+2
  STA BUFFER+3
  STA BUFFER+4
  LDA #LOW 361
  JSR SETFD
  JSR WSIO      ;write sector 361
;
W4
  LDA SAVE
  CMP #CTRL+KB ;if 'B'oth, write DOS
  BEQ WDOS      ;as well, else write
                ;special boot sector
;
;
NODOS            ;write "No DOS" routine
  LDX #LOW BOOT ;to boot sector
  LDY #HIGH BOOT
  LDA #1
  JSR SETUP
  JSR WSIO
  JMP LOOP
;
WDOS
  JSR CLOSE
  LDA #3        ;OPEN command
  STA ICCOM,X
  LDA #LOW DMSG
  STA ICBAL,X
```

```
   LDA #HIGH EMSG
   STA ICBAH,X
   LDA #11
   STA ICBLL,X
   LDA #0
   STA ICBLH,X
   STA 843,X      ;AUX2
   LDA #8
   STA 842,X      ;AUX1 - output
   JSR CIO
   STY SAVE
   JSR CLOSE
   LDY SAVE
   BMI ERROR
   JMP LOOP
;
ERROR
   STY FR0
   LDA #0
   STA FR0+1
   JSR IFP
   JSR FASC
   LDY #2
   LDA #' '
E1
   STA EMSG+9,Y   ;pad number buffer
   DEY            ;with blanks
   BPL E1
;
E2
   INY            ;move ASCII to buffer
   LDA (INBUF),Y
   STA EMSG+9,Y
   BPL E2
   AND #127
   STA EMSG+9,Y
;
   LDX #LOW EMSG  ;print error message
   LDY #HIGH EMSG
   LDA #14
   JSR PRINT
   JMP LOOP
;
PRINT
   STX ICBAL
   STY ICBAH
   STA ICBLL
   LDX #0
   STX ICBLH
   LDA #11
   STA ICCOM
   JMP CIO
;
CLOSE
   LDX #7*16
   LDA #12
   STA ICCOM,X
   JMP CIO
;
SETFD
   LDX #LOW BUFFER
   LDY #HIGH BUFFER
SETUP
   STX DBUFL      ;buffer low byte
   STY DBUFL+1    ;buffer high byte
;
   LDX #128
   STX DBYTL      ;# bytes to transfer
   LDX #0
   STX DBYTL+1
;
   STA DAUX1      ;sector low byte
   CMP #1         ;if low byte =1, then
   BEQ X1         ;high byte =0
   INX            ;else high byte =1
X1
   STX DAUX2        ;sector high byte
;
   LDA #7
   STA DTIML      ;time-out in seconds
;
   LDA #49        ;set Disk for SIO
   STA DDEVIC
   LDA DRV        ;get drive number
   STA DUNIT
;
S1
   RTS
;
WSIO
   LDA 1913
   STA DCMND
   LDA #128
   STA DSTAT
   JSR SIO        ;use SIO
   BPL S1
   PLA            ;preserve stack for
   PLA            ;return to DOS
   JMP ERROR
;
SAVE
   DB 0
;
BFLG
   DB 0
;
DRNO
   DB 31,30,26,24
;
DRV
   DB 1
;
MSG
   DB 155,32,'1'+128,'   '
   DB 'F'+128,'mt   '
   DB 'W'+128,'DOS  '
   DB 'B'+128,'oth  '
   DB 'Z'+128,'ero  '
   DB 'C'+128,'lr   '
   DB 'Q'+128,'uit',155,28,28,253
;
DMSG
   DB 'D1:DOS.SYS'
;
EMSG
   DB 155,155,'Error #128',155,253,253
;
BMSG
   DB 155,155,'Bad sectors : '
BSB
   DB '     '
;
PC
   DB 6
;
BBPTR
   DB 0
;
NBAD
   DB 0
;
SECNO
   DB 0,0
;
SPEC
   DB 0,1,2,3,4,10,55,56
   DB 2,195,2,195,2,15,0,127
;
BOOT
;
   LOC 1152
;
   DB 0,1,128,4
   DW 58487       ;System coldstart
   LDA 710        ;set screen color 2
   STA 712        ;and border color
   LDA #11        ;set cursor to row #11
   STA 84
   STA CRSINH
   LDA #9         ;put record command
   STA ICCOM
   LDA #LOW RMSG
   STA ICBAL
   LDA #HIGH RMSG
   STA ICBAH
   LDA #40
   STA ICBLL
   LDX #0
   STX ICBLH
   JSR CIO
B1
   JMP B1
;
RMSG
   DB 'No DOS.SYS: press '
   DC ' '
   DC 'R'
   DC 'E'
   DC 'S'
   DC 'E'
   DC 'T'
   DC ' '
   DB ' to re-boot',253,155
;
   END
```

●

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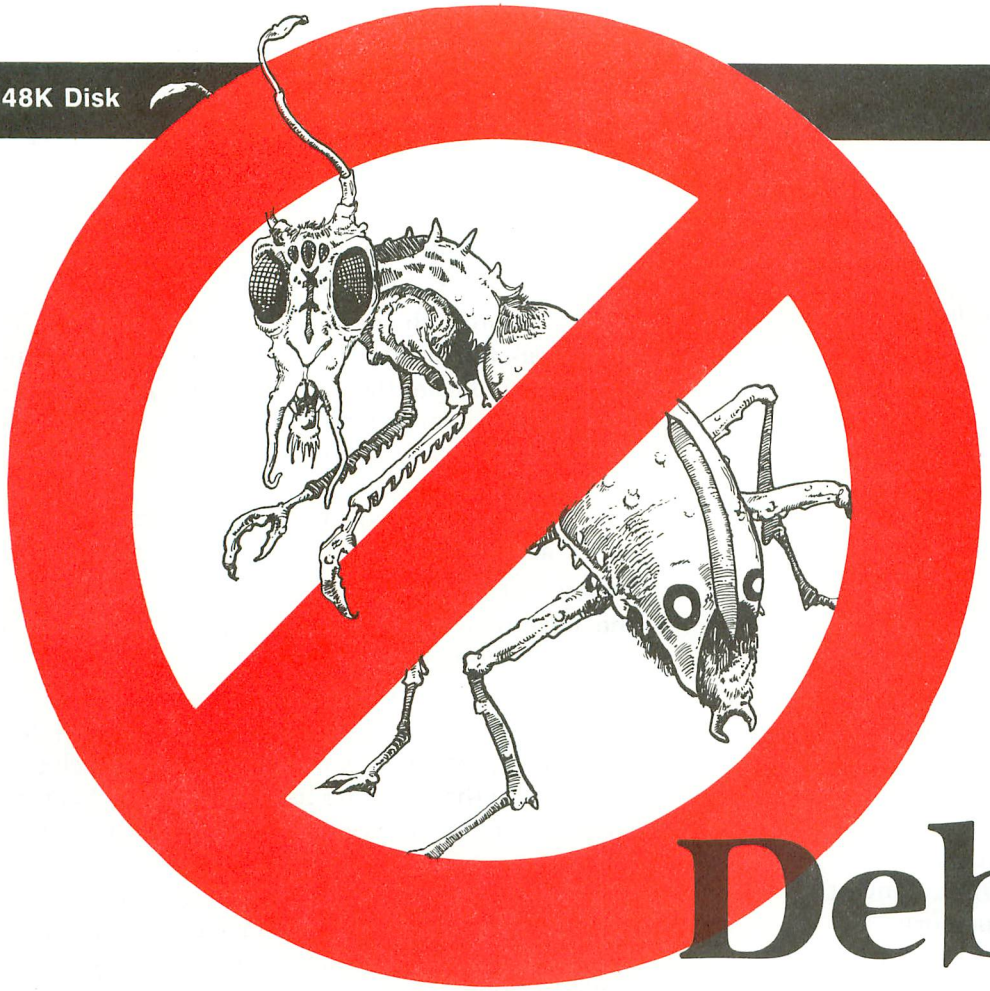

Debug+

by Bryan Schappel

Debug+ is a screen-oriented machine language debugging utility. It contains a program tracer that can step through almost any machine language program in three different ways. **Debug+** also has a complete scrolling disassembler and memory "dumper." It allows user program execution and can perform binary SAVEs and LOADs, plus many, many more functions. Sound too good to be true for a magazine program? Well, it's not. Read on!

Typing it in.

Before you start typing anything, examine the listings accompanying this article.

Listing 1 is the main data and data checking routine, written in Atari BASIC. This program will create a file called DEBUG.COM.

Follow the instructions below to create the DEBUG.COM file.

1. Type Listing 1 into your Atari and verify it with **Unicheck** (see page 11).

2. Type *RUN* and press RETURN. The program will begin checking the data lines, printing the line numbers as it goes. You'll be alerted if it finds any problems. Fix any incorrect lines and re-RUN the program as necessary, until all errors are eliminated.

3. When all data lines are correct, you will be prompted to *INSERT DISK WITH DOS, PRESS RETURN*. Place a disk in drive 1 with DOS and press RETURN. The message *WRITING FILE* will appear, and the computer will create the DEBUG.COM file, printing the line numbers as it goes. Make sure you save the BASIC program under a different filename before continuing.

To LOAD **Debug+** from Atari DOS 2.0S, go to DOS and type:

```
L
D:DEBUG.COM
```

Debug+ will LOAD and RUN automatically.

For those interested in assembly language, the OSS MAC/65 source code for **Debug+** is available on the **ANALOG Computing** TCS and is included on the disk version of this issue.

Remember, you must have the BASIC cartridge removed for **Debug+** to LOAD. For XL owners, this means you must boot up while holding down the OPTION key.

The program resides in cartridge slot A memory

locations ($A100 - $C0FF) and uses addresses $BE00 - $C0FF as screen memory. The program supports eighteen commands, which are listed below:

Key	Function
*	Address Set
D	Display Toggle
Q	Quit DEBUG+, go to DOS
G	Go at address
T	Trace program
P	Print Disassembly
E	Erase Memory
C	Change 1 byte of RAM
N	Change Register Value
R	Display Registers
B	Set/Reset Break Point
S	Save a binary file
L	Load a binary file
F	Find a string in memory
H	High Speed Display
"	Dec/Hex, Hex/Dec convert
-	Scroll up in memory
=	Scroll down in memory

Before I explain all the functions, I'd like to tell you about the prompts that **Debug+** uses. There are three basic prompts: *, ? and *(opt1,opt2,opt3)?*

When the * appears, in the input window, **Debug+** expects a number. This number may be entered in either hexadecimal or decimal. To enter a decimal number, the digits in the number must be preceded by a decimal point (a period). If the number is not preceded by a period, **Debug+** will interpret it as hexadecimal. If there are any "illegal" digits in the number, **Debug+** will respond with a short tone, and the command will be aborted.

When the ? appears, **Debug+** expects a string of characters, a filename, for example, with a maximum of twelve characters. When you reach the maximum input length, all extra characters (except DELETE, SHIFT-DELETE and RETURN) will overwrite the previous twelfth character. (I know that's hard to understand. Try it; you'll see what I mean.)

The final general prompt is *(opt1,opt2,opt3)?* When this appears in the input window, **Debug+** wants you to press one of the keys separated by commas inside the parentheses. An example of this is *(D,P)?* This asks you what device you want to use, the disk or printer. Pressing *D* specifies disk, and so on.

Display formats.

Debug+ has two memory display modes: disassembly and memory dump.

A disassembled line looks like this:

```
ADDR  OP  B1  B1  xMNE
```

where *ADDR* is the address, *OP* is the op code, *B1* and *B2* are the operands, and *xMNE* is the mnemonics. The *x* indicates the direction of a relative instruction (branch instruction). If the arrow points up, it's a backwards branch; and if the arrow points down, it's a forward branch.

A memory dumped line looks like this:

```
ADDR  B1 B2 B3 B4 B5 B6 123456
```

where *ADDR* is the address, *B1-B6* are the values in the locations, and *1-6* are the ATASCII character representations of the values.

Commands.

To use one of the commands in the table printed at left, just press the key on the keyboard which corresponds to the character listed under "key." For instance, to update the register display line, just press the *R* key.

Address set (*). This is how you tell **Debug+** where your disassembly or memory dump will begin. After entering your address, **Debug+** will display the contents of the specified location.

Display toggle (D). This command will flip the screen between disassembly and memory dump, and vice versa.

Quit DEBUG+ (Q). This command returns you to DOS. To re-enter **Debug+** from DOS, do a RUN AT ADDRESS, with the address being A100. To do this from OSS OS/A+, type *RUN A100* and press RETURN. From Atari DOS 2.0S, type *M*, hit RETURN, then type *A100* and hit RETURN.

Go at address (G). When this command is entered, the 6502 registers are loaded with the contents of the user registers, then program execution begins at the address specified.

The user program will continue to execute until it is stopped by a 6502 BRK instruction, one of the break points, or by your pressing CTRL-ESC (the CONTROL and ESCape keys at the same time).

If one of these events occurs, your program will be interrupted, the 6502 registers will be saved in the user registers, and **Debug+** will take control. Then the location where the program was stopped will be disassembled or dumped on the screen, and the register line will be updated with the contents of the user registers.

Trace program (T). When trace is activated, **Debug+** will ask for the starting address, then

begin executing the code at the given location, one instruction at a time. You'll be asked to specify the speed of the trace in the prompt *(F,S,O)?* If you press *F*, then the trace will be as fast as possible; the *S* key will pause one-quarter of a second between each instruction; and the *O* key will cause the trace to be stepped by pressing the OPTION key.

A trace will be aborted if the tracer finds: (1) a 6502 BRK instruction, (2) a break point, (3) an illegal instruction, and (4) by pressing the ESC key. Note: if you're using the stepped mode, you must hold down OPTION and press ESC to abort. The trace can be paused by pressing the SPACE BAR.

The tracer does have some limitations. First, it cannot trace itself, so never try to trace **Debug+**. Second, any attempt to trace the real-time I/O routines (such as disk or cassette access) will almost certainly fail.

During a trace, the user register line will be updated before and after the execution of each instruction, so you can examine the register contents at any time.

Print disassembly (P). When this command is executed, you're asked what device the output will go to (disk or printer) and what the starting address is. If disk output is chosen, a filename will be asked for, then disassembly will begin. During the process, the address just sent out to the device is displayed on the STAT line. To abort this command during execution, press any key.

If you choose the disk as the output device, **Debug+** will create a text file of the disassembly. You can then load this into a word processor or other text editor, and edit the disassembly.

Erase memory (E). When this command is executed, you'll be asked for a starting and ending address of the erase. After this, the memory between and including those addresses will be erased. **Debug+** will fill all those addresses with zeroes (the 6502 BRK instruction). If the end address is smaller than the start address, you'll be given an ADDRESS RANGE ERROR, and the command will be aborted.

Change one byte of RAM (C). When you enter this command, you'll be asked what address to change and what to change it to. At this point the contents of that memory location are changed. This is similar to the BASIC POKE statement.

Make sure that you don't change any of the memory that **Debug+** uses. Also, careless choice of a change address may wipe out vital system data and cause a complete system lock-up. Take care.

Change register value (N). When this command is entered, you'll be asked what register to change. To choose the register, simply press one of the following keys: A for Accumulator, X for X-Register, Y for Y Register, S for Stack Pointer, or P for Processor Status.

Next, you'll be asked the new value. Enter this, and the register contents will be changed. Notice that the register line on the screen has been updated to reflect the new value.

A note about the register line. If you examine the line on the screen, you'll see five small boxes and one large box, labelled *NV__BDIZC*. Under the label, there will be eight binary digits. This is the processor status, broken down into its flags. The following table tells you what each flag is:

N	=	Negative number flag.
V	=	Overflow flag.
__	=	Unused (always shown as set).
B	=	BRK instruction flag.
D	=	Decimal flag.
I	=	Interrupt flag.
Z	=	Zero flag.
C	=	Carry flag.

If a 1 appears under one of these flags, it indicates a "set" or "true" condition. So, if the I bit is 1, then an interrupt is occurring.

Display registers (R). All this command does is update the register line. It will display the current values of the user registers.

Set/Reset a break point (B). A break point will stop the execution (or trace) of a user program. When you enter this command, a *B* will appear in the input window, indicating that you must either set or reset a break point.

Setting a break point is easy. Simply type the break point number (a single digit between 1 and 6), followed by a comma, then the address where you wish the break point to be. A typical line would look like this: *B1,0600[RETURN]*. This tells **Debug+** to set break point number 1 at location $0600 (or 1536 decimal). If break point number 1 is already set, you'll be given an error. If location $0600 contains a BRK instruc-

tion, you will also get an error. All 6502 BRK instructions are considered break points.

When you disassemble the address where a break point is set, the mnemonics will be shown in inverse video. This is how **Debug+** graphically shows the user where break points are. If you're in memory dump mode, the value for the address where the break point is set is also in inverse video.

Resetting a break point is easier than setting one. At the *B* prompt, simply enter the break point number you want to reset, followed by a RETURN. An example would be *B1[RETURN]*. This will reset break point number 1. If it was not set, you'll get an error.

When a break point is reset, the old opcode is restored at the break point address, and the address for the break point is reset to $0000. If you look at the break point line at the bottom of the screen when you load **Debug+**, you'll notice that the addresses of all the break points are 0, and that there are six free break points.

Save a binary file (S). This command allows you to save a single-stage binary file to disk. You'll be prompted to enter a filename, followed by the starting and ending addresses of the save.

Once again, if the ending address is less than the starting address, you'll be given an error. The file created with this function can be loaded from DOS. You cannot specify a run address for the file from **Debug+**, so you may want to append one to the file from BASIC or DOS.

Load a binary file (L). This will load *any* binary file into memory. **Debug+** will not run this file. After you enter the load filename, **Debug+** will load the file into memory, then the initial load address will be displayed on the STAT line.

Find a string in memory (F). This command will locate all matches of any string—up to twelve characters in length—in memory. You'll be asked to enter the string you want to find and press RETURN. **Debug+** will clear the screen, and every match of what you typed in will be displayed on the screen, in this format:

```
FIND # nn   Hexadr    Decadr
```

where *nn* is the find number, and *Hexadr* and *Decadr* are the hex and decimal address of the find. The search will continue until the end of memory is reached (address $FFFF or 65535 decimal).

You may find it useful to begin the find at a specific address. To do this, terminate your string with a comma. **Debug+** will ask you what address to start from, and the search will begin as described above.

Debug+ has certain "reserved" characters that cannot be entered into your input and consequently can't be searched for. They are: (1) RETURN (ATASCII 155), (2) DELETE (ATASCII 126), (3) SHIFT-DELETE or DELETE LINE (ATASCII 156), and (4) ESC (ATASCII 27).

All these characters are used by **Debug+** as either delimiters or cursor controls. However, all other control characters and alpha-numerics are at your disposal. One other thing: if you wish to search for a character that you usually generate by pressing ESC, then the key (such as clear screen—CTRL-CLEAR), enter it without pressing ESC. So, to enter the clear screen character, just press CTRL-CLEAR.

High speed display (H). This command will continually scroll the display through memory. You'll be asked what direction to scroll in—up or down—then the scrolling will begin. Use this command if you want to get somewhere very fast, since the screen will move at blinding speed. To pause the scroll, press SPACE; to abort scrolling, press ESC.

Decimal/Hex and Hex/Decimal conversions (.). This command will convert one number base to the other and display the results on the STAT line. If a hexadecimal number is entered, a decimal number will be generated, and vice versa. After the number to be converted has been entered, the STAT line will look like this: *nnnn = xxxx*, where *nnnn* is what you typed, and *xxxx* is its converted form.

Scroll up in memory (-). When you press the hyphen key, **Debug+** will move the display window up 1 byte in memory. If you're in memory dump, **Debug+** will move the window up 6 bytes in memory.

You may notice that it will usually take several keypresses to scroll up one instruction in memory. This is because **Debug+** has no idea where the previous instruction starts, or how many bytes long it is. When this command is executed, the addresses will get lower.

Scroll down in memory (=). This command will move the display window down one full instruction in memory (or 6 bytes in dump mode). When scrolling down, **Debug+** knows where the next instruction starts. That's why it can move

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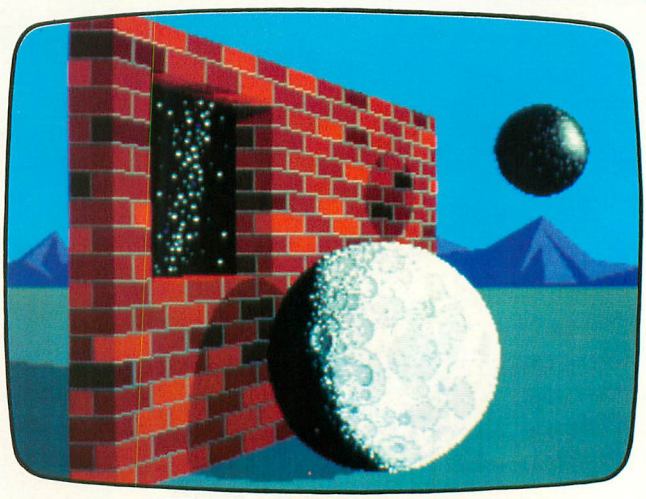

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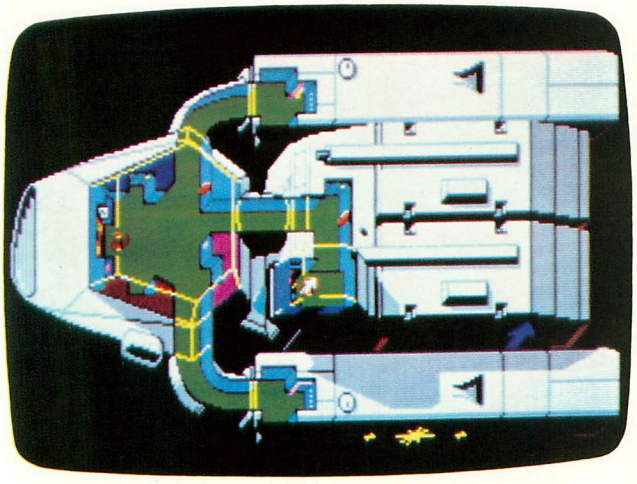

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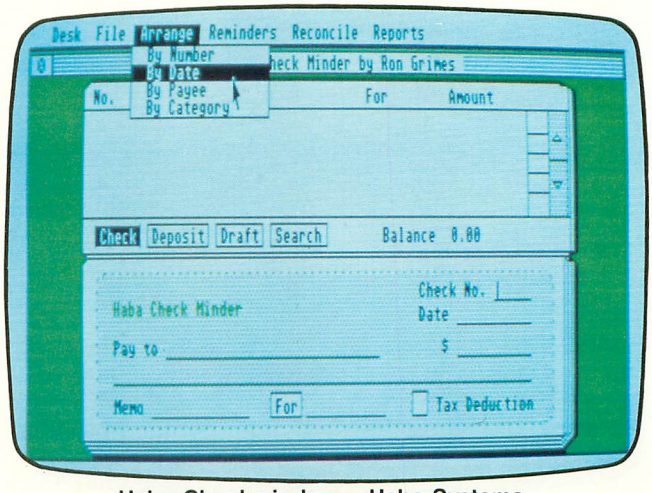

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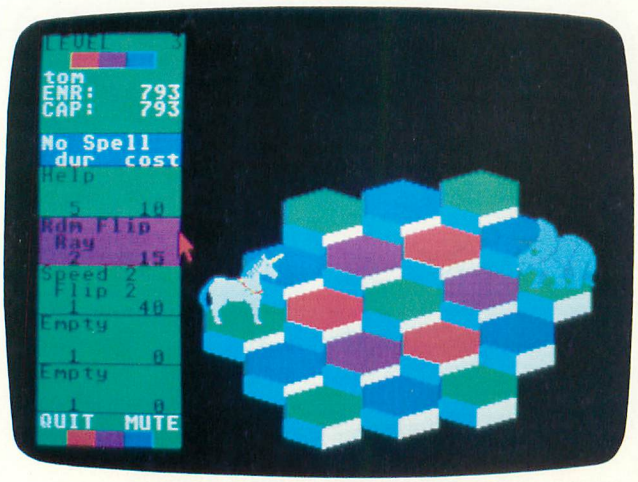

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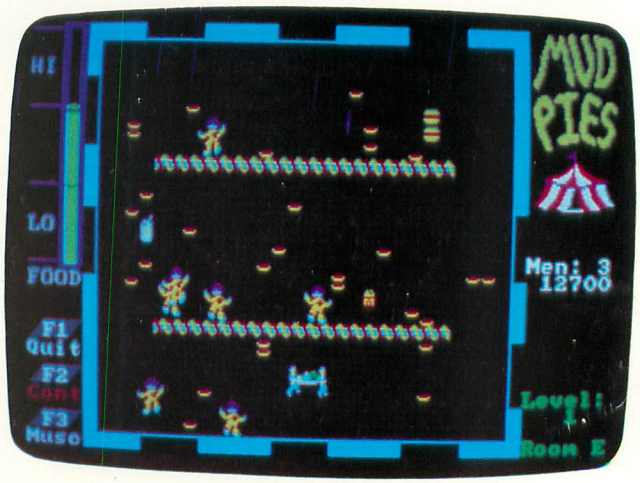

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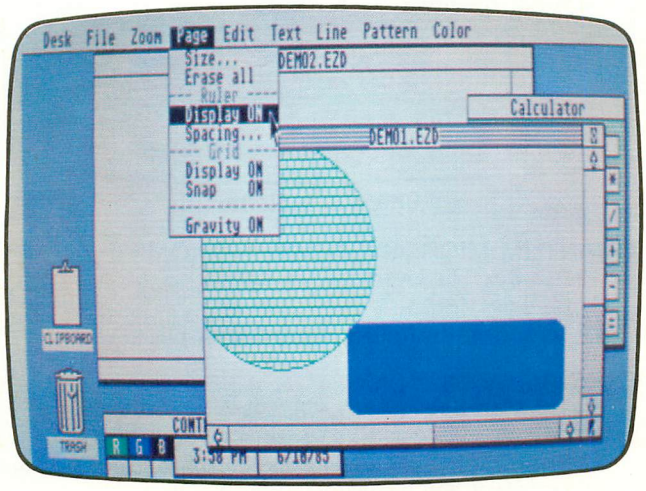

Easy-Draw — Migraph, Inc.

MICHTRON

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(313) 334-5700

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- **Express** — Letter processor, mail list and simplified telecommunications software, all in one package, $49.95.
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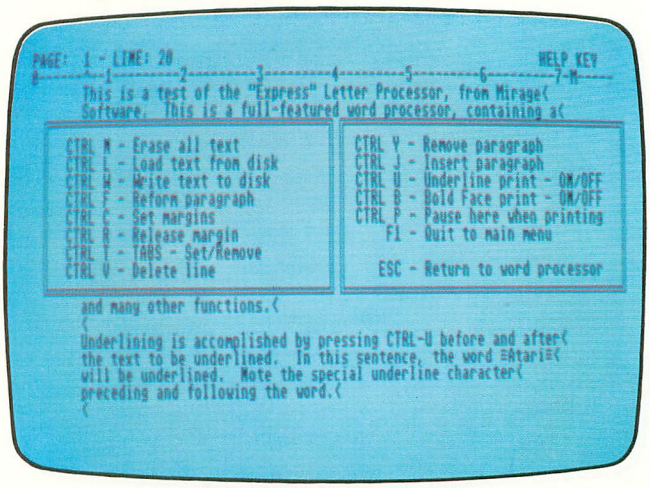
- **Shape and Icon Editor (SHICED)** — Design and use your own icons in ST programs.



Express — Mirage Concepts.

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OMNITREND
8 Huckleberry Lane, West Simsbury, CT 06092
(203) 658-6917

Universe II — A 3-disk game based on the complex Atari 400/800 text adventure; includes extensive documentation.

OPTIMIZED SYSTEMS SOFTWARE (OSS)
1221-B Kentwood Avenue, San Jose, CA 95129
(408) 446-3099

Personal Diskit — A disk utilities package for programmers.

Personal Pascal — ISO Pascal with UCSD enhancements.

Personal Prolog — A new language for the ST.

PENGUIN SOFTWARE
830 4th Avenue, Geneva, IL 60134
(312) 232-1984

Crimson Crown — Graphics adventure game.

Transylvania — An enhanced version of the classic graphics adventure game.

PHILON
641 Avenue of the Americas, New York, NY 10011
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Programming languages — C, PASCAL, FORTRAN, BASIC-M, RPG, COBOL and a compiled BASIC.

PROGRESSIVE COMPUTER APPLICATIONS
2002 McAuliffe Drive, Rockville, MD 20851
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The Graphic Artist — A Computer-Aided Design package with business graphics and "typesetting" capabilities. Simple data file manipulations, word processor and spreadsheet functions are built-in, $495.95.

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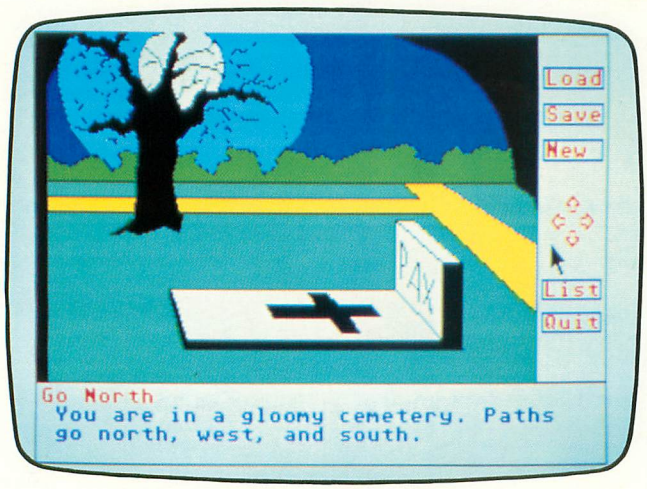
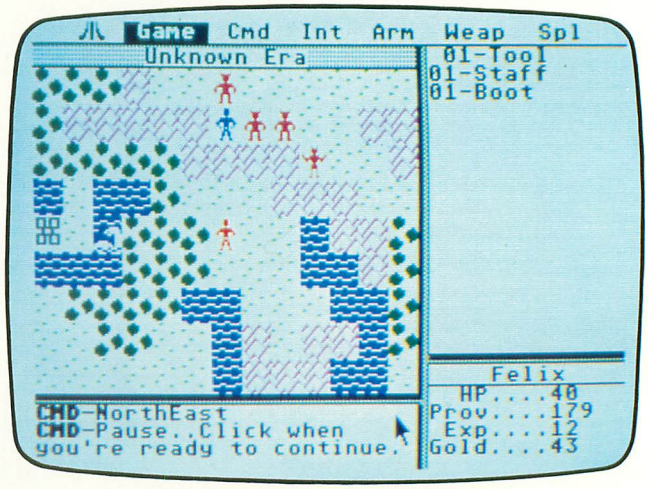
PRYORITY SOFTWARE
635 S. Sanborn, Suite 22, Salinas, CA 93901
(408) 757-0125

Forbidden Quest — A science fiction text adventure.



Transylvania — Penguin Software.



Ultima II — Sierra.

QUANTUM MICROSYSTEMS, INC. (QMI)
P.O. Box 179, Liverpool, NY 13088
(315) 451-7747

Telecommunications products; prices vary.

QUICKVIEW SYSTEMS
146 Main Street, Suite 404, Los Altos, CA 94022
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Zoomracks — An integrated database, card file, word processor and project organizer, $79.95.

REGENT SOFTWARE
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Regent Word — An AtariWriter-like word processor.

Spelling Checker — Looks for typos in word processing files.

RISING STAR
25500 Hawthorne Boulevard, Torrance, CA 90505
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Business Graphics — A graphics system for presentations.

Val Draw — A drawing program using full GEM features.

Val Paint — A paint package.

Scheduler — A personal appointment calendar.

Spreadsheet — A spreadsheet package.

Val Mail — An electronic mail utility.

SIERRA
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(209) 683-6858

King's Quest II — A 3-D animated adventure game.

Ultima II — Graphics adventure game of large scope, where you travel through space and time.

Winnie The Pooh — A graphics adventure game.

SOFTECHNICS
Imported from the U.K.

Rhythm — A desktop accessory featuring a calculator spreadsheet, $34.95.

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SOFT LOGIK CORP.

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

Electro-Calendar — An organizational tool able to print any month as a calendar, with built-in notepad features, $39.95.

Electro Solitaire & 21 — Solitaire and Blackjack featuring mouse manipulation of the cards. Usable in all three graphics modes with the ST's crisp colors in low and medium, $19.95.

Logikhron — This cartridge provides a real-time clock, constantly giving up-to-the-second time and date. Best of all, its built-in battery backup will come in handy for programs like Electro-Calendar, approximately $49.95.

SPINNAKER/TELLARIUM

1 Kendall Square, Cambridge, MA 02139
(617) 494-1200

Amazon — A text adventure game.

Dragon World — Text adventure based on the science fiction novel.

Fahrenheit 451 — Text adventure that follows Ray Bradbury's novel and film, $49.95.

Homework Helper/Math — Provides assistance to students.

Homework Helper/Writing — More help for students.

Nine Princes of Amber — A text adventure based on the Roger Zelazny novels, $49.95.

Perry Mason: The Case of the Mandarin Murder — A mystery text adventure, $49.95.

SST SYSTEMS

3456 Willis Drive, Box 2315, Titusville, FL 32781
(305) 269-0063

CHAT — A telecommunications program loaded with features at an inexpensive price, $19.95.

SWR — BBS software.

SUBLOGIC CORP.

713 Edgebrook Drive, Champaign, IL 61820
(800) 637-4983

Flight Simulator — The advanced flight simulator now takes advantage of the ST's speed and graphics.

Jet — Simulation of a high-performance jet.

TALENT COMPUTER SYSTEMS

Curran Building, 101 St. James Road
Glasgow, Scotland G4 ONS, U.K.

West and **ZKUL** — These text adventures pit you against a gang of notorious bank robbers in the old west (West), or wizards, traps and mazes (ZKUL), $24.95 each.

TDI SOFTWARE LTD.

29 Alma Vale Rd., Clifton, Bristol, England, BS8, U.K.

Modula-2 — A favorite language of computer scientists.

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453 Ravendale Dr., Suite 1, Mountain View, CA 94043
(805) 968-4045

The Professional — A Lotus 1-2-3 clone.

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(617) 494-1200

Treasure Island — A text adventure following the characters in Robert Louis Stevenson's book.

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WORD OF GOD COMMUNICATION

68 Long Court, Thousand Oaks, CA 91360
(805) 495-4441

Comword — Multi windows display, with in-depth cross referencing, ten Bible research functions, including the *King James Bible,* Strong's Concordance Reference System, an integrated Greek and Hebrew dictionary, and more. The 9.3 megabytes of program and data require a hard disk. Sold as a monochrome ST package with Haba 10 megabyte hard disk for $1995.00, or software alone at $495.00.

XLENT SOFTWARE

P.O. Box 5228, Springfield, VA 22150

Typesetter ST — Create forms, labels, signs, letterheads, cards and graphics with high resolution in this enhanced ST version.

Megafont — A fast program lister, capable of printing special characters in many sizes and shapes.

RubberStamp — Create your own pictures, icons or text with a large variety of options, using this utility.

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down one full instruction. When using this command, addresses in the display window will get higher.

Notes.

(1) For every command discussed above, the keyboard auto-repeat is active. So, by holding one of the command keys down, you can re-execute the command as fast as a key will repeat. This is very useful while using the scroll commands.

(2) While executing any command, pressing the ESC key will abort that function. If you are entering a filename and decide not to load a file, just press ESC at any time, and the command will abort.

(3) To pause the screen scrolling at any time, press the SPACE BAR. To abort a command that constantly scrolls the screen, press ESC.

Don'ts.

Well, that's about everything you can do with **Debug+**. Now let me tell you what you *can't* do.

(1) *Do not* alter any of the contents of the memory between $A100 and $C0FF. This is where **Debug+** resides. Changing any of this memory could be fatal.

(2) **Debug+** uses the VBREAK vector located at address $0206-$0207 to detect the 6502 BRK instruction. *Do not* alter this vector. Doing so will severely cripple **Debug+**. When you exit **Debug+**, the program will restore the default VBREAK vector.

(3) **Debug+** also uses the VKEYBD vector located at address $0208-$0209 to detect the CTRL-ESC key combination during a user run. *Do not* alter this vector. If you do, you may never be able to stop the execution of one of your programs. When **Debug+** is exited, it restores the default vector.

(4) When you press RESET while in **Debug+**, the program will take control and reinitialize itself. *Do not* alter the DOSINI vector located at $0C-$0D. When you exit **Debug+**, the default DOSINI vector is restored.

Well, that's it. **Debug+** will run as advertised, unless you break one of the rules I've outlined above. It should prove to be an invaluable aid to you in debugging machine language programs.

Listing 1.
BASIC listing.

```
10 REM *** DEBUG+ ***
20 DIM ML$(151),DAT$(91),BIN$(45):BIN$
(45)=" ":TOTAL=0:PASS=TOTAL:LINE=990:?
 "{CLEAR}CHECKING DATA":POKE 752,1
30 FOR X=1 TO 135:READ N:ML$(X)=CHR$(N
):NEXT X:ML$(136)="0123456789ABCDEF":X
=ADR(ML$)+135:N=INT(X/256)
40 ML$(42,42)=CHR$(N):N=X-N*256:ML$(41
,41)=CHR$(N):RESTORE 1000
50 TRAP 110:LINE=LINE+10:POSITION 2,2:
? "LINE: ";LINE:READ DAT$:IF LEN(DAT$)
<>90 THEN 160
60 DATLIN=PEEK(183)+PEEK(184)*256:IF D
ATLIN<>LINE THEN ? "LINE ";LINE;" MISS
ING!":POKE 752,0:END
70 TOTAL=USR(ADR(ML$),ADR(DAT$),ADR(BI
N$),LEN(DAT$),TOTAL):IF TOTAL=65535 TH
EN 160
80 IF PASS=2 THEN ? #1;BIN$;:READ CHKS
UM:GOTO 50
90 READ CHKSUM:IF TOTAL=CHKSUM THEN 50
100 GOTO 160
110 IF PEEK(195)<>6 THEN 160
120 IF PASS=2 THEN PUT #1,224:PUT #1,2
:PUT #1,225:PUT #1,2:PUT #1,Z:PUT #1,1
61:CLOSE #1:POKE 752,Z:END
130 ? "INSERT DISK WITH DOS, PRESS RET
URN":INPUT #16,DAT$:OPEN #1,8,Z,"D:DEB
UG.COM"
140 PUT #1,255:PUT #1,255:PUT #1,Z:PUT
 #1,161:PUT #1,51:PUT #1,184
150 ? "{CLEAR}WRITING FILE":PASS=2:LINE=990:
RESTORE 1000:TRAP 110:GOTO 50
160 READ CHKSUM:? :? "BAD DATA":? :? L
INE;" DATA ";DAT$;",";CHKSUM:POKE 752,
0:END
170 DATA 104,104,133,204,104,133,203
180 DATA 104,133,206,104,133,205,104
190 DATA 104,133,207,104,133,213,104
200 DATA 133,212,216,160,0,132,210
210 DATA 162,1,134,208,202,134,209,177
220 DATA 203,162,15,221,0,0,240,5,202
230 DATA 16,248,48,75,6,209,6,209,6
240 DATA 209,6,209,138,5,209,133,209
250 DATA 200,198,208,16,224,132,208
260 DATA 164,210,165,209,145,205,164
270 DATA 208,230,210,165,212,24,101
280 DATA 209,133,212,144,2,230,213
290 DATA 165,213,201,4,176,10,201,3
300 DATA 144,19,165,212,201,232,144
310 DATA 13,165,212,56,233,232,133,212
320 DATA 165,213,233,3,133,213,196,207
330 DATA 208,161,96,9,128,145,203,169
340 DATA 255,133,212,133,213,96
1000 DATA D8A50C8D16A2A50D8D17A2AD0802
8D5EB2AD09028D5FB2AD06028D55B2AD07028D
56B2A579057AF00AA5798D9F,837
1010 DATA A9A57A8DA0A9D8A2008E57B28E44
02868D8E0ED486B1E886B286B6BA8EB9B3A9E0
8DF402A9A0856A78A9EB8D06,285
1020 DATA 02A9A68D0702A9598D0802A9A78D
0902A915850CA9A2850D58A200B5009D5AB8BD
00019D5AB9BD00029D5ABAE8,821
1030 DATA D0EC201BA2ADBBB385D4ADBCB385
D520F4A3A9408D0ED42045AE208BA7203AAE20
31AE2029AD2080A92089A929,381
1040 DATA 7FA211DDD8B1F009CA10F82070A2
4CA4A18A0AAABDEAB18DDEA1BDEBB18DDFA120
E5A8204CAC2080A920FFFF4C,947
1050 DATA A4A1A907A062A2E4205CE4AD55B2
8D0602AD56B28D0702AD16A2850CAD17A2850D
78AD5EB28D0802AD5FB28D09,938
1060 DATA 025868686C0A0020FFFF4C33A1A9
008DC602A90A8DC502A9928DC802203DA8A96C
8D3002A9B28D3102A9218D2F,529
1070 DATA 02A907A016A2A74C5CE4A220A90C
9D42034C56E4A90085D485D56085A484A5201E
A9A000B1A4C99BF008201DA8,720
1080 DATA 91A2C8D0F2E65460A9648D00D2A9
AA8D01D2A9008514A514C905D0FAA2008E01D2
8E00D2602031AE203AAEA90A,230
1090 DATA 8D1EB3204FA8900368686A000A2
008690B923B8C92ED005E690C8D03D204FA285
88B923B8C99BD00160A20FDD,622
1100 DATA 7BB4F008CA10F868684C70A206D4
26D506D426D506D426D506D426D58A05D485D4
E688A588C905B0DEC84CB7A2,665
```

```
1110 DATA 204FA28588B923B8C99BD022A900
85F28489A98085F3A90585F4A688A99B9D8005
2000D8B01220D2D9B00DA489,553
1120 DATA 60A209DD7BB4F008CA10F868684C
70A2C8A6889D8005E6884CF4A2A2008690E886
8420E0A6A58585D4A58685D5,904
1130 DATA A2002060A6A99B8D41B8A0008489
204FA2A8B185858320518A9A58385D4A489C99B
F003993AB820B6A6A59EF00D,692
1140 DATA A001B98205098099820588 10F5A4
89BE28B2AD82059D23B8AD83059D24B820BBA4
C8C006D0B960208DA2A5D485,189
1150 DATA 8AA5D5858B208DA2A5D4A0009 18A
60208DA26868A5D48DBBB3A5D58DBCB378A200
BD5AB89500BD5AB99D0001BD,246
1160 DATA 5ABA9D0002E8D0EC58AEB9B39AAD
BAB348AEB7B3ACB8B3ADB6B3EE57B2286CBBB3
208DA2A5D4858585A6A5D585,157
1170 DATA 8685A7A900855420 76A9201EA9A0
1EB923B8C99BD002A920201DA891A28810EFE6
54A554C901D008A58585A8A5,560
1180 DATA 8685A9A554C90ED0D160A00084A1
8490B185858320 51A9A583A000D95CB6F005C8
C097D0F684B020E0A6A58585,908
1190 DATA D4A58685D5A2002060A6204FA2A5
8385D4A2062060A6A4B0BEF3B6A000BDB1B599
35B8E8C8C003D0F4A0018484,153
1200 DATA B1858581C8B1858582A4B0B98BB7
0AA8B90EB28DA1A4B90FB28DA2A420FFFFA027
B923B8C920D0038810F6A99B,522
1210 DATA 9924B8A59EF00320C9A4A5851865
848585A5866900858660A012B923B849809923
B8C8C015D0F36020CAA5A923,164
1220 DATA 8D39B8A9008582A58185D4A58285
D5A2174C60A620CAA54CE1A420CAA520E1A4A0
01E8B9A5B49D24B8CA8810F6,365
1230 DATA 6020CAA520D8A54CE5A4200CA54C
FEA4200CA5A92C9D24B8A9599D25B860A90085
8220CAA520E6A5E8A002D0C8,36
1240 DATA A900858220CAA520E6A5A002B9A8
B49D24B8E88810F660A9418D39B86020CAA5E6
84204FA2E6A1A91D8D34B8A5,969
1250 DATA 811012CE34B8297F497F18690185
9B38E9024C7CA5859BA5811010A58538E59B85
D4A586E90085D54C9BA51865,112
1260 DATA 8585D4A586690085D5A9021865D4
85D4859FA5D5690085D585A020EDA4C6846020
CAA520D8A520E6A5A9299D24,108
1270 DATA B86020CAA520E1A44C1EA5E68420
4FA2A58185D4A20A4C60A6E684204FA2A58285
D4A20E4C60A6A9288D39B84C,719
1280 DATA E5A4204FA284D484AD2070A220E0
A620AAD920E6D8A0FFA2FFC8E8B1F39D23B810
F7297F9D23B8A99B9D24B886,361
1290 DATA 87A211BDFFB3C5ADF005CA10F630
2A8A0AAABD12B48582BD11B48581A0FFA687A9
2C9D24B8E8C8E8B1819D24B8,736
1300 DATA 10F7297F9D24B8A99B9D25B8A90E
855420E5A8A923A0B84C56A2CA868CA590F019
20AAD920E6D8A68CA0FFC8E8,47
1310 DATA B1F39D23B810F7297F9D23B86020
B6A6A68CE8F01EE014B00EAD82059D23B8E8AD
83059D23B860A9249D23B8E8,878
1320 DATA A584C902F0E6A000B980059D23B8
E8C8C004D0F4CA60A000A2018691A9F035D44A
4A4A4AAABD7BB4998005C8A6,966
1330 DATA 91A90F35D4AABD7BB4998005C8A6
91CA10DB60A920A2279D23B8CA10FA60AD57B2
D0026840D88EB7B38CB8B368,37
1340 DATA 8DB6B3688DBAB36838E9028DBBB3
68E9008DBCB3BA8EB9B3584C4AA7EE6EB8D008
EE6DB8D003EE6CB8A5B2D020,596
1350 DATA AD2B02F008A93F85B4A93C85B3A5
B4C6B3D008A01E84B3493F85B4A4879920B34C
62E408AA6829EF4828A9008D,85
1360 DATA 57B24C33A1AD57B2F02AAD09D2C9
9CD0238CB8B38EB7B3A9FF8DFC02688DB6B368
8DBAB3688DBBB3688DBCB3BA,801
1370 DATA 8EB9B3584C4AA76C5EB2A0008489
204FA2B9B6B385D420B6A6A489BE50B2AD8205
38E9209DF6B2AD830538E920,654
1380 DATA 9DF7B2C8C004D0D7ADBBB385D4AD
BCB385D520B6A6A003B9800538E92099F6B288
10F4A211A007ADBAB339C7B3,299
1390 DATA F004A911D002A9109DF6B2E88810
EBA9118D09B360A007B949B4991EB38810F720
89A9A004D962B4F0058810F8,943
1400 DATA 30F1980AA8B9BDB385D4B9BEB385
D520A0A34C8BA7202FA81DCFB3A6AA60202FA8
1DD3B3A6AA60482A2A2A2A29,570
1410 DATA 0386AAAA68299F60A900AA9D00BD
9D00BE9D00BFE8D0F4855460A900858785B220
3AAE20E0A62089A9C91BD004,36
1420 DATA E6B23860A48DD010A028D976B4F0
098810F82070A24C5BA8C97ED024C6871007A9
00858720 70A220DAA8A587F0,758
1430 DATA CBA487C00CD00188A9009920B399
21B34C5BA8C99CF0A9A4879923B8C99BF01920
1DA8C00CD00188 9920B3C8C0,634
1440 DATA 0D900188848720DAA84C5BA8AD23
B8C99BF080A900858D9920B3E6B21860A587D0
068D20B38D21B360A017A900,66
1450 DATA 993EB38810FA60A909A2209D4203
A9239D4403A9B89D4503A9289D4803A9009D49
03AD3AB8100320C9A42056E4,590
1460 DATA 30016068684C45A2A5540AAABD2E
B285A2BD2FB285A360A5B149185B1D008A901
85B6A921D006A90685B6A930,743
1470 DATA 8D13B3A5A685D4A5A785D54CF4A3
A900859EA005A586D9DDB3D014A585D9D7B3D0
0DB9E9B3F008B9E3B38583E6,748
1480 DATA 9E608810E260A5B1D0034C34A44C
37A3A90085B9A94085BA60ADFC02C9FFF0F9A2
FF8EFC0285B7A8C0C09002A0,109
1490 DATA 9AB9FEFE85B8C980F0E2C981D009
A5B9498085B94C89A9C982D009A5BA494085BA
4C89A9C983D006A94085BAD0,909
1500 DATA BEC984D006A98085BAD0B4C985F0
B0A5B7C940B013A5B8C961900DC97BB009A5BA
F00505B74C97A9A20FBDEFB3,485
1510 DATA C5B8F003CA10F6F006A5B845B985
B860A9008514A514C90FD0FA60AEB9B3E8BD5A
B98585E8BD5AB985868EB9B3,81
1520 DATA 4CBBA4A58538E90148A586E900AE
B9B39D5AB9CA689D5AB9CA8EB9B3A001B1AE85
85C8B1AE858660208DA2A5D4,520
1530 DATA 8585A5D585862 03AAEA007B941B4
991EB38810F784802089A9C946D004E680F00C
C953F008C94FD0EDA9018580,432
1540 DATA 203DA8203AAE2031AEA5858DBBB3
85AEA5868DBCB385AF2034A420F7ACA002A9EA
99A5AB8810FA2007AD208BA7,144
1550 DATA AD35B8100A20F2ACA967A0B44C56
A2C93FD005A0974CEEA5A583C960D0062012AA
4CF3ABC940D01EAEB9B3EEB9,210
1560 DATA B3BD5AB98DBAB3E8BD5AB98585E8
BD5AB985868EB9B34CF3ABC94CD0062040AA4C
F3ABC920D0062027AA4CF3AB,705
1570 DATA C96CD0132040AAA000B18548C8B1
858586885854CF3ABA5A1F02FA583A003D960
B2F01BD964B2F0038810F3AD,822
1580 DATA BAB33968B2F008A59F8585A5A085
864CF3ABADBAB33968B2F0ED4CF3ABA000B1AE
99A5ABC8C484D0F6A9008D0E,596
1590 DATA D478A200B500A8BD5AB895009 89D
5AB8BD0001A8BD5AB99D0001989D5AB9BD0002
A8BD5ABA9D0002989D5ABAE8,998
1600 DATA D0D5BA8AAEB9B39A8DB9B3ACB8B3
AEB7B3ADBAB348ADB6B328EAEAEA088DB6B368
8DBAB38EB7B38CB8B3BA8AAE,522
1610 DATA B9B39A8DB9B378A200B500A8BD5A
B895009 89D5AB8BD0001A8BD5AB99D0001989D
5AB9BD0002A8BD5ABA9D0002,918
1620 DATA 989D5ABAE8D0D558A9408D0ED420
8BA7A5803013F014A2088E1FD0AD1FD0C903D0
F98E1FD0D0032007AA4C87AA,608
```

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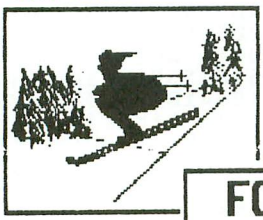

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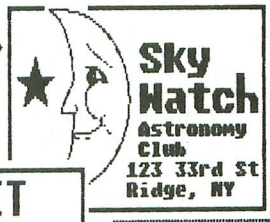

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```
1630 DATA A90085A4A9BD85A5A5A418692085
81A5A569008582A200A01FB18191A488810F9A5
8285A5A5818 5A41869208581,156
1640 DATA A58269008582E8E00ED0DF60A017
A900995EB38810FA60A59085B0A9038584208D
A2A9209923B89925B8A93DC8,859
1650 DATA 9923B8C884AAA59049018590A21C
2060A68687A21CA4AABD23B89924B8E487F004
E8C8D0F2A99B9925B820F2AC,84
1660 DATA A5B085904C59A6208DA2A5D48592
A5D58593208DA2A000A5D5C5939023D008A5D4
C592901BF015989192E692D0,473
1670 DATA 02E693A5D5C593D0F1A5D4C592D0
EB98919260A0994CEEA585818482A000B18199
1EB3C91FF003C8D0F460A90F,276
1680 DATA 855460A554C90ED0072013ACA90D
85544C59A6ADFC02C9FFF01B2029ADC91CF012
C921D0102029ADADFC02C921,469
1690 DATA F006C91CD0F5686848A9FF8DFC02
6860A93BA0B420DFAC2089A9C955D006A90185
BBD008C944D0EFA90085BB20,472
1700 DATA 31AE203AAE2007ADA5BBF0062021
AE4C53AD20D1AD4C53AD201DB1208DA2A90820
F2B0A5D48585A5D585862034,658
1710 DATA A4A9208D34B8AD35B8100320C9A4
20F0A8204CAC20F2ACA99B8D29B82059A6ADFC
02C9FFF0D82029AD204CAC4C,310
1720 DATA 45A2203AAEA935A0B420DFAC2089
A9C91BD005686868686860A001D951B4F0098810
F82070A24CB4AD60A2008A0A,514
1730 DATA A8B92EB2858EB92FB2858FA000B1
8EF030E8E00ED0E82076A920FDACA201BD00BD
2026A8C920F0069D22B8E8D0,578
1740 DATA F0A99B9D22B8A00020B2A2A5D485
A6A5D585A760A5A885D4A5A985D54CF4A3A5A6
38E5B685D4A5A7E90085D54C,470
1750 DATA F4A3A9008D1EB38D1FB360A014A9
009920B38810FA60A00084B58489B9D7B385D4
B9DDB385D520B6A6A489BE58,610
1760 DATA B2A000B9800538E9209D96B3E8C8
C004D0F1A489B9E9B3D002E6B5C8C006D0CDA5
B51869108DB5B3602031AEA9,992
1770 DATA 228D1EB3204FA8900160AD23B838
E931AAC906B024C9009020AD24B8C99BF034A0
02868C20A2A2A68CA000B1D4,280
1780 DATA F005BDE9B3F008A0984CEEA54C70
A2A5D49DD7B3A5D59DDDB3B1D49DE3B39891D4
FEE9B34C45AE2031AEA000BD,428
1790 DATA E9B3F01CBDD7B38581BDDDB38582
BDE3B39181989DE9B39DD7B39DDDB34C45AEA0
964CEEA52031AEA91F8D1EB3,416
1800 DATA 858D204FA8900160A000B923B8C9
9BF00CC92CF008994BB8C8C00CD0ED8480C92C
D014208DA2A5D438E9018592,150
1810 DATA A5D5E900859 3A0FFD006A0FF8492
8493C8849C84948495203DA8A5921869018592
A59369008593C9B8D00EA592,287
1820 DATA C923D008A95A8592A9BB8593A59C
F007A5920593D00160A001849C88B192D94BB8
D0CAC8C480D0F420E0A6A205,608
1830 DATA BD9FB49D23B8CA10F7A59285D4A5
9385D520B6A6A003A211B980059D23B8CA8810
F6A9249D23B8A99B8D35B8E6,820
1840 DATA 94D002E695A59485D4A59585D5A2
07869020 60A62007AD20F7AC4C57AFA9442020
B1A90085 80A907859DA90420,196
1850 DATA F2B02077B0300EAD4EB2C9FFD005
CD4FB2F00CA095848920 45A2A4894CEEA52077
B0A580D00CAD4EB285D4AD4F,302
1860 DATA B285D5E68020D6B020C0B02077B0
20CBB020A5B020E7B030034C10B09848204 5A2
68C988D02F20E0A6A006B9AB,2
1870 DATA B49923B888 10F720B6A6A003A20C
B980059D23B8CA8810F6A9249D23B8A99B8D30
B820F2AC4C59A6A84CEEA5A9,835
1880 DATA 4E8592A9B28593A9008599A90285
98A220A59D9D4203A5929D4403A5939D4503A5
989D4803A5999D49034C56E4,42
1890 DATA A59638E5948598A597E595859 9A5
9818690185 98A5996900859960AD4EB28594AD
4FB2859560AD4EB28596AD4F,74
1900 DATA B2859760AE4EB2E8F00160AE4FB2
E8F001604C77B0A5948592A59585934C87B085
9C2045A2A59CA2209D4A03A9,45
1910 DATA 009D4B03A9039D4203A9539D4403
A9B49D45032056E43001606868 4CEEA520AAAD
488D53B4A99B8D55B468C944,868
1920 DATA F00160203 1AEA91F8D1EB3204FA8
900368686 0A202A000B923B8C92CF014C99BF0
109D53B4C8E8E012D0ECA0A5,448
1930 DATA 68684CEEA5A99B9D53B460A94420
20B1A90B859D208DA2A5D48594A5D585952 08D
A2A5D48596A5D58597C59590,723
1940 DATA 45F002D006A596C594903BA90820
F2B0A9FF8D4EB28D4FB22077B0302BA5948D4E
B2A5958D4FB22077B0301CA5,365
1950 DATA 968D4EB2A5978D4FB22077B0300D
20A5B020E7B030054C45A2A0999848 2045A268
A84CEEA55144524E2A43474C,302
1960 DATA 5342542D3D4650482E45E3A12DA9
8BA7F0A7F1A39DA3B2A3E1AF64B185AE4CAA21
AED1AD08AF66AD31AD57ACA1,277
1970 DATA ACD9A4F2A4F8A40CA515A51BA529
A538A54FA555A5B1A5B2A5C1A505080B0E1114
01BD21BD41BD61BD81BDA1BD,862
1980 DATA C1BDE1BD01BE21BE41BE61BE81BE
A1BE3EB35EB3000005080B0E1100000000050A
0F1419000010509 0D03070B0,712
1990 DATA F0804001027070704296B2000220
4200BD0202020202020202020202022042D6
B2020002000200020241,759
2000 DATA 6CB28080A4A5A2B5A78B80808080
E2F99A80A2F2F9E1EE80B3E3E8E1F0F0E5EC80
8080A1A4A4B28080A2918080,470
2010 DATA A2928080A2938080ADAEA5ADAFAE
A9A3B3808080808080B0A3FC80A1FC80B8FC80
B9FCB3B0FCAEB6BFA2A4A9BA,8
2020 DATA A3FCADAFA4A5808000000007C00
007C00007C00007C00007C0000000000000000
7C242933210000080A9AEB0B5,89
2030 DATA B49A0000000000000000000000000
0000000000000000000000000080A5B2B2AFB2
9A0000000000000000000000,579
2040 DATA 0000000000000000000000000000
8080B3B4A1B49A0000000000000000000000000
0000000000000000000000000,689
2050 DATA 00A2B2AB91FCA2B2AB92FCA2B2AB
93FCA2B2AB94FCA2B2AB95FCA2B2AB96FCA6B2
000000007C000000007C0000,744
2060 DATA 00007C000000007C000000007C00
0000007C1010000000000000000B6B3B7B3B8B3
B9B3BAB3010204081020 4080,342
2070 DATA 4000206020400600000000000000
0000000000000000000000000000000000000FF
FEFD9F9E9D9C9B7F7E7D1F1E,712
2080 DATA 1D1C1B8082898A8B9092A2A4A5A7
A9AA959679899B2B4C1B4D2B4E2B4F0B4FAB4
09B51AB523B534B541B54CB5,236
2090 DATA 5AB568B577B587B595B5A2B50824
0C30091F08350C24091F08330C260C2F091F08
2138393330091F4450203A20,145
2100 DATA 2020202020202020202020209B4158
595350425 24B20504F494E5420464F554E449B
9C7E2C2E3031323334353637,57
2110 DATA 383941424344454647484944B4C
4D4E4F505152535455565758595A46494E4420
232C5829592C294C4F414420,208
2120 DATA 4154425245414B204B4559204142
4F52D44E4F2044455649434520 48414E444C45
D25452554E434154454420 52,602
2130 DATA 45434F52C4444556494345205449
4D454F55D4444556494345204E41CB57524954
452050524F5445435445C446,355
2140 DATA 554E4354494F4E204E4F5420444F
4EC54449534B2046554CCC46494C45204E554D
204D49534D415443C8424144,909
```

```
2150 DATA 2046494C45204E414DC546494C45
204C4F434B45C44449524543544F5259204655
4CCC46494C45204E4F542046,383
2160 DATA 4F554EC446494C45204E4F542042
494E4152D94E4F2053455420425248204B20504F49
4ED4494E56414C4944204F50,939
2170 DATA 434F44C542524B20504F494E5420
5345D44144522052414E4745204552524FD241
4443414E4441534C42434342,462
2180 DATA 435342455142495442 4D49424E45
42504CC2D2CB42564342565343 4C43434C4443
4C49434C56434D5043505843,155
2190 DATA 505944454344455844459454F52
494E43494E58494E594A4D504A53524C44414C
44584C44594C53524E4F504F,607
2200 DATA 524150484150485 04C41504C50
524F4C524F525254495254535342435345435 3
4544534549535441535458 53,78
2210 DATA 545954415854415954535854584 1
5458535459413F3F3F6965756D7D7961712925
352D3D3921310A06160E1E90,390
2220 DATA B0F0242C30D0100050701 8D858B8
C9C5D5CDDDD9C1D1E0E4ECC0C4CCC6D6CEDECA
884945554D5D594151E6F6EE,322
2230 DATA FEE8C84C6C20A9A5B5ADBDB9A1B1
A2A6B6AEBEA0A4B4ACBC4A46564E5EEA090515
0D1D190111480868282A2636,476
2240 DATA 2E3E6A66766E7E4060E9E5F5EDFD
F9E1F138F87885958D9D99819186968E84948C
AAA8BA8A9A9800000000000,463
2250 DATA 0000030303030303030306060606
06090C0F121215181B1E2124272A2D30333333
3333333333636363939393C,735
2260 DATA 3C3C3C3F424545454545454545548
4848484B4E5151545757575757575575A5A5A
5A5A5D5D5D5D5D6060606060,374
2270 DATA 6366666666666666666696C6F7275
7575757578787878787B7E8181818181818181
84878A8D8D8D8D8D8D8D9090,873
2280 DATA 9093939396999C9FA2A5A8000102
0304050607000102030405060708010203040 9
0909010309090 90A09090A0A,751
2290 DATA 0A0A000102030405060700010300
0103010203040A0A000102030405060701020 3
040A0A030B03000102030405,927
2300 DATA 060700010C0305000102030408 01
0203040A000102030405060 70A0A0A0A080102
0304080102030 40A0A000102,126
2310 DATA 0304050607 0A0A0A0102030405 06
07010C0301020304 0A0A0A0A0A0A0A0000000000
0000000000000000000000000,301
2320 REM * 5940 BYTES
```

●

CHECKSUM DATA.

(see page 11)

```
10 DATA 488,843,502,590,136,343,521,38
4,352,701,611,720,621,852,92,7756
160 DATA 297,968,975,977,928,99,168,84
6,2,814,22,759,950,794,767,9366
310 DATA 70,89,252,661,937,176,856,84,
395,44,953,860,762,832,976,7947
1110 DATA 811,907,850,865,59,378,788,7
50,818,155,680,949,115,981,880,9986
1260 DATA 863,970,128,168,331,68,970,2
64,404,158,385,998,129,750,106,6692
1410 DATA 112,762,38,14,733,764,116,54
,156,225,446,289,879,99,63,4750
1560 DATA 423,966,287,227,647,74,120,6
79,928,162,794,884,10,134,914,7249
1710 DATA 196,795,128,118,19,20,893,21
6,426,982,773,857,14,828,120,6385
1860 DATA 744,106,865,101,18,896,875,1
,952,897,229,107,608,876,963,8238
2010 DATA 307,352,771,577,23,60,161,74
,536,410,476,305,464,650,506,5672
2160 DATA 601,268,321,483,256,421,140,
91,13,67,554,715,154,784,841,5709
2310 DATA 804,648,1452
```

●

Bryan Schappel is a Computer Science major at the University of Wisconsin. He's been programming the Atari for three years. Besides writing programs, his main computer interests are word processing and data management.

---

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HIPPO ST RAMDISK
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by Clayton Walnum

Hippopotamus Software has come out with a whole slew of new products for the ST. Among them is this useful utility that allows you to set aside any size portion of memory as a ramdisk. The ramdisk specifications are defined from options available in a series of drop-down menus.

When the Install menu is activated, you may choose from four options: install ramdisk, remove ramdisk, quit, and reset machine. The first selection allows you to modify your system disk in such a way that, when used to boot the system, it will automatically install the ramdisk in memory. When the ramdisk is activated, an extra disk icon will show on your screen, labeled (appropriately) *drive H*.

The remove ramdisk option deletes the files that were added to your system disk, restoring it to original condition, while quit does the obvious and returns you to the GEM desktop.

Reset machine is somewhat of a mystery option. I assume that this selection was meant to allow you to reboot your system—thus installing the ramdisk. Clicking on reset machine presents you with a dialog box containing the message *Press Reset Button*, and two buttons labeled *YES* and *NO*. Activating either of these buttons accomplishes exactly the same thing—nothing. Also, there is no mention of this option in the instructions. Most curious!

When the size menu is activated, you're able to define the size of the ramdisk you wish created. Numbers range from 1K to 8192K, and can be added together in any combination, giving a maximum size of over 16000K. I don't know where you're going to find an ST with 16M of RAM, but if you do, the Hippo **Ramdisk** has got you covered (and if you happen to stumble into the Twilight Zone and locate a 16M ST, buy one for me, too).

The last two drop-down menus, Default and Help, allow you to change the default drive, and to view the instruction manual. The instructions are skimpy (to say the least), and novice ST owners may find them incomplete and confusing.

For instance, the instructions state that the files DESK3.ACC, HIPPODSK.ACC, and DESKTOP.INF "must be on the disk which will be in drive A at startup time," in order to create the ramdisk. What they *don't* mention is that this must also be a system disk. Sure, you and I know that, but what about the new guy in town? In the instructions for one-drive systems, however, they do specify that you must use a system disk.

Maybe I'm just nit-picking. I guess when it comes down to it, not too many novices are going to be interested in a ramdisk program, anyway. By the way, the instructions are only included on the disk at this time, though future shippings will include a hard copy of the manual. If you don't have a printer, a phone call or letter to Hippo will get you the manual.

The only real complaint I have is that the dialog boxes don't always function properly. If you make a mistake (such as not having the HIPPO disk in drive A) during the creation of your ramdisk, you're presented with a warning message and the previously mentioned YES and NO buttons. I don't know why they included these warnings, since clicking on the buttons usually does you no good. In fact, with most errors, the only way out seems to be to reboot.

All in all, this is a useful program. Its few faults aren't serious, since once you've created your ramdisk, you don't have to go back to the original disk unless you want to make changes or create another ramdisk.

The lack of documentation and chintzy packaging makes me feel that this program was rushed out—but that's not necessarily a criticism. After all, there's a real need for ST software, and the sooner it gets into our hands, the better. Of course, that doesn't mean that anything goes, but though Hippo may have released this program a *bit* prematurely, I think that those in need of a flexible ramdisk program will be more than willing to forgive a few minor eccentricities.

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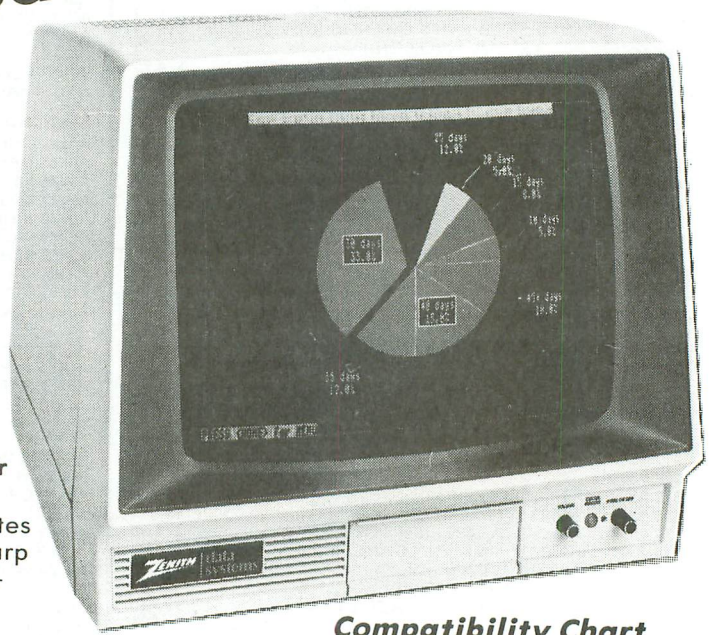

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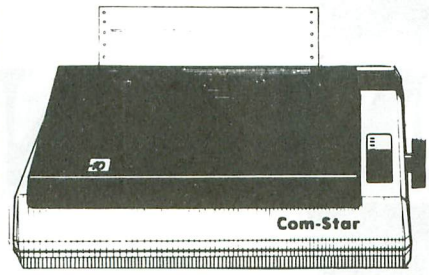

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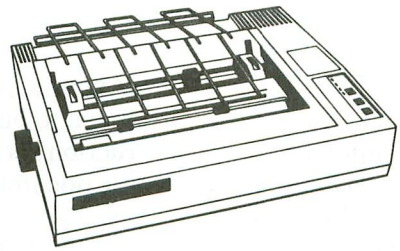

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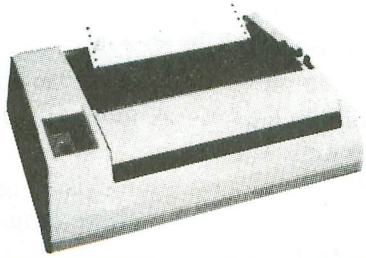

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C-MANSHIP

Part 1.

by Clayton Walnum

With the appearance of the 520ST, computer enthusiasts have within their grasp a machine that rivals any micro on the market today, at a price that makes the honest purchaser want to turn himself over to the law. Once you get that new ST unwrapped and set up, it'll become apparent that you're about to journey into a whole new world.

If you're not interested in programming, you have a bit of an advantage. You can run out and dig up whatever software you need, read the documentation and be happily on your way. The rest of us are going to have to sit back and think for a minute. How are we going to program this marvelous new wonder?

Choices, choices.

Unfortunately, when it comes to programming languages for the ST, we don't have a lot of options. We must take our pick from four alternatives.

First there's LOGO, which Atari, for some strange reason, chose to ship with the ST. Not a good choice if you want to get the most out of your computer. LOGO is too limited and slow, slow, *slow*. On top of that, few people are familiar with it (which makes Atari's choice even stranger). Why spend all the time and effort learning a language that you'll probably abandon once you get down to some serious programming?

Another possibility is machine language. If you happen to be familiar with the Motorola 68000's instruction set, and have the time, patience and necessary documentation to make your ST perform its tricks, go to it! As for the rest of us? Next, please.

How about BASIC? This will probably be the dominant language for the ST, if for no other reason than it's an old friend. But, in considering BASIC as a programming environment, one has to ask an important question: why are programmers of the 8-bit machines, slowly but surely, abandoning BASIC and moving to Action!? Answer: because Action! provides the convenience of a high-level language with the speed and versatility of assembly language.

And guess what? There is just such a language available for use on the ST. For those who haven't guessed the obvious, this language is C.

Why C?

C is a high-level language that's compiled into machine language form. This means programs can be developed quickly and easily, but still retain the speed of machine language.

Also, C encourages the use of structured programming techniques. If that buzzword *structured* doesn't mean anything to you now, it will when you've finished learning about C. I promise you that, once you get accustomed to structured programming, you won't want to go back to the old "spaghetti code" of BASIC.

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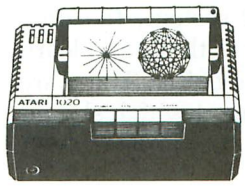

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Another important characteristic of C is its compactness. There are only about thirty reserved words. This yields a language that is easy to learn, yet extremely powerful.

One of the qualities of C that has made it popular with professional software developers is portability. Programs can be transferred from one machine to another with a minimum of effort. This means that, once a software package has been developed, it can be marketed for many machines—with very little extra expense.

If none of the above makes an impression, consider that the majority of software available for the ST was written in C. Does that tell you something?

C, wherefore art thou?

I assume at this point that I've got you all hopping up and down, anxious to start your first programming experiments with C. If you go through all that packaging your computer was packed in, you'll quickly discover that there's nothing with *C* written on the label. That's right, folks. You're going to have to track down a copy on your own.

As of this writing, there's only one viable possibility. You may write to Atari and request their ST software development package. If you lay out $300, you will not only get C, but a bunch of neat utilities and reams of documentation on the ST. When it comes to the documentation, though, a word of caution is in order. Unless you have a lot of experience with operating systems, you may find them far too technical.

There's one other C compiler on the market, but I hesitate to even mention its name, since it would be fairly useless for our purposes. Just the fact that it doesn't support floating point numbers makes it impossible for me to recommend. I'd have to spend too much time explaining how to get around **Hippo-C**'s (Whoops! It slipped out.) deficiencies, if I decided to cover it here.

If your poor heart is going pitter-patter at the hefty price tag on Atari's development system, the only thing I can suggest is that you stick with us, and learn to program C on paper for the time being. There are several new compilers in development which should be available soon. I'll check them out, and pass the information on to you.

Underway at last.

Now that you know where to get C, let's take a look at the way programs in this language are created.

C programs are written using a text editor. How sophisticated the editor is will depend upon the C package you're using. Since C source code is really nothing more than a text file, you can use many different word processing programs. The only restriction is that the text must be saved to disk without the extra codes that some editors like **ST Writer** automatically add to your files.

Once the source code has been written, it must be compiled. How complicated this process is depends, once again, on what software you're using. But essentially, during the compilation, the source file is read in from the disk and translated into a form that the ST can understand (machine language). This new version of the program is stored on your disk, ready to load and run at your command.

Sounds easy, right? Good! Let's get on with it.

A simple program.

Get your text editor loaded up and type in the following code exactly as it appears here:

```
#include <stdio.h>

main()
{
char ch;

printf ( "Press any key\n" );
ch = getchar();
}
```

Now compile the program and RUN it. What happened? Bet you made some typing errors! You'll find that the compiler is very fussy. If you're used to programming in Atari BASIC, you've been spoiled by getting syntax error messages immediately upon entering a new line of code. Life isn't so simple when you're dealing with a text editor. It will let you enter any kind of mumbo-jumbo. Your compiler, however, will do great deal of whining if it doesn't see exactly what it expects.

So go back to your text editor (unless you managed to get it all right the first time) and correct your source code, then try to compile it again. Got it?

When you run the program, the words *Press any key* should be printed on your screen. Pressing a key will bring you back to the ST's desktop. Let's take a look at the code and figure out what's going on.

Line 1 tells the compiler to look on your disk for a file called "stdio.h" and insert whatever code it contains into your program. This file is supplied with your compiler and contains input/output information for your ST. The file name stands for STandarD Input/Output Header, and, though not every program you write will need it, it's a good idea to include it —just in case.

Line 2 is a function name. C programs are made up of one or more functions, executed in a sequence specified by the programmer. Large programs will

contain many functions, each doing a small part of the job. Breaking a program up into small portions makes the programmer's job easier and results in source code that's more readable.

A function can be quickly identified by the parentheses which follow its name. In our example, the parentheses are empty, but this won't always be the case. Sometimes we may wish to send values to a function when we call it. These values are called "arguments," and the variables which will receive these values are found within the parentheses. In our case, there are no arguments being passed, so the parentheses remain empty. If you're a bit confused, don't worry about it. We'll get into functions in greater detail later on.

The function *main()* is not your everyday, garden variety function. Every C program must contain main(), for it's here that program execution begins.

Line 3 contains nothing but a left brace. It marks the beginning of our function. The body of every function must begin with a left brace and end with a right brace. All the program statements that make up the function fall in between.

Line 4 is a declaration statement. It declares a variable of the type character and gives it the name *ch*. Every variable in your C program must be declared before it's used. This allows the compiler to allocate the proper type of storage and supplies your computer with the information it needs to interpret the data properly.

The word *char* is a C keyword, a word that's been set aside for specific use within the language. Keywords may never be used for any other purpose, such as function or variable names. A list of keywords can be found in Figure 1.

Notice the semicolon following the declaration. All program statements in C must be followed by a semicolon. But, wait a minute! What about Lines 1 and 2? They're missing their semicolons! Not really. The former is a compiler directive, not a program statement, so it doesn't require a semicolon. Function names are also excluded from the semicolon rule.

Line 5 is the equivalent of a print statement in BASIC. See the parentheses following the word *printf()*? What does this tell you? If you said that it has something to do with a function, you're absolutely correct. This line is a function call. The text inside the parentheses is the argument we wish sent to the function.

The astute among you may now be checking the program listing for a function called "printf()." Don't bother. It's an additional C function that's defined

C Keywords.

auto	extern	short
break	float	sizeof
case	for	static
char	goto	struct
continue	if	switch
default	int	typedef
do	long	union
double	register	unsigned
else	return	while

Figure 1.

when your program is compiled. Also note that printf(), being a function name, isn't a keyword.

The argument for printf() is the text you want printed, plus any format control characters you wish to include. See the \n? This is the escape sequence that moves the cursor to the next line. If we hadn't inserted it in our text, the next line we printed would be on the same line as the first. Line 5 in BASIC would look like this:

```
PRINT "Press any key"
```

There are five control characters that may be used with printf(). They are: \n — new line; \r — carriage return; \t — tab; \b — backspace; and \f — form feed.

When the compiler sees the backslash, it knows that it should interpret the next character as a control code. (Note that, even though each control appears as two characters on your screen, they're stored as a single character in the computer's memory.) What if you want a backslash in your text? No problem. There are three escape sequences to let you print characters which may confuse the compiler. They are: \\ — backslash; \" — quote; and \' — single quote.

Line 6 is similar to BASIC's GET command. See those parentheses? That's right. We're calling another function. The function *getchar()* accepts a single character from the keyboard and is one of the goodies defined in the stdio.h file. Aren't you glad we included it? Here, we're taking the character returned by getchar() and placing it in the variable *ch*.

Something worth noting at this point is the way the expression *ch = getchar()* is evaluated. The equal sign is an assignment operator and doesn't mean "equal to." C has a separate operator, = =, for the equal condition. The expression *a = b* should be read as "a becomes the value of b." Contrast that with the statement *if a = = b*, which is read "if a equals b." In BASIC, the single equal sign fulfilled both jobs. Time to break old habits.

Line 7 is the right brace to mark the end of our function (and our program as well, in this case). The program has ended, and control is returned to your ST's operating system.

Where's the beef?

Okay, now let's look at something with a little more meat to it. Type the following code into your text editor and compile it.

```
#include <stdio.h>

main()
{
char ch;
int num1,num2,ans;

printf ( "Enter two numbers: " );
scanf ( "%d %d", &num1, &num2 );
ans = num1 + num2;
printf ( "\n\n" );
printf ( "The sum of %d and %d is %d.\n\n", num1, num2, ans );
printf ( "Press any key\n" );
ch = getchar();
ch = getchar();
}
```

When you run this one, you'll be prompted to enter two numbers. Enter them one after the other, separated by one space (*5 10*), then press the SPACE BAR. Presto! Now your computer's doing first grade math.

Let's see what's going on.

Lines 1 through 4 are now old hat. You should be able to figure them out with no problem.

Line 5 gives us something new to chew on. Here, we're declaring three variables of the type integer, another of C's basic data types. C interprets an integer as any whole number from −32768 to 32767. Notice I said *whole* number. No decimal portions are allowed.

Why are we restricted to this range? On the ST computer, an integer is stored in 2 bytes. That gives us 16 bits, or a maximum value of 65525. Unfortunately, all 16 bits aren't used to store the value, since the most significant bit holds the number's sign. It's set when the number is negative and cleared when the number is positive. With 15 bits, the maximum value that can be represented is 32767.

If you need to use a larger integer value, you may declare the variable as *unsigned int*, or the abbreviated version, *unsigned*. This will free up the sign bit and allow any whole *positive* number up to 65525. If this range is still not satisfactory, use the *long int* (abbreviated *long*) data type. This increases the length of the variable's storage to 4 bytes. Now you can work with numbers from about negative two billion to positive two billion. That big enough for you? Here are some declaration examples:

```
unsigned num1, num2;
long ans;
```

You may declare as many variables on one line as you wish, as long as they're all the same type and are separated by commas.

Line 6 is our old friend printf(), only this time we've left off the new line character, so that whatever text is printed next will appear on the same line.

Line 7 introduces you to a new function, *scanf()*. This is similar to BASIC's input command, but is a little bit trickier. The equivalent BASIC code for line 7 would be:

```
INPUT NUM1,NUM2
```

There's a bit of a difference, however, in the way numbers are entered from the keyboard in the BASIC version, as compared to C. In BASIC, you would enter the two numbers separated by a comma. With the scanf() function, you separate the numbers with spaces.

The arguments for scanf() consist of a control string and a list of pointers. The control string may consist of white space characters (blanks, tabs, etc.) and conversion specifications. The pointers are the *addresses* where you wish the data to be stored.

Okay, okay, I'll slow down. First, let's look more closely at the control string.

The control string is the portion of the function call that appears between the quotes. There are two conversion specifications in our example, both of which tell the computer to expect the input of an integer. Take note of the syntax.

The control string is within quotes, just like any other string, and the conversion character *d* is preceded by the percent sign. Each control specification is matched with its corresponding argument. In other words, in our example, the first %d is paired with &num1, and the second with &num2. The ampersand tells the compiler we want the address of num1 and num2, not their value. This is important. If you leave off the ampersands (and believe me, sooner or later you will), you're guaranteed to see those famous ST mushroom clouds appear on your screen. For instance, look at this program fragment:

```
num1 = 100;
num2 = 150;

scanf ( "%d %d", num1 ,num2 );
```

When we enter the data in this example, the first value will be stored in memory at address 100 decimal, and the second at address 150 decimal. Ouch!

Line 8 is where we do the calculation. This looks exactly the way it would look in a BASIC program, except for the semicolon at the end. Once again, there's a subtle difference.

In Atari BASIC, every value is considered to be a floating point number. In C, there are many different data types—including not only integer and floating point, but long, short, unsigned and character. The danger lies in the fact that C allows you to mix these data types with impunity. When you do, C will do type conversions on the numbers, and you may not end up with what you expect.

In this example, we're adding two integers (num1 and num2) and assigning their value to a third integer (ans). Although we're not mixing data types, we're still not out of danger. We must be sure that the result of our calculation falls within the −32768 to +32767 range that we discussed earlier.

Hmmm. What happens if we try to add 1 to an integer that's already at its maximum value (32767)? Can you guess? You'll end up with a result of −32768. This is called an "overflow." You get a result of −32768, because the integer wraps around from its highest value back to its lowest. What will you end up with if you add 2 to an integer value of 32767? If you guessed −32767, you're right!

Be forewarned: C doesn't care about overflows and will not give you an error message.

Now that we've done our calculation, we have to get the answer out to the user. We do this with our old pal printf().

Line 9 does nothing more than leave a blank line between the earlier text and the text we'll be printing next.

Line 10 actually prints out the final data. Take a good look at the control string. There are those conversion specifications again, only this time we're not accepting values from the keyboard—we're printing them to the screen. We put the conversion specification %d wherever we wish to have an integer printed in the text.

Following the control string are the matching arguments for the conversion specifications. Each %d pairs with an argument in the same manner as scanf(). You must be sure that the arguments match the control string properly, or you'll get unpredictable results.

There are nine basic conversion specifications you may use. They are: %d-decimal integer; %f—floating point; %e—floating point, scientific notation; %c—single character; %s—string; %g—use the shorter of %f or %e; %u—unsigned decimal integer; %o—unsigned octal integer; and %x—unsigned hex integer. If some of these confuse you, don't worry about it. We'll get to them in due time.

Getting back to Line 10, when the text is printed, whatever you entered as the first number (now stored in num1) will be substituted for the first %d, the second number (num2) will replace the second %d, and the sum (ans) will be printed in place of the last %d.

Study this use of the printf() function closely until you understand it. You'll see it a lot, and many times it'll be much more complicated. Just remember that none of the conversion specifications are printed literally. If you're used to BASIC, this can be a bit confusing, since you'd expect everything within the quotes to be printed as it appears.

Lines 11, 12, and 13 bring us back to familiar territory. But why are we using the getchar() function twice? Remember when you entered those two numbers, then pressed SPACE BAR? Well, the first number was stored in the variable num1, and the second in num2, but the SPACE character didn't have any place to go, so it stayed in the keyboard buffer. When we call getchar() the first time, the SPACE gladly jumps into our character variable *ch*, and the program goes on its merry way. If we didn't have the second getchar(), the program wouldn't pause for our next input.

Well, I guess I've tried to stuff enough between your ears for now. Spend some time writing a few simple programs using what you've learned. Next month, we'll pick up where we left off. See you then.

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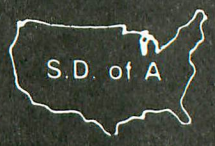

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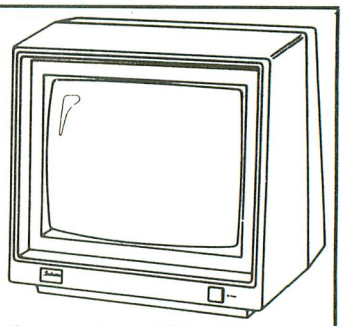

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CIRCLE #130 ON READER SERVICE CARD

XM301
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by Clayton Walnum

When I first saw the price tag on Atari's new modem, the **XM301**, a couple of old cliches sprang to mind, namely: "You get what you pay for" and "If something seems too good to be true, then it probably is."

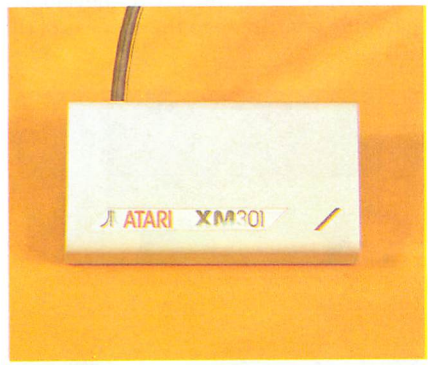
I knew that, in all fairness, I had to put aside those misgivings and tackle this review with an untarnished, open mind. But when I opened the packing carton and saw this little gray lump of plastic just slightly larger than a cigarette pack, I was sure that whoever was responsible for those aforementioned words of wisdom really had an accurate (if somewhat cynical) view of life. Ah, well. I connected it up, booted the software and prepared for the worst.

Folks, I do believe I've gained a new outlook on life. You don't always get what you pay for—you sometimes get much more. And, if something seems too good to be true, check it out *anyway*. You never know what you might be missing. With the **XM301**, Atari has offered a complete telecommunications package at a price that's a real eyebrow raiser.

One of the key words in the above paragraph is *complete*. Atari, from day one, has been having a love affair with telecommunications software that only did half the job. How many of you stared in disbelief at your 1030 manuals when you realized that you wouldn't be able to download?

The **XM301** comes with a terminal program called XE Term, and guess what? It's finally occurred to Atari that one of the main reasons people buy modems is to download software. To this end, XE Term supports Xmodem file transfers and CompuServe's A-protocol. Of course, you can also upload or receive files without an error-checking protocol.

XE Term includes an option menu that allows you to set some terminal parameters, such as parity, duplex and translation modes. From this menu, you may also change the left margin from 2 to 0. Oddly enough, there's no way to force word wrapping. Words are frequently chopped in half at the end of a line, making text a bit difficult to read.



XM301.

The **XM301** is an auto-dial, auto-answer modem. XE Term manages these functions through a dialing menu. You can edit and store up to five telephone numbers, as well as set up a log-on macro.

For those of you who aren't familiar with the latter term, a *macro* simplifies a log-on procedure by automatically dialing the number, waiting for an answer, and transmitting the necessary codes and passwords. Handy for something like CompuServe.

XE Term, however, allows only one macro. Users of programs like **HomeTerm** may not find this adequate to their needs.

Once you have all your terminal parameters and auto-dialing information set up, you can save everything to a configuration file. This file will automatically load when the program is booted.

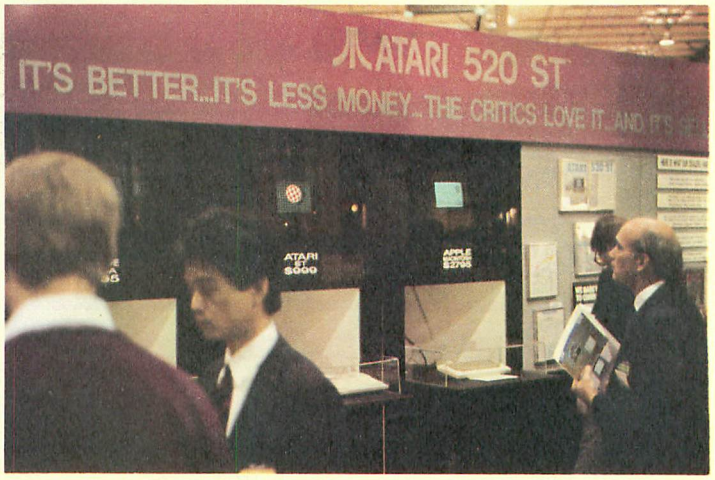
Another nice feature of XE Term is its file utilities menu. You may view directories, or lock, unlock, rename and delete files—without having to break your connection and load DOS. Speaking of disk files, if you have a 130XE computer, XE Term will automatically install DOS 2.5's ramdisk at boot-up time. Downloading to D8: (the ramdisk) is much faster than waiting for your old 810 to plod its way through a save (you could almost hear it moaning, "I think I can . . . I think I can . . ."). Once you have the file in memory, you can go off-line, and *then* save it to disk.

The manual is an attractive, spiral-bound book that's well written and easy to follow. Even novices should have no trouble getting their system set up and on-line. All of XE Term's functions are covered in a step-by-step manner, leaving nothing to the imagination.

As an added bonus, the package includes some introductory specials to various networks, including CompuServe, The Source, Dow Jones and—soon—Games Computers Play.

The **XM301** is a nice little unit. I would recommend it to beginning or intermediate users. More advanced users may find the software too limited and the data rate (300 baud) too slow for their purposes. Still, it's far superior to anything Atari has supplied previously. I'm sure it won't be too long before more sophisticated software for this modem becomes available.

COMDEX 1985
Atari's back!



Atari's main display—"It's better. . . It's less money. . . The critics love it. . . and it's selling!"

by Tom Hudson

If there was one message delivered to the computing community at the Fall 1985 COMDEX show in Las Vegas, it is this: Atari is well on its way to making the 520ST the hottest computer of 1986.

If Atari had shown their computers in an ordinary booth display, there would have been a great deal of room for doubt about this statement among the nearly 100,000 people attending the exhibition. However, Atari took a new approach at this show. Instead of showing the computers themselves, Atari set up approximately fifty ST systems and had the software developers come and demonstrate their products in person. The Atari display was so large, in fact, that there were three separate groups of displays, each containing from ten to twenty developers.

For those familiar with the "old" Atari, this was a radical departure. In the past, Atari acted as if other software companies didn't exist—a dangerous way to do business, and one which alienated many software publishers. The new Atari, under the command of the Tramiel clan, seems to realize that the success of a product depends not only on the product's attributes, but also on the software that's available for it. Atari's cooperation with third-party developers can only contribute to the success of the ST.

Sierra On-Line was showing its new ST graphic adventure program.

The thing that has caused many people to put off buying an ST system is its lack of software. At COMDEX, Atari distributed a list of software currently available for the ST (included in our listing—see the center insert). Their list showed almost 120 titles, ranging in function from paint programs to communication packages to database systems.

If you need to perform a function on your ST computer, it won't be too long before you'll have several programs to choose from. If you want to write your own software, several companies are producing languages, from LOGO to BASIC, to C and FORTH.

The ST wasn't the only Atari product displayed at COMDEX. The 130XE was also being shown, along with various products for it. XLent Software was displaying its **Rubber Stamp**, **Typesetter**, **Page Designer** and **Megafont II**. Batteries Included was showing its new version of **PaperClip**, which takes advantage of the XE's extra memory.

To show that the Atari computers can do just about anything the competition can, Atari had a Commodore Amiga, a 520ST and an Apple Macintosh, all running versions of the now famous Amiga "bouncing ball" demonstration. The Amiga and ST demos were quite simi-

Martin Herzog (left), of Batteries Included, explains DEGAS to an interested customer.

ANALOG Computing's Pat Kelley tries his hand at Progressivecomp's *Graphic Artist*.

lar in operation, but the Macintosh just couldn't hack it—its lack of color and speed was pathetic. Not to be left out, the 130XE was running its own version of the bouncing ball, written by a clever Atari user group member. So much for the "creative edge"!

Talking to exhibitors and other Atari developers at the show soon made it apparent that the ST was the talk of the show. The incredible display of so many products, by so many developers, gave the unmistakable impression that the ST is a force to be reckoned with—one that is here to stay.

Another subject of many discussions at COMDEX was the whereabouts of the Atari arch-rival, Commodore. They were nowhere to be found—a personal disappointment for me, because I wanted an up-to-date software list for the much-ballyhooed Amiga personal computer to compare with that for the Atari ST. After the show, I spoke with an Amiga developer, who told me that Commodore didn't show up because there wasn't enough software available for the Amiga to make a good impression. Other industry insiders told me that Commodore's creditors wouldn't allow the company to spend the large amount of cash necessary to purchase display space at the show.

Regardless of the reason for Commodore's absence, they missed an ideal opportunity to make a good impression on the computing public. Atari, on the other hand, showed the world that both their 8-bit and 16-bit machines are ready to take on the world.

Rising Star Industries' booth, complete with MIDI-equipped synthesizers.

Spinnaker Software was displaying their impressive line of ST products.

Coincidence Technical Software was showing a line of IEEE-488 products for the ST, as well as other utility programs.

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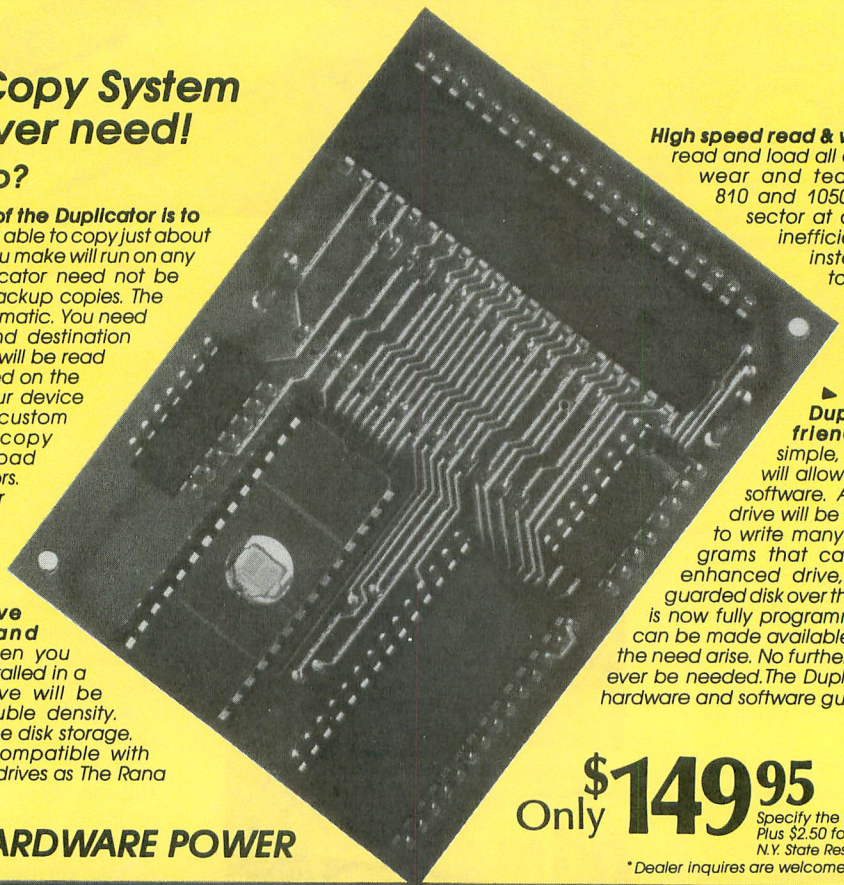

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CIRCLE #131 ON READER SERVICE CARD

CalcPi

A simple program in C and BASIC

by Bruce D. Noonan, M.D.

In the mid-1960s at Dartmouth College, all freshmen were introduced to computer programming in the introductory math courses. We used teletype terminals located throughout the campus and programmed, of course, in BASIC. Professors John Kemeny (who later became the president of the college) and Thomas Kurtz wrote and developed BASIC for use on the college's mainframe computer.

One of the early assignments to help us learn programming was a simple problem, calculating the value of pi. Pi, of course, is a transcendental constant; that is, it has an infinite number of characters following the decimal point, with no repeating sequence. The value is usually rounded off, for use in equations, to *3.14159265* or, more frequently, to *3.14*.

CalcPi is presented not only as an exercise in mathematics, but to demonstrate how to program in C, for use on the 520ST by those who are already familiar with BASIC. Although I'm familiar with BASIC and 6502 assembly language, this is my first C program.

The following two listings calculate an approximation of pi. The first, written in Atari BASIC for the 8-bit machine, lets the user choose which graphics mode to use, then draws a hexagon divided into six equilateral triangles, with sides having the value of 1 (Figure 1). Since we know that the circumference of a circle is equal to pi times its diameter, pi is therefore equal to the circumference divided by the diameter of the circle: pi = c/diameter.

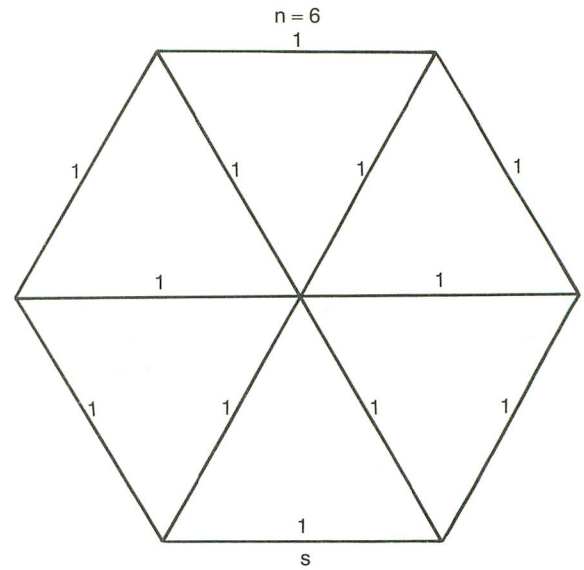


Figure 1.

The hexagon comprises a crude circle. Each of its sides approximates a portion of the circumference of a circle. Since we assigned the length of the side of each of the triangles to be 1, the "radius" of the hexagon is 1, and the diameter is therefore 2. Multiplying the number of sides ($n = 6$) by the length of a side ($s = 1$) yields the circumference: $c = n * s$, and pi is approximated by: pi = c/diameter, pi = 6/2, or pi = 3.

That approximation is close, but not very accurate. In Figure 2, each of the original six triangles is divided into two right triangles, and two other right triangles are created outside the original triangles. We now have a twelve-sided polygon whose sides approximate even more closely the edge of a circle. All we have to do is keep track of the number of sides (*new n = 2 * old n = 12*), and calculate the length of the new side, *s*.

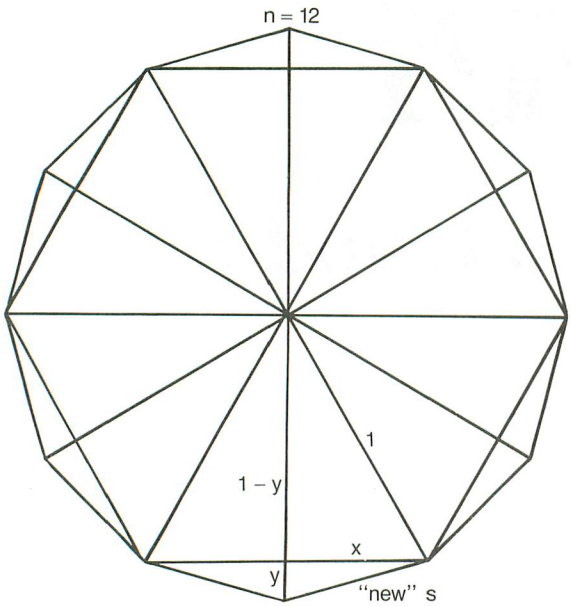


Figure 2.

We can find *s* by letting the base of the larger right triangle be *x* and the base of the smaller right triangle be *y*. Since the length of the radius is still 1, the other side of the larger right triangle becomes $1-y$, and the hypotenuse is equal to the "radius" of the polygon, which we set to 1. We also know that we've bisected the base of the original equilateral triangle of side *s*, so: $x = s/2$.

By the Pythagorean theorem, the squares of two sides of a right triangle add up to the square of the hypotenuse. We can solve for *y* in the larger right triangle by: $(1-y)^2 = 1^2 - x^2$, and taking the square roots of both sides, $1-y = SQR(1 - x^2)$. Solving for *y*, we have: $y = 1 - SQR)1 - x^2)$.

From the smaller right triangle, we can solve for s, the new length of a side of the polygon, also using the Pythagorean theorem: $s^2 = x^2 + y^2$ and $s = SQR(x^2 + y^2)$.

The circumference is then found by multiplying the number of sides ($n = 12$) by the length of a side (*s*), and pi is recalculated as above. We can go on dividing the newly formed triangles in half, making thinner and thinner triangles until the base is almost equal to the edge of the circle.

This sort of problem is easy for the computer, though doing it manually would soon drive one buggy. The value calculated for pi will never be completely accurate, since the floating point numbers used in the calculations don't have infinite precision. We achieve greater accuracy by using $x*x$ instead of x^2 in our calculations—eliminating the error introduced by the computer in converting *x* to a logarithm, by taking the log of the log, adding it to the log of 2, then taking the antilog of the antilog.

CalcPi not only performs the calculations over and over again with nary a grumble, but also draws the figure on the screen. As the triangles become more numerous, the drawing process gets longer and longer. To continue dividing up each polygon on the 8-bit Atari, hit SELECT or START. Pressing OPTION terminates the program. On the 520ST, pressing SHIFT or CTRL will continue the drawing, and ALTERNATE will terminate the program, returning to the GEM desktop.

Both listings demonstrate how to write the graphics routine so that any graphics mode can run the same program. The 520ST has three modes: low, medium and high resolution. Each uses differing numbers of pixels vertically or horizontally. Similarly, the 8-bit machine has different resolutions. Both programs define xbase and ybase, the resolution of the lowest resolution mode. The higher resolution modes utilize even multiples of these numbers, so multiplying the plotted points by those multiples will scale the drawing for each of the modes. The ratios are referred to as "scalex" and "scaley" for the x- and y-axis, respectively.

Notice another constant which appears in the equations, shaper. This is an empirical number used to create a "rounder" circle on the screen. It's different for each monitor, due to the fact that color screens and monitors have pixels which are taller than they are wide, producing vertically oval, rather than circular, plots.

To calculate shaper for your particular screen, set it to 1 initially. Stop the drawing when $n = 12$ and measure the height of the polygon and its width. Then, divide the height by the width. That's the value to use for shaper. The value in the C listing (Listing 1) is for the color monitor (SC1224). For the monochrome monitor, set shaper equal to 1.

Another constant, TWOPIRAD, is the number of radians in 360 degrees. It's used in calculating the points to be plotted. GEM only uses radians in an-

gle measurement, but Atari BASIC can use radians or degrees. The default value is radians.

I've tried to make the listings similar as far as possible. Pyxarray is an array of points to be plotted, the even-numbered elements being the x-coordinates, and the odd-numbered elements the y-coordinates.

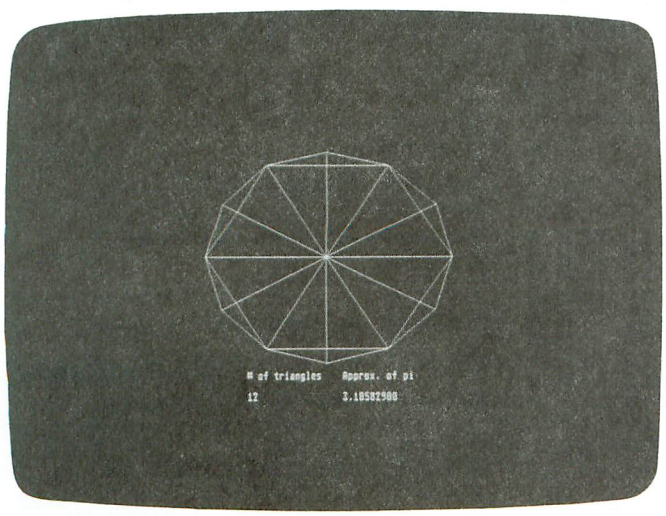
Since GEM has no way to print results from calculations in colors other than black on our black background directly, it was necessary to first convert the calculated values for *n* and pi to strings, then to print the strings on the screen. This was also done in the BASIC listing (Listing 2) for comparison purposes.

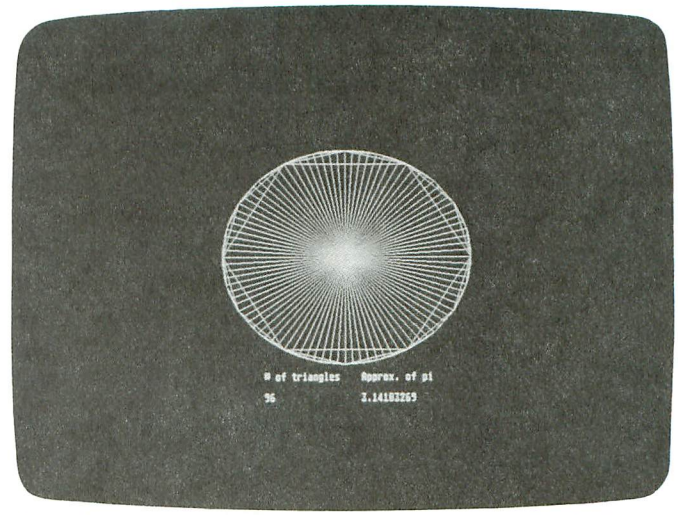
The C listing uses the function sprintf to write the string to memory. Remember, in C, all functions have parentheses after the function name. The parentheses may or may not contain arguments.

For example, in BASIC, the USR function may contain arguments within its parentheses. In C, these arguments may be used to pass information *to* the function and to get information *back*. The conversion specifier *%d* in the sprintf function simply says, "at this point in the string, substitute the integer contained in the following argument list, and convert it to a string." The minus sign *(-)* says to left justify the string, and the *18* says to reserve eighteen characters minimum for the string. The *\0* says to append a "null terminator" at the end of the string. This is done automatically by some compilers.

The *%.8lf* is the conversion specifier to convert a double-precision, floating-point number to a string, and the *.8* instructs the function to print a minimum of eight digits following the decimal point.

I won't bother repeating previously published information about the integer arrays that GEM uses in its procedure calls, but I will point out a big difference between BASIC and C. When performing calculations, BASIC doesn't care whether or not you use





floating-point numbers or integers in calculations.

Atari Microsoft BASIC allows you to declare the precision of the variables, but Atari BASIC does not. C requires that the precision of all variables be declared prior to use. When performing operations on numbers, C compilers may differ in results if you multiply or divide a floating point number by an integer.

For consistency, it's better to use similar numbers when performing operations. Notice that *n* is defined as an integer, but is multiplied by *s*, a double-precision, floating-point number. In the calculation, *(double)* precedes *n*, indicating that, for the purposes of this calculation, the compiler should treat *n* as a double-precision, floating-point number. In C, the *(double)* is known as a "cast."

C is rapidly becoming *the* development language for microcomputers. I urge BASIC programmers interested in C programming to read *Going from BASIC to C* by Robert J. Traister, published by Prentice-Hall, 1985.

Dr. Noonan is an ophthalmic surgeon in Edmonds, Washington. He's been interested in computing since college, and has developed a program on the 8-bit Atari that magnifies text files on the screen, plotting the text in graphics modes 5 and 7, for his low-vision patients.

Listing 1.
C listing.

```
/*  Pi Calculation                  */
/*  By Bruce D. Noonan, M.D.        */
/*  (c) 1985 ANALOG COMPUTING       */

#include  "gemdefs.h"
#include  "osbind.h"

#define   TWOPIRAD  6.2831853
#define   XBASE     320
#define   YBASE     200
#define   SHAPER    1.17
#define   DIAMETER  2.0
```

```
int  contrl[12], intin[128], ptsin[128], intout[128];
int  ptsout[128], l_intin[20], l_ptsin[20], l_out[100];
int  pxyarray[6], max_color, handle, xres, yres, index;
int  scalex, scaley, a, b, i, j, n, dummy, r, cx, cy;
int  color_index, set_color, rgb_in[3], key_state;

static char  heading[] = "# of triangles    Approx. of pi";

char  triangles[19], pistring[11];

double  x, y, s, c, pi, ang;

extern double  sqrt(), cos(), sin();

main()
{
  appl_init();

  handle=graf_handle( &dummy,&dummy,&dummy,&dummy );

  v_hide_c( handle ); /* cursor off */
  v_clrwk( handle );  /* remove desk! */

  for(i=0; i<10; i++)
  {
    l_intin[i]=1;
  }
  l_intin[10]=2;

  v_opnvwk( l_intin, &handle, l_out );
  xres=l_out[0];
  cx=(xres+1)/2;
  scalex = (xres + 1)/XBASE;
  yres=l_out[1];
  scaley = (yres + 1)/YBASE;
  cy=(yres+1)/2 - 20*scaley;
  max_color=l_out[13];

  /* background = black */

  rgb_in[0] = 0; /* red */
  rgb_in[1] = 0; /* green */
  rgb_in[2] = 0; /* blue */
  index = 0; /* background */
  vs_color( handle, index, rgb_in );

  /* polygon = white */

  rgb_in[0] = 1000;
  rgb_in[1] = 1000;
  rgb_in[2] = 1000;
  index = 1;
  vs_color( handle, index, rgb_in );

  /* calculations = yellow */

  rgb_in[0] = 1000;
  rgb_in[1] = 1000;
  rgb_in[2] = 0;
  index = 3;
  vs_color( handle, index, rgb_in );

  n = 6;
  s = 1.0;

  /* headings = red (white in high res.) */

  color_index = 2 - (max_color < 3);
  set_color = vst_color( handle, color_index );
  v_gtext( handle, cx-120, yres-30*scaley, heading );

  r = 78;  /* pixel radius of polygram */

  for( i=1; i<19; i++)
  {
    color_index = 1;
    set_color=vsl_color( handle, color_index ); /* white */

    pxyarray[0] = cx;
    pxyarray[1] = cy;

    pxyarray[2] = cx + SHAPER * r * scalex;
    pxyarray[3] = cy;

    for( j=1; j < (n + 1); j++)
    {
      ang = j * TWOPIRAD / n;  /* # radians per angle */

      a = cx + r * cos(ang) * scalex * SHAPER;
      b = cy + r * sin(ang) * scaley;
      pxyarray[4] = a;
      pxyarray[5] = b;
      v_pline( handle, 3, pxyarray );

      pxyarray[2] = a;
      pxyarray[3] = b;
    }

    x = s/2.0;
    y = 1.0 - sqrt( 1.0 - x*x );
    c = (double)n*s;
    pi = c/DIAMETER;

    sprintf( triangles,"%-10d\0", n );
    sprintf( pistring, "%.8lf\0", pi );
    strcat( triangles, pistring );

    /* data = yellow (white in high res.) */

    color_index = 3 - 2 * (max_color < 3);
    set_color = vst_color( handle, color_index );
    v_gtext( handle, cx-120, yres-15*scaley, triangles );

    n = 2*n;
    s  = sqrt(x*x + y*y);

    do
    {
      vq_key_s( handle, &key_state );
    }
    while( key_state == 0 );
    if( key_state == 8 ) break;
  }

  /* reset background color to white */

  rgb_in[0] = 1000;
  rgb_in[1] = 1000;
  rgb_in[2] = 1000;
  index = 0;
  vs_color( handle, index, rgb_in );

  /* reset color 1 to black */

  rgb_in[0] = 0;
  rgb_in[1] = 0;
  rgb_in[2] = 0;
  index = 1;
  vs_color( handle, index, rgb_in );

  /* reset color 3 to green */

  rgb_in[0] = 0;
  rgb_in[1] = 1000;
  rgb_in[2] = 0;
  index = 3;
  vs_color( handle, index, rgb_in );

  v_clsvwk( handle );
  appl_exit();
  _exit(0);

}
  /* END MAIN */
```

Listing 2.
BASIC listing.

```
10 REM ******************************
20 REM *                            *
30 REM *         CALCPI.BAS         *
40 REM *                            *
50 REM * by Bruce D. Noonan, M.D.   *
60 REM *                            *
70 REM * (c)1985 ANALOG COMPUTING   *
80 REM *                            *
90 REM ******************************
100 GRAPHICS 0:POSITION 2,10:? "TYPE G
RAPHICS MODE 4,5,6,7, OR 8 ":?:OPEN #1
,4,0,"K:":GET #1,MODE:CLOSE #1
```

```
110 MODE=MODE-48:IF MODE<4 OR MODE>8 T
HEN 100
120 TWOPIRAD=6.2831353
130 XBASE=80
140 YBASE=40
150 SHAPER=1.07:REM varies from 1.07 t
o 1.19
160 DIAMETER=2
170 DIM PYXARRAY(6),HEADING$(30),BLANK
S$(30),TRIANGLES$(18),PISTRING$(10)
180 HEADING$="# of triangles   Approx.
 of pi"
190 BLANKS$="
    "
200 GRAPHICS MODE
210 SETCOLOR 2,0,0:REM BACKGROUND = BL
ACK
220 SETCOLOR 0,0,14:REM POLYGON = WHIT
E
230 POKE 752,1
240 XRES=320*(MODE=8)+160*(MODE=7 OR M
ODE=6)+80*(MODE=5 OR MODE=4)
250 CX=XRES/2
260 SCALEX=XRES/XBASE
270 YRES=160*(MODE=8)+80*(MODE=7 OR MO
DE=6)+40*(MODE=5 OR MODE=4)
280 SCALEY=YRES/YBASE
290 CY=YRES/2
300 N=6
310 S=1
320 ? :? "   ";HEADING$
330 R=19.5
340 FOR I=1 TO 18
350 COLOR 1
360 PYXARRAY(0)=CX
370 PYXARRAY(1)=CY
380 PYXARRAY(2)=CX+SHAPER*R*SCALEX
390 PYXARRAY(3)=CY
400 FOR J=0 TO N
410 ANG=J*TWOPIRAD/N
420 A=CX+R*COS(ANG)*SCALEX*SHAPER
430 B=CY+R*SIN(ANG)*SCALEY
440 PYXARRAY(4)=A
450 PYXARRAY(5)=B
460 PLOT PYXARRAY(0),PYXARRAY(1):DRAWT
O PYXARRAY(2),PYXARRAY(3):DRAWTO PYXAR
RAY(4),PYXARRAY(5)
470 PYXARRAY(2)=A
480 PYXARRAY(3)=B
490 NEXT J
500 X=S/2
510 Y=1-SQR(1-X*X)
520 C=N*S
530 PI=C/DIAMETER
540 TRIANGLES$=STR$(N):TRIANGLES$(LEN(
TRIANGLES$)+1)=BLANKS$
550 PISTRING$=STR$(PI)
560 PRINT "   ";TRIANGLES$;PISTRING$;C
HR$(28)
570 S=SQR(X*X+Y*Y)
580 N=2*N
590 KEY=PEEK(53279)
600 IF KEY=3 THEN POP :GOTO 630
610 IF KEY=7 THEN 590
620 NEXT I
630 GRAPHICS 0
640 END
```

CHECKSUM DATA.

(see page 11)

```
10 DATA 335,827,585,831,142,835,539,83
9,351,156,933,117,789,783,350,8412
160 DATA 963,415,260,674,395,440,319,7
82,94,127,200,29,212,143,226,5279
310 DATA 234,597,560,151,490,592,599,9
80,611,339,839,648,556,351,360,7907
460 DATA 324,354,363,763,354,477,305,4
58,141,369,877,666,295,703,328,6777
610 DATA 857,744,903,48,2552
```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CIRCLE #135 ON READER SERVICE CARD

DOS Mods

Keep track of new and old versions of programs

by Gary S. Domrow

It's late at night, and I'm working on my latest programming masterpiece. In a fit of foolishness, I make widespread changes to the program, slashing here, adding there and modifying in-between. Then I save the program, using the same filename as I did earlier. The disk drive whirs to life and obediently writes the new program—over the only other version that I have.

After running the new program, I decide that the changes are all wrong; the previous version was much better. Slowly, realization that the last version has been totally and irretrievably erased comes to me, and I spend hours repairing the damages.

If you've written many programs, you may have suffered through the preceding nightmare. I know that I have, several times. Recently, inspired by a mini computer that I use, I decided to attempt to modify DOS to eliminate the problem. **DOS Mods** is the result of my work.

The program.

The two BASIC programs shown at the end of this article will modify DOS. Notice that one is for Atari DOS, and the other is for OS/A+.

These programs will rewrite DOS on your disk. From then on, booting the disk with modified DOS is all that needs to be done to make the modification available. **DOS Mods** does not use the AUTORUN.SYS file, so that is unaffected.

DOS Mods looks at the filename each time you load or save a file, or each time a file is opened for input or output (not updated or appended). If the filename extension (characters after the period) is not a V, DOS will work as if it weren't modified. However, if the extension is a V, the modification will append a version number to the V before saving or loading the file.

If the file is being opened for output, as in a save, DOS will look for the highest version number on the disk and add 1 to get the new extension.

If the file is being opened for input, as it would be to perform a LOAD operation, the highest current version number will be appended to the extension. The open file routine will then continue with that filename.

Using the modified DOS.

As implied above, **DOS Mods** is easy to use. However, I believe that a few examples will clarify many questions. For these examples, I will use BASIC, though the modification is not restricted to BASIC. I've also used it with two different assemblers and my word processor.

Example 1. To LOAD a standard BASIC program named "D:STUFF.BAS", *type: LOAD "D:STUFF.BAS".* No surprises here. The modification sees the *BAS* extender and does nothing.

Example 2. To SAVE that same program, but use version numbers, type: *SAVE "D:STUFF.V".* The modification will see the V, look for other

files named 'STUFF.V??' and find none. Therefore, the file will be saved as 'STUFF.V01'.

Example 3. To SAVE the program after making changes, type: *SAVE "D:STUFF.V"*. Does this look familiar? Now, DOS will see the *V* and also see the *V01* on the disk, so it will SAVE it as 'STUFF.V02'.

Example 4. To LOAD the most recent version of the program, type: *LOAD "D:STUFF.V"*. Here, when DOS sees the *V*, it will look for the highest version number, since the file is opened for input. It will automatically load 'STUFF.V02'.

There's one more wrinkle to my modification that I haven't yet mentioned. If you save version after version of a long program, it won't be long before the disk fills up. Therefore, I added one more feature. When the DOS is modified, **DOS Mods** will ask for the maximum number of versions on the disk. If I answer *2* to this question and continue the above examples, something new will happen.

Example 5. To SAVE 'STUFF' again, for the third time, type: *SAVE "D:STUFF.V"*. This time, DOS sees that there are already two versions of 'STUFF' on the disk—the maximum number of versions that we set. So, before saving 'STUFF.V03', it deletes 'STUFF.V01'. Then two, and only two, most recent files will always be on the disk. Incidentally, the maximum number of versions may be set anywhere between 2 and 8, inclusive.

Example 6. To LOAD the version before the last one, type: *LOAD "D:STUFF.V02"*. DOS will see the *02*, and not mess around with our filename.

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Typing and executing.

Before you rush off to the keyboard, please bear with me for a few more sentences. There are three program listings with this article. To modify DOS, you must type in at least one of the two BASIC programs. If you wish to modify Atari DOS 2.0, type Listing 1. To modify OS/A+, type Listing 2. If you use both, the only lines that need to be typed the second time are 90-110, 380-390, and 5000-5260.

Once **DOS Mods** has been typed, it's extremely important to save it before you run it. If you make a typing mistake, running the program may cause the computer to lock up, and you'd lose the program if you hadn't saved it.

Next, boot the disk that has the DOS to be modified on it. LOAD and RUN the BASIC program. First, **DOS Mods** will ask for the maximum number of versions, then it will check the data. If any errors are found, check the indicated line, SAVE the program, and RUN it again. When the data checks out, it will be POKEd into memory. DOS will be reinitialized, and you'll be asked to press a key. With the disk to be modified in drive 1, press a key. You should hear the file being saved to your disk. If the computer doesn't respond, LOAD the program and check Lines 90 and 300-400 first. If they're all correct, check lines 5000-5260 and try again.

Before using the modified disk, SAVE and LOAD a program using *V* extenders several times, then check the directory to make sure everything is intact. If any problems arise, recheck the data.

When you have one copy of modified DOS that works properly, you no longer need the BASIC programs. To get another copy, just boot the disk with the modified DOS before writing the DOS files. However, it may be wise to keep the BASIC program—in case something happens to the disk with modified DOS.

Notes and precautions.

Although **DOS Mods** shouldn't cause any problems,

I do have suggestions and warnings about its use.

(1) By all means, *do not modify* the DOS on your system master disk. In fact, you shouldn't be able to, because the write-enable notch isn't cut in the jacket.

(2) The modified DOS may not be compatible with every language and every utility. This is especially true of machine language utilities that load right above DOS. If you're unsure, test it out with a short program before you proceed.

(3) If you have a very large program, it may not load with **DOS Mods**. The modification uses about 350 bytes in low memory.

(4) If you get all the way to version 99, the next save will be version 00. However, if you then load with an extender of V, version 99 will be loaded, since 99 is greater than 0. In this case, either use an explicit version number, or rename or delete version 99.

(5) If you wish to disable the modification, enter the following:

For Atari: POKE 2239,33:POKE 2240,15
POKE 1804,124:POKE 1805,26
Press RETURN, then SYSTEM RESET.

For OS/A+: POKE 2239,33:POKE 2240,15
POKE 5464,29:POKE 5459,0
Press RETURN, then SYSTEM RESET.

The only safe way to re-enable the modification is to reboot the system, or run the BASIC program used to create the modified DOS.

(6) Some options of DUP.SYS may not work, or may give erroneous error messages with this modification. Option 0 will not work, and D may give an error 130 after deleting the file. I haven't had problems with the others. However, it's probably safest to disable the modification (note 5) before going to DOS. This will prevent any problems.

Special note.

I wish to applaud Atari and Optimized Systems Software. OSS, for those of you who aren't familiar with the beginnings of Atari, wrote Atari BASIC and Atari DOS, as well as OS/A+ and many other fine programs. I wish to applaud both companies, for their outstanding policy of publishing the source code for DOS.SYS, as well as for Atari BASIC and the Atari OS.

I know of no other computer that has been so public with its software. Without the source code to DOS, found in the book *Inside Atari DOS* (compiled by Bill Wilkinson, OSS, and published by *COMPUTE!* books of Greensboro, North Carolina), I would have been unable to even attempt such a modification.

How DOS Mods works.

For those of you who wish to know how and why programs work, I include this brief explanation. First, the BASIC programs should be relatively straightforward, but there are a few things I wish to point out.

Notice Line 380 (either BASIC program). This line POKEs the new address for DOS to JSR to, when opening a file. In unmodified DOS, this instruction does a JSR to the directory search routine.

The next set of POKEs tell DOS the new address at which to start allocating its buffers, to make room for my routine. Finally, by some strange design feature of DOS, Line 440 will automatically rewrite the resident DOS to the file DOS.SYS on the disk.

Instead of searching the directory immediately, **DOS Mods** merely changes the filename, if conditions are right, before doing the search. Notice that the very last instruction executed before the RTS is a JSR to the directory search routine. Because of this, DOS will never know that it was interrupted. My routine begins at $1A7C (Atari), or $1D00 (OS/A+), depending on the type of DOS. Normally, DOS would allocate its buffers here, but I moved that pointer in the BASIC program to make room.

I tried to be generous with comments, so the source code should be fairly self-explanatory. The routine begins by initializing some variables, checking the extender and the open type. Then it searches for files of this name on the disk, saving information about them in a table. Next it deletes files, if necessary. The appropriate extender is then decided upon and put into the filename buffer. Finally, the routine does the directory search that was originally in DOS.

Gary Domrow is a third year computer science student at a Purdue University extension. He has worked with Ataris for over four years, learned assembly language two years ago, and now spends much of his free time learning and experimenting with FORTH.

Listing 1. — BASIC listing for Atari DOS 2.0S.

```
10 REM ********************************
20 REM *                              *
30 REM *  DOS VERSION MODIFICATION    *
40 REM *       by Gary S Domrow       *
50 REM *         May 2,  1984         *
60 REM *   ATARI DOS 2.0S VERSION     *
70 REM *                              *
80 REM ********************************
85 REM
90 POKE 8,255:START=6780:REM FOR ATARI
 DOS
95 REM INTRO
100 GRAPHICS 0:PRINT :PRINT "      ATA
RI DOS 2.0S MODIFIER"
110 PRINT :PRINT " Use this program fo
r ATARI DOS only"
120 PRINT :PRINT
130 PRINT "Enter the maximum number of
 versions "
140 PRINT "to be kept on the disk.  Th
is number "
```

```
150 PRINT "must be at least 2, and no
greater    "
160 PRINT "than 8."
170 PRINT
175 REM GET VERSION INPUT
180 TRAP 180:PRINT "How many versions
";:INPUT NUMVER:TRAP 44444
190 IF NUMVER<2 OR NUMVER>8 THEN 180
200 ERFLG=0:PRINT "Checking Data Line:
"
203 REM
205 REM CHECK DATA LINES
210 FOR LINE=5000 TO 5260 STEP 10:READ
 DAT:SUM=DAT
220 REALLINE=PEEK(183)+PEEK(184)*256:I
F LINE<>REALLINE THEN ? "Line ";LINE;"
 Missing.":END
230 ? LINE
240 FOR ITEM=1 TO 11:READ DAT:SUM=SUM+
DAT:NEXT ITEM
250 READ CHSUM:IF CHSUM<>SUM THEN ? "B
ad data in line ";LINE:ERFLG=1
260 NEXT LINE
265 REM
266 REM CHECK ERROR FLAG
270 IF ERFLG=1 THEN END
273 REM
275 REM PUT DATA INTO DOS
280 RESTORE 5000
290 PRINT "Poking data into DOS from l
ine:"
300 FOR I=0 TO 31:POKE START+I,0:NEXT
I
310 OFS=32
320 FOR LINE=5000 TO 5260 STEP 10:? LI
NE
330 FOR ITEM=1 TO 12:READ A:POKE START
+OFS,A:OFS=OFS+1:NEXT ITEM
335 REM SKIP CHECKSUM THIS TIME
340 READ CHSUM
350 NEXT LINE
355 REM
360 REM POKE IN NUMBER OF VERSIONS
370 POKE START+32,NUMVER
373 REM
375 REM POKE IN JSR PATCH
380 POKE 2239,157:POKE 2240,26
383 REM
385 REM POKE IN NEW BUFFER START
390 POKE 1804,0:POKE 1805,28
393 REM
395 REM REINITIALIZE DOS
400 POKE 1536,104:POKE 1537,76:POKE 15
38,64:POKE 1539,21:X=USR(1536)
403 REM
405 REM RE-WRITE DOS.SYS FILE
410 POKE 764,255:PRINT :PRINT :PRINT "
Press any key to write modified DOS"
420 IF PEEK(764)=255 THEN 420
430 POKE 764,255
440 OPEN #4,8,0,"D:DOS.SYS":CLOSE #1
443 REM
445 REM THAT'S IT
450 END
5000 DATA 3,169,0,141,114,19,141,115,1
9,160,31,153,1065
5010 DATA 124,26,136,16,250,173,97,19,
201,86,208,25,1361
5020 DATA 173,98,19,201,32,208,18,173,
99,19,201,32,1273
5030 DATA 208,11,189,130,19,201,4,240,
7,201,8,240,1458
5040 DATA 3,76,160,27,142,116,19,169,6
3,141,98,19,1033
5050 DATA 141,99,19,32,33,15,176,60,17
2,5,19,174,945
5060 DATA 114,19,185,15,20,10,10,10,10
,157,124,26,700
5070 DATA 185,16,20,41,15,29,124,26,15
7,124,26,173,936
5080 DATA 6,19,157,125,26,152,157,126,
26,173,7,19,993
5090 DATA 157,127,26,24,173,114,19,105
,4,141,114,19,1023
5100 DATA 238,115,19,32,49,15,144,196,
174,116,19,189,1306
5110 DATA 130,19,201,4,240,64,173,115,
19,205,156,26,1352
5120 DATA 144,56,141,117,19,160,4,162,
0,206,117,19,1145
5130 DATA 240,17,189,124,26,217,124,26
,144,2,152,170,1431
5140 DATA 200,200,200,200,76,53,27,32,
164,27,32,205,1416
5150 DATA 27,174,116,19,32,110,16,32,8
3,12,32,113,766
5160 DATA 16,32,149,16,206,115,19,76,3
8,27,160,0,854
5170 DATA 162,0,173,115,19,141,117,19,
189,124,26,217,1302
5180 DATA 124,26,144,2,138,168,232,232
,232,232,206,117,1853
5190 DATA 19,173,117,19,16,234,174,116
,19,189,130,19,1225
5200 DATA 74,74,74,24,248,121,124,26,1
53,124,26,216,1284
5210 DATA 152,170,32,164,27,174,116,19
,32,33,15,96,1030
5220 DATA 189,124,26,41,15,9,48,141,99
,19,189,124,1024
5230 DATA 26,74,74,74,74,9,48,141,98,1
9,189,125,951
5240 DATA 26,141,6,19,189,126,26,141,5
,19,189,127,1014
5250 DATA 26,141,7,19,96,169,0,224,28,
176,3,189,1078
5260 DATA 128,26,157,124,26,232,224,32
,208,239,96,0,1492
```

●

CHECKSUM DATA.

(see page 11)

```
10 DATA 771,223,81,2,822,740,233,785,2
80,105,917,390,779,344,977,7449
140 DATA 1,751,860,690,802,711,997,166
,79,293,374,375,638,954,705,8396
260 DATA 189,99,292,235,100,660,454,29
3,14,633,164,965,600,40,188,4926
355 DATA 98,858,584,102,609,677,105,46
8,694,108,559,67,83,971,437,6420
420 DATA 523,263,557,95,361,47,928,821
,952,669,762,731,472,714,569,8464
5090 DATA 821,80,797,939,26,760,524,67
4,23,115,73,844,18,806,552,7052
5240 DATA 755,711,821,2287
```

●

Listing 2.
BASIC listing for OSS OS/A+.

```
10 REM ********************************
20 REM *                              *
30 REM *  DOS VERSION MODIFICATION    *
40 REM *       by Gary S Domrow       *
50 REM *         May 2,  1984         *
60 REM *   OSS OS/A+ Version 2.10      *
70 REM *                              *
80 REM ********************************
85 REM
90 POKE 8,255:START=7424:REM FOR OS/A+
```

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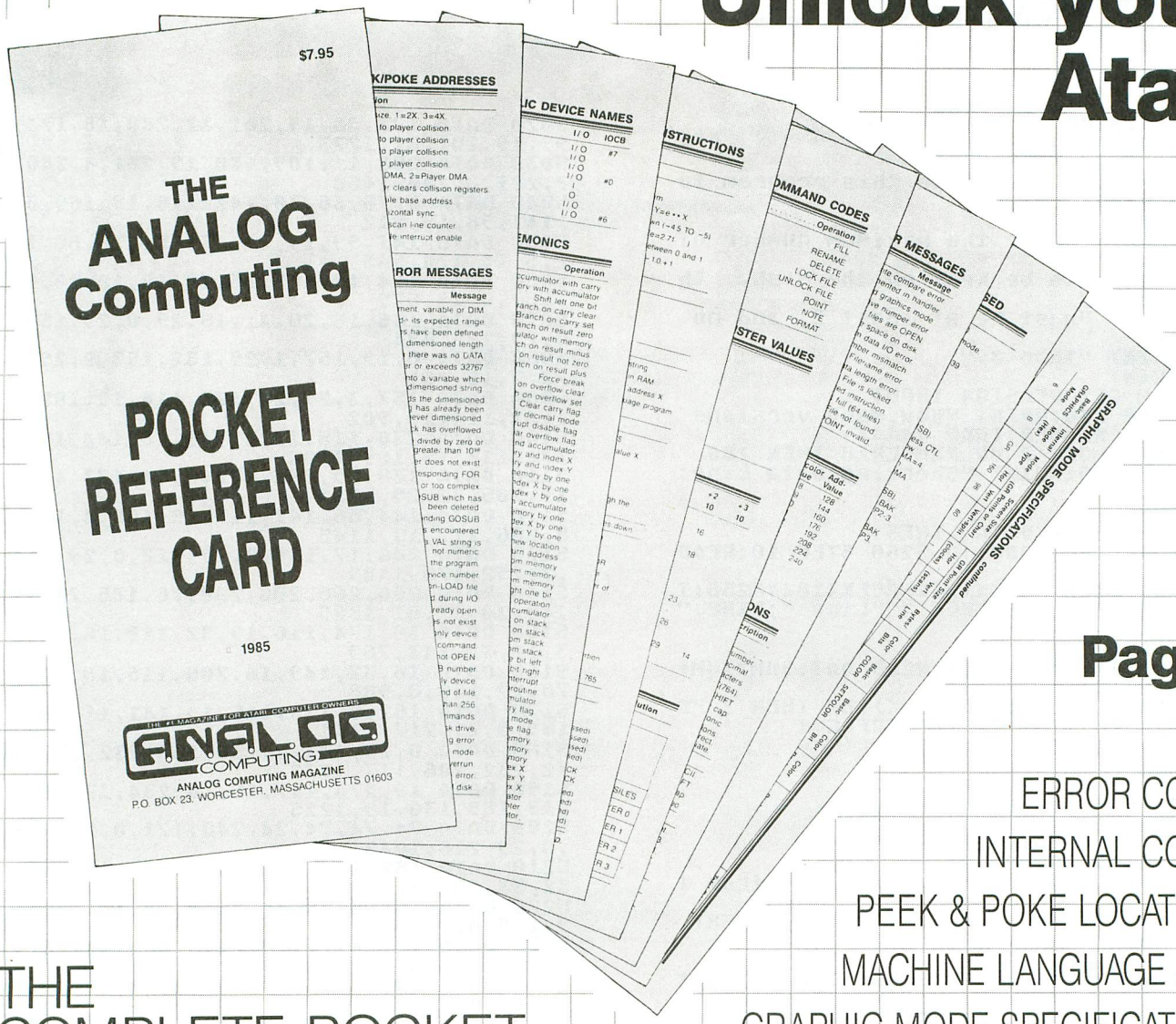

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```
95 REM INTRO
100 GRAPHICS 0:PRINT :PRINT "      ATA
RI DOS 2.0s MODIFIER"
110 PRINT :PRINT " Use this program fo
r DOS DOS/A+ only"
120 PRINT :PRINT
130 PRINT "Enter the maximum number of
 versions "
140 PRINT "to be kept on the disk.  Th
is number "
150 PRINT "must be at least 2, and no
greater    "
160 PRINT "than 8."
170 PRINT
175 REM GET VERSION INPUT
180 TRAP 180:PRINT "How many versions
";:INPUT NUMVER:TRAP 44444
190 IF NUMVER<2 OR NUMVER>8 THEN 180
200 ERFLG=0:PRINT "Checking Data Line:
"
203 REM
205 REM CHECK DATA LINES
210 FOR LINE=5000 TO 5260 STEP 10:READ
 DAT:SUM=DAT
220 REALLINE=PEEK(183)+PEEK(184)*256:I
F LINE<>REALLINE THEN ? "Line ";LINE;"
 Missing.":END
230 ? LINE
240 FOR ITEM=1 TO 11:READ DAT:SUM=SUM+
DAT:NEXT ITEM
250 READ CHSUM:IF CHSUM<>SUM THEN ? "B
ad data in line ";LINE:ERFLG=1
260 NEXT LINE
265 REM
266 REM CHECK ERROR FLAG
270 IF ERFLG=1 THEN END
273 REM
275 REM PUT DATA INTO DOS
280 RESTORE 5000
290 PRINT "Poking data into DOS from l
ine:"
300 FOR I=0 TO 31:POKE START+I,0:NEXT
I
310 OFS=32
320 FOR LINE=5000 TO 5260 STEP 10:? LI
NE
330 FOR ITEM=1 TO 12:READ A:POKE START
+OFS,A:OFS=OFS+1:NEXT ITEM
335 REM SKIP CHECKSUM THIS TIME
340 READ CHSUM
350 NEXT LINE
355 REM
360 REM POKE IN NUMBER OF VERSIONS
370 POKE START+32,NUMVER
373 REM
375 REM POKE IN JSR PATCH
380 POKE 2239,33:POKE 2240,29
383 REM
385 REM POKE IN NEW BUFFER START
390 POKE 5464,128:POKE 5459,30
393 REM
395 REM REINITIALIZE DOS
400 POKE 1536,104:POKE 1537,76:POKE 15
38,64:POKE 1539,21:X=USR(1536)
403 REM
405 REM RE-WRITE DOS.SYS FILE
410 POKE 764,255:PRINT :PRINT :PRINT "
Press any key to write modified DOS"
420 IF PEEK(764)=255 THEN 420
430 POKE 764,255
440 OPEN #4,8,0,"D:DOS.SYS":CLOSE #1
443 REM
445 REM THAT'S IT
450 END
5000 DATA 3,169,0,141,114,19,141,115,1
9,160,31,153,1065
5010 DATA 0,29,136,16,250,173,97,19,20
1,86,208,25,1240
5020 DATA 173,98,19,201,32,208,18,173,
99,19,201,32,1273
5030 DATA 208,11,189,130,19,201,4,240,
7,201,8,240,1458
5040 DATA 3,76,36,30,142,116,19,169,63
,141,98,19,912
5050 DATA 141,99,19,32,33,15,176,60,17
2,5,19,174,945
5060 DATA 114,19,185,15,20,10,10,10,10
,157,0,29,579
5070 DATA 185,16,20,41,15,29,0,29,157,
0,29,173,694
5080 DATA 6,19,157,1,29,152,157,2,29,1
73,7,19,751
5090 DATA 157,3,29,24,173,114,19,105,4
,141,114,19,902
5100 DATA 238,115,19,32,49,15,144,196,
174,116,19,189,1306
5110 DATA 130,19,201,4,240,64,173,115,
19,205,32,29,1231
5120 DATA 144,56,141,117,19,160,4,162,
0,206,117,19,1145
5130 DATA 240,17,189,0,29,217,0,29,144
,2,152,170,1189
5140 DATA 200,200,200,200,76,185,29,32
,40,30,32,81,1305
5150 DATA 30,174,116,19,32,110,16,32,8
3,12,32,113,769
5160 DATA 16,32,149,16,206,115,19,76,1
70,29,160,0,988
5170 DATA 162,0,173,115,19,141,117,19,
189,0,29,217,1181
5180 DATA 0,29,144,2,138,168,232,232,2
32,232,206,117,1732
5190 DATA 19,173,117,19,16,234,174,116
,19,189,130,19,1225
5200 DATA 74,74,74,24,248,121,0,29,153
,0,29,216,1042
5210 DATA 152,170,32,40,30,174,116,19,
32,33,15,96,909
5220 DATA 189,0,29,41,15,9,48,141,99,1
9,189,0,779
5230 DATA 29,74,74,74,74,9,48,141,98,1
9,189,1,830
5240 DATA 29,141,6,19,189,2,29,141,5,1
9,189,3,772
5250 DATA 29,141,7,19,96,169,0,224,28,
176,3,189,1081
5260 DATA 4,29,157,0,29,232,224,32,208
,239,96,0,1250
```

●

CHECKSUM DATA.

(see page 11)

```
10 DATA 771,223,81,2,822,24,233,785,28
0,326,917,390,657,344,977,6832
140 DATA 1,751,860,690,802,711,997,166
,79,293,374,375,638,954,705,8396
260 DATA 189,99,292,235,100,660,454,29
3,14,633,164,965,600,40,188,4926
355 DATA 98,858,584,102,609,478,105,46
8,698,108,559,67,83,971,437,6225
420 DATA 523,263,557,95,361,47,928,762
,952,669,767,731,440,168,424,7687
5090 DATA 499,80,970,939,544,963,529,5
20,992,23,73,679,498,452,488,8249
5240 DATA 354,701,728,1783
```

●

DISK WIZARD II
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by Jonathan David Farley

C.A.P. Software, Incorporated, has just produced **Disk Wizard II**, a utility written by P.A. Campanaro. **Disk Wizard II** is menu driven, comes in four 100% machine language programs, and it's all on one side of one unprotected diskette. **Disk Wizard II** is exactly the kind of utility we hackers have been looking for.

The four programs are Disk Backup, Disk Edit, Disk Speed, and Dissassembler. Disk Backup allows you to copy several sectors at a time—or even copy the entire disk. While it copies, **Disk Wizard II** informs you whether the sector it's currently accessing is empty, or contains data. It can also warn you about two types of disk errors—bad sectors and cyclic redundancy check errors. Disk Backup has many features which allow you to read and copy more data on a single pass.

The "map disk" option of the Disk Backup program examines the sectors you specify, to determine the number of empty sectors, bad sectors, sectors which return CRC errors when read and data sectors. Map disk also gives you the last data sector of the sectors read.

Options in the Disk Backup program include writing empty sectors (as opposed to going on to the next sector containing data), "fast write" (which does not verify what's been written, and thus operates faster), and formatting the destination diskette (before copying onto it). **Disk Wizard II** can even format damaged diskettes by locking out the bad sectors. When formatting is finished, **Disk Wizard II** creates a file called BADSECT. FMT, with a length equal to the number of bad, unformatable sectors on the diskette.

Disk Edit is the most powerful (and useful) program in **Disk Wizard II**. It can display sectors in both hexadecimal and ASCII (or ATASCII), and it also displays "sector link" information—the number of the file each sector belongs to, the number of bytes in the sector and the next sector in the file. Disk Edit lets you modify sector data and write this onto the disk. The plus sign (+) and minus sign (-) commands allow two-way sequential access of sectors. *N* uses sector link data to find and display the next sector in the file. This all works in both double- and single-density modes.

"Scan sectors," another option of Disk Edit, examines sectors for either a sequence of bytes or a string. When scan sectors locates the sector with the data it's seeking, it displays that sector with the first byte of the data in inverse.

Disk Edit also lets you display the directory, which gives the file number and name, the starting sector and length of the file, and tells you if the file is deleted. If it is, you can recover it. The file links may be traced with Disk Edit by using another option of the program—one which also lets you find and repair the sectors, so that you will never again receive those irritating error 164s ["file number mismatch (sector link error)"].

The third program, Disk Speed, functions not only as a tachometer for your drive, but can also write bad sectors if you can change the speed of your drive's motor. The last program, Disassembler, disassembles machine code by sectors or by files. Optionally, the Dissassembler may disassemble using Atari's standard mnemonic names for memory locations! So:

```
1000 A9 01     LDA #$01
1002 8D 04 03  STA $304
```

becomes:

```
1000 A9 01     LDA #$01
1002 8D 04 03  STA DBUFLO
```

The manual, written by R.W. Pakan and A.L. Arbital, covers all of the above quite clearly, although the generic black and white cover is a bit bland. The instructions begin by telling you how to back up your copy of **Disk Wizard II**, how to correctly enter the commands and how to get started. The manual even included instructions for booting up the disk!

Some technical notes concerning the physical structure of disks were included, as well as a miniature tutorial on disk protection methods. One of the appendices contained a list of all four hundred of Atari's mnemonic memory loca-

tion names and their locations for use with the Dissassembler.

I believe **Disk Wizard II** is for you — if you want easy command of the disk, helpful technical information and a greater knowledge of your disk-based environment and software. **Disk Wizard II** is so easy to use that you probably won't even have to read the instructions, but read them anyway, since the technical information, the disk protection methods and a few other things in it shouldn't be missed.

The one aspect of **Disk Wizard II** which I disliked was having to press RETURN after virtually every command. This prevented me from using **Disk Wizard II** at my own pace and slowed me down considerably.

Disk Wizard II is always resident, eliminating much wear and tear, and preserving your diskette. You also don't have to insert the **Disk Wizard II** disk all the time. Just about everything that comes onto the screen can also go out onto the printer, a fantastic feature! The ESC key may be used to abort most functions.

Disk Wizard II is very affordable, and ordering by phone is quick and easy. I highly recommend it.

Jonathan David Farley is a sophomore at Brockport High School in New York. He has been working with computers since taking a college computer course at age nine, and is now interested in reviewing and writing software.

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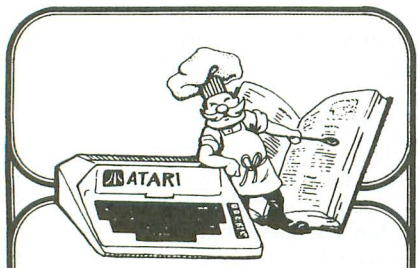

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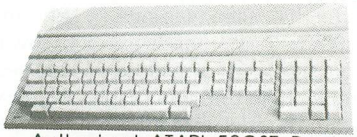

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eye from the mountains of California, at just over seventh magnitude.

Harry Hammond
Mashpee, MA

Atari Corp. service okay — for some.

In reference to Matthew J.W. Ratcliff's letter in issue 32, I have found my dealings with the new Atari Corp. to be quite different from his.

After reading about the LOAD and SAVE problem since February, I decided to take Atari up on their offer of a REV.C cartridge. In June, I sent Atari one letter and fifteen dollars. Four weeks later I had my REV.C cartridge.

My one other dealing with Atari happened only this month. I was unable to obtain DOS 2.5 from the **ANALOG Computing** TCS because I have only DOS 3.0. I wrote to David Duberman at Atari, telling him my problem and asking him to send me the name of an Atari user group in my area. Instead, he sent me the new Atari DOS 2.5 master disk, complete with its three new utility programs. This was obviously a great PR move, but one that nonetheless shows me that the new Atari is willing to support its customers.

Sincerely,
Richard S. Larkin
Rome, NY

Review bugs.

Nag, nag, nag! I feel as if I am giving your game reviewers a bad time, but here's the latest.

I read Patrick Kelley's review of **Crusade in Europe** closely and with interest. It was a good and pretty thorough review. In the end he writes, "What else can I say?" I have some suggestions.

How about comment on whether or not this game has a save game feature (not all Microprose games do). How about a workout of this feature if it is included (not all Microprose save-game features are reliable.) I purchased **NATO Commander** last year for the amusement of my husband and various males who hang out at our house in company with my daughters. All of them had repeated (and unpredictable) problems with the save and restore functions.

Pretty frustrating after hours of careful playing. So frustrating, in fact, that none of them wants to take a chance on any more games from Microprose. Has this been corrected?

Another suggestion: Does the documentation include—in addition to a bibliography—a thorough explanation of all options that must be used to complete the game? This review was pretty thorough about the options, but to what extent they were self-discovered and to what extent they were documented is not explicit.

In **F-15 Strike Eagle**, for example, the jet has to return to the carrier and land. This is not stressed in any way, nor are there any hints as to how to do it. Everybody managed to master this on their own, eventually, but a sentence or two would have been nice.

Thanks again.
Sandra van Vegten
Chicago, IL

A choice must sometimes be made in reviews, because of space limitations, as to the game features to detail. We've had no problems with the save game feature, nor were we aware of any.

Pat also tries to leave a few discoveries to the player. —*Ed.*

ST BBS.

I would like to let you know of a bulletin board primarily for the Atari 520ST. The Coastal Area BBS is located in Biloxi, Mississippi and runs on a Kaypro 10, 24 hours per day, 7 days a week, at 300, 1200 or 2400 baud—(601) 388-3490. There is approximately 10 megabytes of message and program storage space available.

This board is sponsored by the Coastal Area Atari Users' Group and was started to help spread the popularity of the new computers. It provides a message base forum and public domain software area for uploads and downloads.

We hope that this will become one of the most popular bulletin boards in the country. The ST itself has already shown its strength, and we hope to help it continue. One thing we would like you to know: All of this equipment has been donated to further the Atari cause. Many other groups start out way behind in their ability to provide a bulletin board service. We feel that we have started out with a great system—that will be able to grow even more when needed!

Once again, thanks for your support.
Sincerely,
David E. Warner, President
Coastal Area Atari Users' Group
Biloxi, MS
(601) 388-8284

Solid Gold refined.

I enjoyed Jim Dunion's **Solid Gold Input Routine** in your issue 36 (November). Sorry, Jim, but you forgot the old CTRL-3 bugaboo, which will generate a 136 error and break the routine. I suggest the following to prevent it:

```
185 TRAP 185:GET #Z4,ZR:IF
 ZR=CARRET THEN 195
195 POKE SHFLOK,Z64:POKE I
NVFLG,Z0:TRAP 40000:RETURN
```

The TRAP 40000 statement in Line 195 is necessary, to prevent potential errors in another part of the program from transferring execution into the middle of the input subroutine.

Sincerely,
Bruce D. Noonan, M.D.
Edmonds, WA

Don't Panak.

I'd like to correct an error that appeared in Steve Panak's January column (issue 38).

We are most certainly *not* abandoning our 8-bit Atari fans! Except for Steve Meretsky's **A Mind Forever Voyaging**, every Infocom game published to date is available for all Atari 400, 800, XL and XE computers with at least 48K of RAM. This includes our latest title, **Spellbreaker**, as well as our new February release, **Ballyhoo**.

A Mind Forever Voyaging *is the first* in our Interactive Fiction Plus™ series. "Plus" games require an 80-column display, 300K of disk space and 128K of RAM (preferably more). Regrettably, these specifications exclude most Atari, Commodore and Tandy machines, and all but the largest Apples.

Fear not, loyal InfoFans! Only a limited number of our future games will use the "Plus" system. Most titles we're working on are "Classic" games, and will run fine on 8-bit Ataris. Relax! Infocom will publish 8-bit games as long as you continue to buy them.

Brian Moriarty
Infocom, Inc.
Cambridge, MA

Thank you for bringing this information to our attention, Brian. Steve Panak realized (too late) that his statement was indeed inaccurate, as he mentions in his column next month.

Brian also tells us that the 520ST is one of the few machines in which the entire ***A Mind Forever Voyaging*** *runs in RAM with no disk access necessary.*
—*Ed.*

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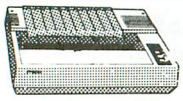

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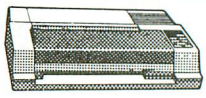

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Program Helper

Converts constants to variables to save RAM

by Jonathan Stone

Have you ever encountered a memory insufficient error while putting the finishing touches on your BASIC masterpiece? Has the dreaded error 164 ever destroyed your BASIC file? If so (and even if not), take a look at this utility—**Program Helper**.

What the program does.

One thing **Helper** does is decrease the amount of RAM a program occupies, by converting frequently-used constants to variables. For example, if the constant *8* was used ten times in a program, and you told **Helper** to convert that number, it would define the variable C8 as equal to 8 at the beginning of your file, and would then replace each *8* with *C8*. You must leave Line 0 in your program free if you want to use this option.

Because a constant occupies 7 bytes in a program and a variable occupies only 1, this would save you a total of 60 bytes (minus the bytes used in Line 0). But that's just the start. Any constant which appears more than twice is worth converting to a variable. And, in a large program, some constants will occur hundreds of times.

If **Helper** is run on itself, for example, converting the constants 0-10, 20, 34, 100, and 256, it decreases the RAM it occupies by more than 15 percent. You can find the most frequent constants in your program by just LISTing through it.

Helper also allows you to change the name of any variable in your program. When prompted, just enter the name of the variable to be changed, then enter the new name for the variable, and it's done. Just make sure, if a variable name ends in (or $, that the new name also ends that way. These endings tell BASIC whether a variable is an array or a string.

There's another benefit of **Helper**. If your file contains an error 164 (file number mismatch), it's usually unrecoverable without an in-depth knowledge of DOS file structure. This is because BASIC clears what's been loaded prior to the error—leaving you with nothing. If you run **Helper** on such a file, the output file will recover everything up to the error, and that can be ENTERed into memory. Even though some of the file is still usually lost, I've found this function extremely useful more than once.

How to use it.

When prompted, give the names of the file you want to modify and the output file. For a disk directory, hit RETURN at the first prompt. If you want to change any variable names, or convert any constants to variables, just hit *Y* at the correct prompt. The maximum number of constant to variable conversions allowed is 25. Once **Helper** has started creating the output file, you can quit at the end of any line by pressing ESC.

How it works.

Helper takes apart a saved (or "tokenized") file, byte by byte, and temporarily turns it into a listed program, much like BASIC does when a file is loaded. (If you don't care how this is done, skip this section.)

To understand how the program works, you need a little information on the structure of a tokenized BASIC file. For detailed information on BASIC file

structure, read *The Atari BASIC Source Book* or *De Re Atari*.

A saved file will always begin with seven 2-byte pointers. The first 2 bytes are always zero. **Helper** uses the other six pointers to find the various tables in the file. These are: the Variable Name Table, the Variable Value Table, and the Statement Table.

The Variable Name Table is simply a list of all variables used in a program. In **Helper**, the entire table is put into a string. The Variable Value Table is where space is reserved for the values of variables. **Helper** skips over this table.

The Statement Table is the body of the file. It contains, in tokenized form, all program lines in numerical order. Each line consists of a 2-byte line number, a line length token, and a statement or statements.

Each statement is composed of a statement length token, a command token and any number of other tokens. (The command is the first executable token in a statement and determines how all following tokens will be interpreted). A token following the command will be one of the following types: a variable, constant, operator, function, double quote, another statement, or an end-of-line (EOL). Each type has a routine to handle it (see program description).

Helper gets each token in the Statement Table from disk and prints listed statements to the screen, as well as to the disk. This way, you can see the program as it's created. After the listed program has been finished, it's ENTERed and SAVEd—creating the tokenized output file.

Program description.

Here's a line-by-line breakdown of **Helper**:

Lines 10-70 — Set up screen and read in statement and operator/function tables.

Lines 80-160 — Input file to modify and output file.

Lines 170-290 — Load Variable Name Table from file and put it into VAR$. The Variable Value Table is skipped over.

Lines 300-320 — Handle line numbers (first 2 bytes of each entry in the statement table).

Lines 330-350 — Get the line length, statement length and a 1-byte command.

Lines 360-390 — Handle commands.

Lines 400-410 — Handle REM and error statements. The actual content of these statements is ignored. Only the command is sent to the output file.

Lines 420-490 — Get token following command and determine whether it's one of the special cases (anything other than operators and functions) which require separate routines.

Lines 500-540 — Handle operators and functions.

Lines 550-600 —Handle variables.

Lines 610-690 — Handle constants. Line 670 converts constants to variables.

Lines 700-730 — Handle strings.

Lines 740-760 — Handle data statements.

Lines 770-790 — Help in handling THEN statements and the EOL token.

Lines 800-850 — End-Of-File routine.

Lines 860-950 — Various string routines used in the program.

Lines 960-990 — Command Table data.

Lines 1000-1040 — Operator/Function Table data.

Lines 1050-1190 — Routine allowing you to change variable names.

Lines 1200-1330 — Input which constants are to be converted to variables.

Now, let **Program Helper** help you create that BASIC masterpiece.

Jonathan Stone attends high school in New York City. He has owned his Atari 800 for four years and still hasn't upgraded to Operating System B.

Listing 1.
BASIC listing.

```
10 OPEN #3,4,0,"E:":DIM F$(20),FF$(20)
,VAR$(2560),A$(256),S$(20),T$(20),R$(1
),CO(20),ST$(600),OP$(700)
20 POKE 710,146:POKE 752,1:? "{CLR}
    PROGRAM HELPER":? :? "          by
 Jonathan Stone":? :POKE 752,0
30 VAR$(1)="♥":VAR$(2560)="♥":VAR$(2)=
VAR$:POKE 53774,64:POKE 16,64:POKE 191
3,80
40 OP$(1)="♥":OP$(700)="♥":OP$(2)=OP$:
ST$=OP$
50 FOR X=0 TO 55:READ F$:ST$(X*10+1,X*
10+10)=F$:NEXT X
60 FOR X=0 TO 66:READ F$:OP$(X*10+1,X*
10+10)=F$:NEXT X
70 TRAP 120
80 ? :? "What file to modify?":? :GOSU
B 860:IF F$()"" THEN GOTO 130
90 CLOSE #1:OPEN #1,6,0,"D:*.*":? "  D
isk Directory":?
100 INPUT #1,F$:? F$:IF F$(5,9)()"FREE
" THEN 100
110 GOTO 80
120 TRAP 120:? :? "ERROR #";PEEK(195):
? :GOTO 80
130 A$=F$:CLOSE #1:OPEN #1,4,0,F$:GET
#1,A:GET #1,B:IF A+B()0 THEN ? :? F$;"
 is not a SAVEd file":GOTO 80
140 ? :? "Output file?":? :GOSUB 860:I
F F$="" THEN 80
150 IF F$=A$ THEN ? :? "You can't use
the same name!!":GOTO 140
160 OPEN #2,8,0,F$:S$=F$
170 TRAP 850
180 GET #1,A:GET #1,B
190 GET #1,A:GET #1,B
```

```
200 GET #1,A:GET #1,B:DVVT=A+256*B-256
210 GET #1,A:GET #1,B:DST=A+256*B-256
220 GET #1,A:GET #1,B
230 GET #1,A:GET #1,B:DEND=A+256*B-256
240 M=0:AD=0:FOR X=1 TO DVVT-1
250 GET #1,A:IF A<128 THEN VAR$(M*20+1
+AD)=CHR$(A):AD=AD+1:NEXT X:GOTO 270
260 VAR$(M*20+1+AD)=CHR$(A-128):M=M+1:
AD=0:NEXT X:GOTO 270
270 FOR X=DVVT TO DST:GET #1,A:NEXT X
280 GOSUB 1050
290 POKE 766,1:? :? "Press any key to
begin":? :? :GET #3,A:A$=""
300 GET #1,A:GET #1,B:LINE=A+256*B:IF
PEEK(764)=28 THEN 800
310 IF LINE>32767 THEN 800
320 ? LINE;" ";:A$(LEN(A$)+1)=STR$(LIN
E):A$(LEN(A$)+1)=" "
330 GET #1,LLEN
340 GET #1,SLEN
350 GET #1,SNT
360 RESTORE 970
370 T$=ST$(SNT*10+1,SNT*10+10):GOSUB 9
10
380 A$(LEN(A$)+1)=T$:? T$;:IF SNT<>54
THEN ? " ";:A$(LEN(A$)+1)=" "
390 ON SNT<>0 AND SNT<>55 GOTO 420
400 POKE 766,0:? "{":POKE 766,1:A$(LEN
(A$))=" "
410 GET #1,A:ON A<>155 GOTO 410:GOTO 7
90
420 IF SNT=1 THEN 740
430 GET #1,TOK:IF THE=1 THEN 770
440 IF TOK>127 THEN 550
450 IF TOK=14 THEN 610
460 IF TOK=15 THEN 700
470 IF TOK=20 THEN ? ":";:A$(LEN(A$)+1
)=":":GOTO 340
480 IF TOK=22 THEN ? :GOTO 790
490 IF TOK=27 THEN THE=1
500 TOK=TOK-18:RESTORE 1010
510 T$=OP$(TOK*10+1,TOK*10+10):GOSUB 9
10
520 IF T$=CHR$(34) THEN T$=","
530 ? T$;:A$(LEN(A$)+1)=T$
540 GOTO 430
550 TOK=TOK-128
560 IF LEN(VAR$)<TOK*20+20 THEN T$=VAR
$(TOK*20+1,LEN(VAR$)):GOTO 580
570 T$=VAR$(TOK*20+1,TOK*20+20)
580 FOR X=1 TO LEN(T$):IF T$(X,X)=CHR$
(0) OR T$(X,X)=CHR$(40) THEN POP :GOTO
 430
590 ? T$(X,X);:A$(LEN(A$)+1)=T$(X,X):N
EXT X
600 GOTO 430
610 GET #1,EX:IF EX>127 THEN ? "-";:EX
=EX-128
620 NUM=0:FOR L=1 TO 5:GET #1,QQ
630 NUM=NUM*100+QQ-6*INT(QQ/16):NEXT L
640 EX=EX-68:IF EX=0 THEN 690
650 FOR QQ=EX TO SGN(EX) STEP -SGN(EX)
660 NUM=(EX>0)*NUM*100+(EX<0)*NUM/100:
NEXT QQ:IF P=0 OR THE=1 THEN THE=0:GOT
O 690
670 FOR X=0 TO P-1:IF NUM=CO(X) THEN P
OP :? "C";NUM;:A$(LEN(A$)+1)="C":A$(LE
N(A$)+1)=STR$(NUM):GOTO 430
680 NEXT X
690 ? NUM;:A$(LEN(A$)+1)=STR$(NUM):GOT
O 430
700 A$(LEN(A$)+1)=CHR$(34):? CHR$(34);
:GET #1,STRL
710 ON STRL=0 GOTO 730:FOR X=1 TO STRL
720 GET #1,A:? CHR$(A);:A$(LEN(A$)+1)=
CHR$(A):NEXT X
730 A$(LEN(A$)+1)=CHR$(34):? CHR$(34);
:GOTO 430
740 GET #1,A:? CHR$(A);:A$(LEN(A$)+1)=
CHR$(A)
750 IF A<>155 THEN 740
760 GOTO 790
770 IF TOK<>14 THEN THE=0:GOTO 350
780 GOTO 610
790 PRINT #2,A$:A$="":GOTO 300
800 CLOSE #1:CLOSE #2:POKE 766,0:POKE
764,255:POKE 709,130
810 ? "{↓↓↓↓NEW":? "↓↓↓↓ENTER ";CHR$(3
4);S$;CHR$(34):? "↓↓↓↓SAVE ";CHR$(34);
S$;CHR$(34)
820 ? "↓↓↓↓POKE 842,12:GR.0:?";CHR$(34
);"Program now saved as ";S$;CHR$(34)
830 POSITION 0,2
840 POKE 842,13:END
850 CLOSE #1:CLOSE #2:POKE 766,0:POKE
764,255:GRAPHICS 0:? "Sorry, error ";P
EEK(195);" occurred.":END
860 POKE 702,64:POKE 694,0:INPUT #3,F$
870 IF F$="" THEN RETURN
880 IF LEN(F$)<3 THEN 900
890 IF F$(1,1)="D" AND (F$(2,2)=":" OR
 F$(3,3)=":") THEN RETURN
900 T$="D:":T$(3)=F$:F$=T$:RETURN
910 X=1:IF T$(1,1)="♥" THEN T$="":RETU
RN
920 IF T$(X,X)="♥" THEN T$=T$(1,X-1):R
ETURN
930 X=X+1:GOTO 920
940 POKE 764,255:POKE 702,64:POKE 694,
0:GET #3,K:ON K<>89 AND K<>78 GOTO 940
:F$=CHR$(K):? F$:? :RETURN
950 GOTO 800
960 REM *** Commands ***
970 DATA REM,DATA,INPUT,COLOR,LIST,ENT
ER,LET,IF,FOR,NEXT,GOTO,GO TO,GOSUB,TR
AP,BYE,CONT,COM,CLOSE,CLR,DEG
980 DATA DIM,END,NEW,OPEN,LOAD,SAVE,ST
ATUS,NOTE,POINT,XIO,ON,POKE,PRINT,RAD,
READ,RESTORE,RETURN,RUN,STOP
990 DATA POP,?,GET,PUT,GRAPHICS,PLOT,P
OSITION,DOS,DRAWTO,SETCOLOR,LOCATE,SOU
ND,LPRINT,CSAVE,CLOAD,,
1000 REM *** Operators/Functions ***
1010 DATA ",",$,;,;, GOTO , GOSUB , TO
 , STEP , THEN ,#,<=,<>,>=,<,>,=,,*,+,
-,/, NOT , OR , AND ,(,)
1020 DATA =,=,<=,<>,>=,<,>,=,+,-
1030 DATA (,(,(,(,(,(,",STR$,CHR$,USR,AS
C,VAL,LEN,ADR,ATN,COS,PEEK,SIN,RND,FRE
,EXP,LOG,CLOG,SQR,SGN,ABS,INT
1040 DATA PADDLE,STICK,PTRIG,STRIG
1050 ? :CLOSE #3:OPEN #3,4,0,"K:"
1060 T$=VAR$((M-1)*20+1,LEN(VAR$)):F$=
"♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥":F$(1,LEN(T$))=T$
1070 VAR$((M-1)*20+1)=F$
1080 ? :? "Change any variables?";:GOS
UB 940:ON F$="N" GOTO 1200
1090 ? :? "Variable Name Table :":?
1100 FOR X=0 TO M-1:FOR Y=X*20+1 TO X*
20+20:ON VAR$(Y,Y)<>"♥" GOTO 1120:? "
 ";:IF (X+1)/4=INT((X+1)/4) THEN ?
1110 NEXT X:GOTO 1130
1120 ? VAR$(Y,Y);:NEXT Y:NEXT X
1130 ? :? :? "Which variable to change
";:INPUT F$:ON F$="" GOTO 1080:FOR X=0
 TO M-1
1140 IF VAR$(X*20+1,X*20+LEN(F$))=F$ A
ND VAR$(X*20+LEN(F$)+1,X*20+LEN(F$)+1)
="♥" THEN 1160
1150 NEXT X:? "No such variable!{":GOT
O 1130
1160 ? :? "Change it to :";:INPUT FF$:
ON FF$="" GOTO 1080
1170 IF F$(LEN(F$))="(" OR F$(LEN(F$))
="$" THEN IF FF$(LEN(FF$))<>F$(LEN(F$)
) THEN ? "Wrong type!!{":GOTO 1160
```

```
1180 VAR$(X*20+1,X*20+LEN(FF$))=FF$:VA
R$(X*20+LEN(FF$)+1,X*20+20)="♥♥♥♥♥♥♥♥♥
♥♥♥♥♥♥♥♥♥♥"
1190 ? :? "**Done**":GOTO 1090
1200 P=0
1210 ? :? "Convert any constants?";:GO
SUB 940:ON F$="N" GOTO 1270
1220 ? "Enter all numbers to convert,"
:? "then hit RETURN to end."
1230 TRAP 1210:INPUT CON:GOTO 1250
1240 GOTO 1270
1250 CO(P)=CON:P=P+1:ON P=20 GOTO 1270
:GOTO 1230
1260 ? :? "All 20 constants used!■":GO
TO 1290
1270 IF P=0 THEN RETURN
1280 A$="0 ":FOR X=0 TO P-1
1290 A$(LEN(A$)+1)="C":A$(LEN(A$)+1)=S
TR$(CO(X)):A$(LEN(A$)+1)="=":A$(LEN(A$
)+1)=STR$(CO(X))
1300 A$(LEN(A$)+1)=":":NEXT X
1310 A$(LEN(A$))=" "
1320 ? :? A$:PRINT #2,A$:A$=""
1330 RETURN
```

●

CHECKSUM DATA.

(see page 11)

```
10 DATA 843,690,950,150,395,384,469,35
0,61,874,497,248,27,22,991,6951
160 DATA 62,740,557,560,475,502,541,40
3,995,906,396,300,823,263,845,8368
310 DATA 208,753,1,11,830,228,203,604,
586,343,21,862,16,901,990,6557
460 DATA 997,218,929,241,687,125,688,9
43,718,167,294,60,594,467,708,7836
610 DATA 489,147,974,630,991,300,410,7
92,593,731,89,471,291,267,870,8045
760 DATA 752,611,732,771,230,746,720,4
43,480,887,729,516,198,418,255,8488
910 DATA 734,251,525,487,728,747,602,9
65,996,863,192,543,675,893,834,10035
1060 DATA 376,776,276,31,147,811,289,9
30,174,573,504,182,737,665,989,7460
1210 DATA 178,722,645,722,933,62,184,2
18,84,360,136,507,791,5542
```

●

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CIRCLE #142 ON READER SERVICE CARD

XL CAPS Toggle

by Rod Rees, Ph.D.

One clear advantage the XL Operating System has over the B-version used in the 400/800 series of Atari computers is the CAPS toggle. In the XL OS, repeatedly pressing the CAPS key will toggle back and forth between lower and upper case, but the 400/800 OS requires a SHIFT-CAPS combination of keystrokes for the same result. If you've used both versions, you know the XL CAPS toggle is much sweeter than the SHIFT-CAPS combination.

Ignorance triumphs.

Having gotten used to the CAPS toggle on my 800XL, I sorely missed it when I began using Angelo Giambra's **Home-made Translator** (issue 32). It wasn't enough of a loss to force me back to the XL OS, but it was still irritating. So I dug out my copy of the Atari 400/800 *Operating System Source Listing* to see if I could replace the 400/800 CAPS code with the equivalent XL code. It didn't turn out to be as simple as I had hoped—but it wasn't beyond my modest capabilities, either.

The first problem to solve was that, although I had the source code for the 400/800 OS, there's no published listing for the XL OS. I knew *where* to put a CAPS toggle, but not *what* to put there. I didn't even know what part of the XL OS ROM to disassemble in order to find the code, since the XL routines are not necessarily in the same locations as their 400/800 counterparts.

This problem of wayward routines is, of course, partly responsible for the need for "XL translators" to begin with. Fortunately, the locations that point to the beginning of the keyboard handler routines *are* the same, and are documented in the 400/800 *Operating System Source Listing* (at locations 58404-5; $E424-5). Once I found the keyboard handler routines, because of its similarity to the 400/800 code, I was able to recognize the section of the disassembled XL source code that performed the CAPS toggle.

At this point, I was all set to replace the 400/800 code that the **Home-made Translator** had stored in RAM, when I realized that the XL version that I wanted was 5 bytes longer than the 400/800 version it was to replace! My skill with assembly language is rudimentary at best, but I figured it was worth trying to rewrite in 22 bytes what takes 27 bytes in the XL OS. However, my best effort came in at 24 bytes—still 2 bytes too long.

Undaunted, I looked more closely at the source code and found that the next 12 bytes in the XL keyboard handler (while not strictly part of the CAPS toggle routine) could be included in the rewrite—with a net savings of (you guessed it) exactly 2 more bytes.

Let's get specific.

The 400/800 keyboard handler processes the CAPS key and the SHIFT-CAPS combination in two short routines of 11 bytes each (16 and 11 bytes in the XL OS). These are the two routines that must be replaced

in order to create an XL-style CAPS toggle.

The next 11 bytes (12 in the XL OS) process the CTRL-CAPS combination. These routines first determine if one of the special keys has been pressed by checking for the ATASCII code for CAPS (130; $82), SHIFT-CAPS (131; $83), CTRL-CAPS (132; $84) and others. If so, then a code number is stored in location 702 ($02BE, the SHFLOK register) to specify whether subsequent key presses are to be processed as lower case (0), upper case (64; $40), or control (128; $80) characters.

Table 1.

	400/800	XL	Modified
CAPS	63262	62277	63262
	$F71E	$F345	$F71E
SHIFT-CAPS	63273	62293	63275
	$F729	$F355	$F72B
CTRL-CAPS	63284	62304	63283
	$F734	$F360	$F733

You can study these routines by disassembling the OS beginning at the locations shown in Table 1.

Setting up XL CAPS Toggle.

My 33-byte rewrite of the XL routines is shown in Listing 2, the assembly listing. To implement the toggle, you need only type in BASIC Listing 1. Begin by making the **Home-made Translator** and boot it up with BASIC. Type in Listing 1 and SAVE it to disk. Then RUN it, and check the operation of the CAPS key and the SHIFT-CAPS and CTRL-CAPS combinations. They should operate the same as they do with the XL OS.

Make sure that repeatedly pressing the CAPS key toggles back and forth between lower and upper case, that pressing the SHIFT-CAPS combination will always set the upper case, and that pressing the CTRL-CAPS combination will always set the control characters.

If you're satisfied with the operation of the CAPS, SHIFT, and CTRL keys, place a disk containing DOS (but not AUTORUN.SYS) in drive 1, and LOAD and reRUN Giambra's BASIC Listing 1 from issue 32, to create a new version of the **Home-made Translator**. The AUTORUN.SYS file on this disk will be the same as your original **Home-made Translator**, with the addition of the **XL CAPS Toggle**.

Rod Rees is an Associate Professor of psychology at Western Washington University. He spends considerable effort extolling the virtues of Atari in an environment dominated by IBM and Apple.

Listing 1.
BASIC listing.

```
100 REM XL caps toggle
110 REM by Rod Rees
120 REM
130 REM put caps toggle into OS
140 REM
150 CAPS=63262
160 FOR INDEX=0 TO 32
170 READ CODE
180 POKE CAPS+INDEX,CODE
190 NEXT INDEX
200 REM
210 REM machine language code
220 REM
230 DATA 201,130,208,9,173,190,2,240
240 DATA 8,169,0,240,14,201,131,208
250 DATA 4,169,64,208,6,201,132,208
260 DATA 8,169,128,141,190,2,76,221
270 DATA 246
```

CHECKSUM DATA.

(see page 11)

```
100 DATA 812,257,80,566,86,829,802,98,
408,149,76,134,82,9,794,5182
250 DATA 825,805,661,2291
```

Listing 2.
Assembly listing.

```
; XL-STYLE CAPS LOCK
; BY ROD ROOS
;
; CAPS TOGGLE
;
$F71E  CMP #130    ;DO CAPS TOGGLE?
$F720  BNE $F72B   ;NO, TRY SHIFT/CAPS
$F722  LDA $02BE   ;GET CURRENT SHFLOK
$F725  BEQ $F72F   ;IF LOWER, DO UPPER
$F727  LDA #0      ;IF UPPER, DO LOWER
$F729  BEQ $F739   ;GO SET SHFLOK
;
; SHIFT/CAPS
;
$F72B  CMP #131    ;DO SHIFT/CAPS?
$F72D  BNE $F733   ;NO, TRY CTRL/CAPS
$F72F  LDA #64     ;YES, GET UPPER
$F731  BNE $F739   ;GO SET SHFLOK
;
; CONTROL/CAPS
;
$F733  CMP #132    ;DO CONTROL/CAPS?
$F735  BNE $F73F   ;NO, NOT CAPS LOCK
$F737  LDA #128    ;YES, GET CTRL/CAPS
$F739  STA $02BE   ;SET SHFLOK
$F73C  JMP $F6DD   ;PROCESS NEXT KEY
```

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CIRCLE #158 ON READER SERVICE CARD

Some program listings reproduced in **ANALOG Computing** may contain "strange" characters not shown on the keyboards of earlier Atari models. These are special characters which use the CTRL, ESC and "ATARI LOGO" (inverse) keys. Shown below is a list of these characters and the keystrokes used to get them.

```
♥ --- CTRL ,
├ --- CTRL A
| --- CTRL B
┘ --- CTRL C
┤ --- CTRL D
┐ --- CTRL E
/ --- CTRL F
\ --- CTRL G
◢ --- CTRL H
  --- CTRL I
◣ --- CTRL J
▘ --- CTRL K
▖ --- CTRL L
▔ --- CTRL M
_ --- CTRL N
▝ --- CTRL O
┼ --- CTRL P
┌ --- CTRL Q
─ --- CTRL R
┼ --- CTRL S
● --- CTRL T
▗ --- CTRL U
▕ --- CTRL V
┬ --- CTRL W
┴ --- CTRL X
▌ --- CTRL Y
└ --- CTRL Z
ESC ESC
↑ --- ESC CTRL UP-ARROW
↓ --- ESC CTRL DOWN-ARROW
← --- ESC CTRL LEFT-ARROW
→ --- ESC CTRL RIGHT-ARROW
♦ --- CTRL .
♠ --- CTRL ;
↖ --- ESC SHIFT CLEAR
◀ --- ESC BACK S
▶ --- ESC TAB
♥ --- INVERSE CTRL ,
▚ --- INVERSE CTRL A
▌ --- INVERSE CTRL B
▟ --- INVERSE CTRL C
▙ --- INVERSE CTRL D
▛ --- INVERSE CTRL E
▞ --- INVERSE CTRL F
▚ --- INVERSE CTRL G
▝ --- INVERSE CTRL H
▜ --- INVERSE CTRL I
▜ --- INVERSE CTRL J
▙ --- INVERSE CTRL K
▟ --- INVERSE CTRL L
▀ --- INVERSE CTRL M
▀ --- INVERSE CTRL N
▘ --- INVERSE CTRL O
▛ --- INVERSE CTRL P
▜ --- INVERSE CTRL Q
▀ --- INVERSE CTRL R
▚ --- INVERSE CTRL S
▖ --- INVERSE CTRL T
▗ --- INVERSE CTRL U
▐ --- INVERSE CTRL V
▛ --- INVERSE CTRL W
▚ --- INVERSE CTRL X
▗ --- INVERSE CTRL Y
▜ --- INVERSE CTRL Z
♥ --- ESC DELETE
♥ --- ESC INSERT
♥ --- ESC CTRL TAB (CLR)
♥ --- ESC SHIFT TAB (SET)
  --- INVERSE SPACE
▁ --- INVERSE _
♦ --- INVERSE CTRL .
♠ --- INVERSE CTRL ;
▕ --- INVERSE |
♥ --- ESC CTRL 2
◀ --- ESC CTRL BACK S
♥ --- ESC CTRL INSERT
```

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by Curtis W. Crowe

How often have you spent some time on your Atari, only to end up wishing that you had the printers, ports, disk drives, etc. that you have on your CPM-based machine? If you're like I am, you bought the Atari for the kids and ended up liking the machine quite a bit yourself.

However, no matter how much you enjoy working with the computer, it's difficult to get used to a machine that doesn't have some of the peripherals that make your larger machine such a joy.

The obvious answer (just buying the needed devices) isn't always possible or desirable. I wasn't going to buy another serial port and disk drive for the Atari, when I'd already purchased these items for my CPM system.

A California company called USS Enterprises has come to the rescue and made it possible to use a plug-in "black box" that will allow my CPM machine to be used in conjunction with my Atari 400.

The secret to this magic is that Atari has interfaced its disk drives and other devices to the computer in a way that's unusual in the industry. Most companies use a form of parallel data transfer to communicate with the disk drives. Atari, however, uses a 19200 baud serial port for all its peripherals.

This is the port that all your Atari-manufactured devices plug into. It was a smart move from a marketing standpoint, in that it allowed Atari to keep its disk controller, modem ports and other add-ons outside of the computer, thus keeping down the cost of the basic unit.

The downside of this scheme is that most industry standard peripherals will not directly plug into Atari computers without the purchase of an interface box. Plain disk drives cannot be added, since Atari mounted the controller board inside their disk systems.

But shouldn't my CPM computer then be able to communicate with the Atari, since it has a serial port that can be run at 19200 baud? The answer is yes, but two things are needed to make that happen.

First, you need some hardware to change your CPM system's RS-232 level signals to the TTL level signals that the Atari uses. Second, and most important, you need a piece of software on the CPM system that can make the Atari think it's talking to one of its own devices.

That is, when the Atari wants to talk to the disk drive, it will send a command down the line, and the CPM system must receive this command and respond just as a real 810 or 1050 disk drive would. This is quite a trick and puts the project out of the reach of most hackers.

The **Critical Connection** is the hardware and software system that can do precisely this job—and do it very well.

When you open the box, you'll find a 30-foot cable with a male DB-25 connector on one end, to go to your CPM system. On the other end is a connector that plugs into the peripheral port on the Atari.

In the middle is a small square box that apparently contains the electronics to handle the voltage level conversions. I say "apparently," because inside this box you'll find only a big glob of epoxy. This is a "copy protection" scheme for hardware.

Also included is a CPM disk in a format to match your machine, and a 12-page instruction manual. For the life of me, I can't figure out why the folks at USS Enterprises supply such a long cable. While I appreciate their thoughtfulness, you'll want your CPM and your Atari to be where you can reach both keyboards. The extra cable will mostly be wasted.

To use the **Critical Connection**, you just plug in the cable between the CPM and the Atari, and copy all the software off of the **Connection** disk onto a bootable CPM disk.

Since the **Connection** works with several different CPM systems, you must first go through a procedure called "install," to customize the software for your particular hardware environment. The install program first presents you with a list of computers supported, then asks you if yours is on the list.

If you're lucky enough to have one of these, then you need only choose your system from a menu and you're ready to start using the **Connection**. Here's a list of the systems directly supported by the software: Morrow Disk Jockey, Port A of CCS 4 Port Serial Card Model 2710, Kaypro II, Serial Port of CCS CPU Card, Superbrain, Heath/Zenith H/Z-89 with HA-88-3, Z80 SIO with Data A4 and Status A5, Xerox 820, Sanyo MBC-1000, LOBO and Heath/Zenith H/Z-100 (now supported for auto install).

If your system isn't listed here, you must go through a non-automatic install procedure. This requires you to know how to initialize your port for 19200 baud, and you must know the address of your data and status port.

It sounds difficult, but my Heathkit H-100 wasn't on the list, and with this option and the appendix in my Heathkit manual, I was able to get it running in only five minutes. If you have any doubts about this aspect, just call USS Enterprises. They should be able to help you with most popular brands of computers.

Now you're ready for the moment of

(continued on next page)

truth. Just install the BASIC cartridge in the Atari and run the program called ATARI on the CPM system. Turn the Atari OFF and then back ON.

You will see a message on the CPM screen that indicates Atari DOS boot sectors are being sent. You'll soon see the familiar Atari BASIC prompt on the TV screen. To load a sample BASIC program included with the **Connection**, just type *ENTER "D:CHICKEN.ATR"*.

Your CPM disk drive should come alive, and you'll hear the sounds of the Atari loading software from your CPM drive! When you get the *READY* prompt, type *RUN*, and you'll see that the Atari now has the ability to treat your CPM system as a disk drive, and load and save BASIC programs.

While this would make the **Connection** a desirable product, that isn't all it can do. If you have a printer on your CPM system, you can also use it as the Atari printer. And the **Connection** software will even use some of the CPM system's memory as a print spooler. To see it work, you need only type *LIST "P.*

In addition, by issuing the *K* command, you can use your CPM system's keyboard in place of the Atari keyboard when typing in or editing BASIC programs. This is a real advantage if you have a 48K Atari 400, as I do.

The above commands all deal with Atari BASIC, but USS hasn't left out support for Atari DOS, either. The problem here is that, since DOS is a copyrighted product, it cannot be included with the **Connection**. But, if you already own a copy of it and can borrow an 810 or 1050 disk drive, you can actually create disks for the CPM system that contain the entire Atari DOS, with the same directories, file structures, etc.

To do this, you go into the **Connection**'s "virtual disk" mode and assign CPM disks as Atari D0: through D4:. You can have up to four drives on your Atari system, and they can be any combination of real or "virtual" drives.

You only need a real drive on your system long enough to copy software you've purchased to your CPM disks. Then the "real" 810 or 1050 can be disconnected.

Here's an example to help make this clear. On my Heathkit H-100 I have a 27 megabyte hard disk, and I've put on it twenty "Atari" disks. I just tell the **Connection** that I want D0: to be my CPM file called GAMES, then I can boot the Atari, do directories, run programs, delete and rename files—just as if I had a real Atari drive in front of me.

The only difference that you'll notice from using a real Atari drive is that your **Critical Connection** might be significantly faster than an 810 or 1050. To change to another disk, I simply change the assignment of D0:. This gives tremendous flexibility in the use of the CPM system as a server for the Atari.

As you can tell, I'm very happy with my **Critical Connection** and can recommend it wholeheartedly. However, any product must have *something* that could be done better.

With the **Connection**, the weak point is its documentation. The manual is adequate, but just barely so. There will be things not covered that you'll have to dope out for yourself.

The second annoying thing about this product is really nothing that USS Enterprises could prevent—the problem of copy protected software.

Remember, if you buy a commercial software product and want to put it on your CPM system for use on the Atari, you must first have a real 810 or 1050 drive to copy it to the CPM disk. Copy protected software makes this very difficult.

The **Connection** comes with an Atari utility called "CopyDisk" that should copy virtually any disk, but some copy protection schemes beat it. As a Heath computer owner, I'd never *seen* a copy protected disk before buying the **Connection**, and I found this aggravating.

One final point. . . I was a bit apprehensive about buying a product such as this one through the mail. You can never be sure what questions you may have or what kind of support you may need.

I can tell you that the people at USS Enterprises have been most helpful with all my questions. They've even incorporated some of their users' suggestions in the form of an update to the software portion of the package. This update was offered at a reasonable $15 and includes an experimental command that could make the product even better.

The command will allow users of certain CPM systems to actually read disks made for the Atari, eliminating the need to have an Atari drive at any time. As I said, this capability is experimental, so if it's of great importance to you, call the folks at USS Enterprises and ask if your CPM system can be made to read Atari disks directly.

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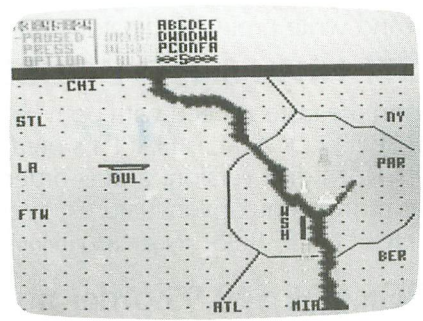
by Lee H. Pappas

It's well known that air traffic controllers have one of the most demanding professions in the world. In a continually changing situation, the controller has the lives of thousands of passengers and crew members on his hands, not to mention tens of millions of dollars worth of aircraft. Flight departures, arrivals, restricted flight areas, foul weather and various terrain hazards add to the tension. And don't forget the dreaded emergency that crops up now and then, such as fire, low fuel or any number of malfunctions.

Kennedy Approach gives you the opportunity to see how you stack up. Five levels of play are available, starting with Atlanta's William B. Hartsfield International Airport. Jets are the only aircraft flying in and out of here (so you won't have to contend with slower traffic), the weather is always good and the terrain fairly flat. I recommend that this be your "test" area, as the traffic moves on a steady basis, flowing smoothly along.

The second airfield is Dallas-Fort Worth International, with fairly heavy traffic, and nearby Dallas Love Field, from which light planes may appear at any time. Then there's Stapleton International in Denver, where jet traffic is constant, and mountainous terrain, coupled with nasty weather, pose a constant threat.

Washington DC's Dulles International and Washington National airports are both large, very busy airfields with light planes, jet traffic and an occasional Concore SST flight. There is also a restricted area to be avoided.



Kennedy Approach.

The toughest level is, of course, the New York metropolitan area. As you juggle departures and arrivals between LaGuardia International and John F. Kennedy International airports, the heavy air traffic will demand intense precision.

After selecting the airfield/level, you'll be prompted to enter a Computer Access Code for your shift. These can be found throughout the Operating Procedures Manual. If all goes well, the visual display will appear for the airspace you've selected. This display contains graphic representations similar to those found on air traffic monitors.

A dot matrix on the display indicates distances of one mile, with normal air traffic routes shown in brighter dots. Entrance and exit zones are labelled, along with nearby airports. You'll also find a VOR (Visual Omni Reference) tower on the approach end of each airfield, to give circling planes a turning point until they're cleared to land. Mountains, restricted zones and storms also appear on the display.

The planes themselves are flying in the direction indicated on the display. They're represented as jets, light planes or the SST. Altitude is also graphically shown under the plane, along with its ID letter. Above the graphic display is the command line, where radio messages are displayed. Above that a clock shows how much time is left on your shift, and there's an alarm area where dangerous situations are reported.

Flight plans are also shown at the top of the screen, giving an aircraft's origin, destination and altitude. You'll be given a one-minute notice before departing aircraft signal they're ready to leave.

Now that I've covered all of the basics, just how good is this simulation? Well, I'm a little biased, since this kind of thing appeals to me and I've been flying light planes since I was twelve years old. These factors make me a little more critical.

The manual for **Kennedy Approach** is excellent, leaving out nothing—that I could find. If anything, Microprose

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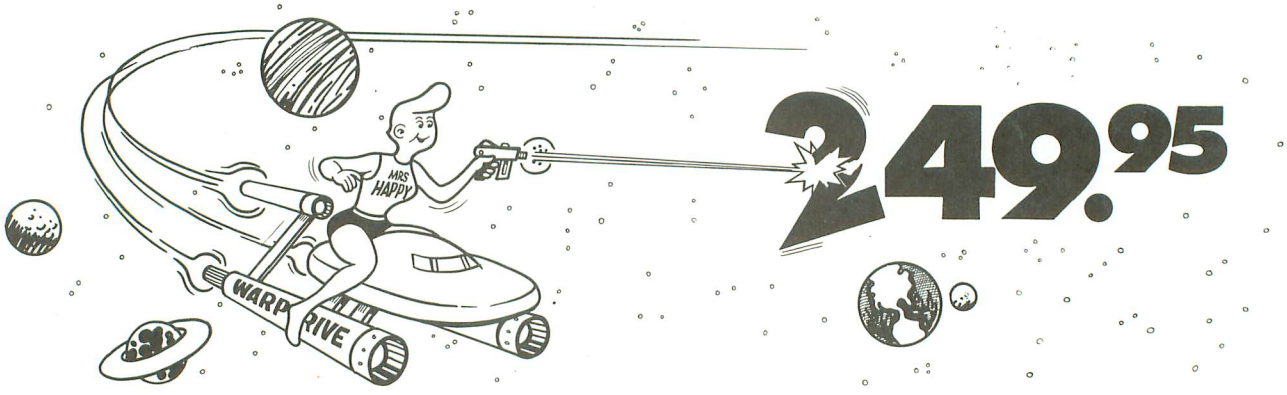

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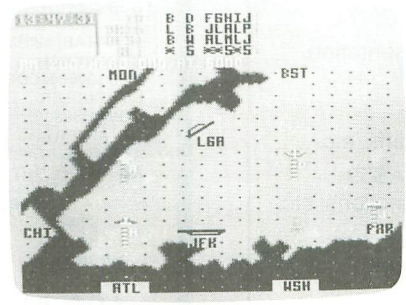
went to more trouble than most, including a list of air traffic control terms, an easy-to-read legend and a small terminal control area map for each of the five levels/airfields.

So far, I haven't mentioned one of the most imaginative features I've ever seen in the annals of Atari game history. All of the ground-to-air and air-to-ground radio transmissions are spoken via a voice synthesizer over the TV/monitor speaker, along with printing on screen. This adds to the realism, and is even complete with static, "Roger," and so on.

Microprose has done an outstanding job integrating joystick functions, allowing you almost complete freedom from the keyboard. The logic required to smooth out the air traffic is incredible. You must avoid midair collisions, and also separate aircraft by at least 1000 feet of altitude or 3 miles horizontally. Aircraft taking off and landing simultaneously is frowned upon, along with long delay times, or letting a plane with an emergency leave your area.

Planes destined for other cities must depart your area on the correct heading and proper altitude. You'll also encounter aircraft passing through your zone, bound for other airports. You must guide



them through, making sure they don't conflict with planes already under your control.

Kennedy Approach *really* gets tough when you have a small airstrip, or even worse, another major airport in your area. At this point, you're in control of several airports. What drives me nuts is some guy who just wants to take his light plane up and return—right back to the same airfield. And when the weather turns sour or the terrain is rough, bring on the straightjacket!

If you're looking for something really different, really challenging and really terrific, you won't be disappointed with **Kennedy Approach**. As much as I've been hooked on some of Microprose releases in the past, this one combines intense strategy with a constantly changing scenario.

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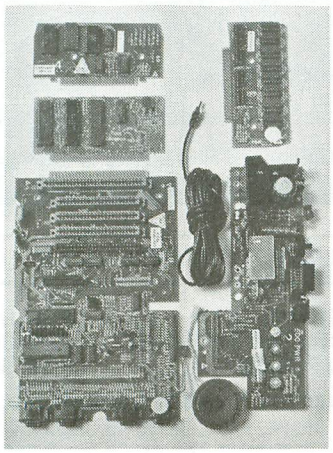

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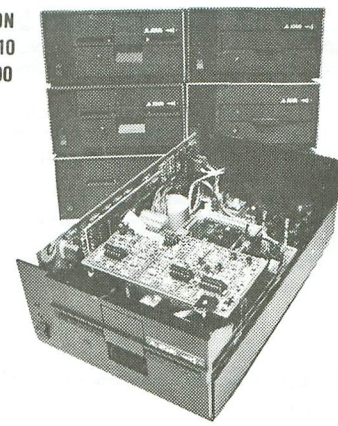

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THE END USER

THIS MONTH:

Atari Corp. from the user's view —plus more software for the ST

by Arthur Leyenberger

I've been writing about Atari computing for several years now and have been an Atari user for slightly longer. In the old days (that is, before the coming of Jack Tramiel), I was highly critical of many of the things that the "old" Atari did.

I was critical not because I wanted to be malicious, but because I wanted them to change. I wanted them to succeed. Well, as history shows, my constructive criticisms and the criticisms of many other sincere, loyal Atari users fell on deaf ears.

Once again, I find myself in the role of critic. Once again, I find myself wanting Atari to succeed—and being judgmental about the way that they do certain things. However, throughout all of this criticism, it is important to distinguish between the company and the product. Simply and bluntly put: I like the Atari product, but I don't always like the way Atari Corp. does business. Let me explain.

I think that the Atari 520ST represents a tremendous computing value to the user. Why, a half-megabyte computer with an RGB monitor and 360K disk drive for under $1000. . .that's less than I paid for my Atari 800 with 48K and 410 Tape Recorder. Unquestionably, the ST is "power without the price." I like the ST computer, except for what I consider to be a "mushy" keyboard. Okay, that's how I feel about the product.

Now, here's how I feel about Atari. First, as I said before, I want Atari to succeed. I will do all I can to ensure that it happens. But I feel that the attitude of the Atari executives may jeopardize the future of the company.

Jack Tramiel has long been known for his style as well as his "penny-pinching." His trademark of hard-nose bargaining, sometimes at the risk of everything else, may serve him well now. In my dealings with the Atari executives (and, with the small size of the company, almost *everyone* there is an executive), I have found that Jack's "religion" has many disciples.

Everything seems to be deal, deal, deal—get the most out of everything and everyone. If that means implicitly requiring each employee to assume the responsibilities of three people, so be it. If that means saving money on toll-free phone numbers and end user support, then by all means rely on the user groups to perform the support function.

If it means saving money on documentation for the LOGO language, ST-BASIC, the developer's kit, etc., then do it. And, if it means offering the ST to user groups at a price not only higher than the norm but also higher than the price Atari would get through its distribution channels, then. . .well, you know the rest.

In the spirit of "dealing," Atari folks are also known to answer questions with what seems to be a brush-off, or perhaps not the entire truth. Witness the continuing release dates of such programs as **AtariWriter Plus**, the **Learning Phone**, ST-BASIC, TOS on ROM, etc., or such hardware products as the 260STD, 520ST (originally a May, 1985 release), the ST Hard Disk, CD-ROM, etc.

Granted, some of these products are now out, but listening to Atari personnel is a lot like listening to the boy who cried "wolf." Pretty soon, you don't believe anything they say.

I know what many of you are saying: Atari is a small company and can't afford to do the things that we'd like to see. It has been explained to me that the Tramiel business philosophy is to be decisive—and flexible enough to switch directions immediately. But Atari has made certain decisions and has to live by them. For example, to say that poor little Atari can't afford decent documentation is to confuse the issue. Atari chose not only to do the minimum effort on documentation, but also to ignore the offer of several qualified writers and systems people to help them out.

I won't belabor the point. By now you've probably written me off as a "nay-sayer" or labeled me as a person with a grudge against Atari. On the other hand, perhaps you've been provoked into thinking about what I am saying.

I think Atari Corp. had better start considering how they're perceived by the non-Atari-using public. The people who are unfamiliar with what Atari computers are and the people who think Atari is synonymous with "game machine" are those who will make or break Atari.

Let me remind you that I like Atari's products and that I am saying this in the spirit of constructive criticism. Let me know what *you* think; I'd be interested in your reactions.

Some good stuff.

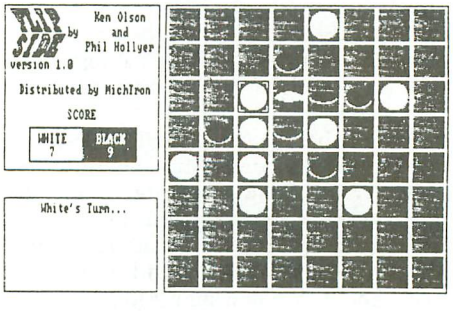
Software is starting to appear for the 520ST from all different directions. If you're interested, check out the article on utility programs also appearing in this issue (see page 41). Last month, **ANALOG Computing**'s **End User** compared several terminal programs for the ST, and next month we'll have a comparison of word processors. In the meantime, I have to tell you about a couple of programs that I've been using recently.

I'll just mention **Micro C-Shell** from Beckemeyer Development Tools (92 Jean St., #304, Oakland, CA 94610—(415) 658-5318, evenings) briefly, since it's described in the utilities article. If you're looking for an alternative to the GEM desktop—pointing, clicking, dragging and whatnot—this program provides a shell that is primarily a command processor. Once this program is run, you can get disk directories, copy, delete and move files, and list the contents of files.

The **Shell** package also includes a history mechanism, I/O redirection, pipes and environment variables. There is additional support for the Atari GEM developer's toolkit, including a "cc" program for compiling C programs, with options for controlling the location of include files, pre-defining identifiers, etc. **Micro C-Shell** allows you to define command synonyms, and supports batch files and command scripts to automate operations. Based on the Berkeley Unix Shell, this program also comes with several Unix tools such as "grep," "diff," "more" and "sed."

Originally, the program cost $50, which included all of the C language utility programs. After talking to the author, I convinced him to offer just the command processor, and make it available for $25. At $50, **Micro C-Shell** was a bargain. At $25, no ST user should be without it. 'Nuff said.

Another program I've gotten attached to is a game. **Flip Side** is an Othello/Reversi type of game from MichTron (576 S. Telegraph, Pontiac, MI 48053 — (313) 334-5700). Written by Ken Olsen and Phil Hollyer, it is both a challenging game and a good example of how ST GEM graphics can be used. If you're unfamiliar with the game, **Flip Side** is a competition between two players (human or machine), in which disks that are black on one side and white on the other are placed on a game board. When disks of one color are trapped in a straight line by disks of the other color, they're flipped over to the captor's color. The object of the game is to have more disks of your color left when no more moves can be made.



Flip Side.

Flip Side offers six different skill levels and uses drop-down menus for option choices. Options include: show all possible moves, suggest move, switch sides, time limit for moves, change board colors and edit board. If you like this type of game, I suggest you give **Flip Side** a try. You, too, may become hooked on the game.

The 8-bit Atari.

The Atari 800 computer has been in existence since 1979. Six years is a pretty long time for a computer to last. Unfortunately, its age is starting to show.

The 400, 600, 800, 800XL and 130XE computers are still technically excellent machines. At this point, the amount of software for these machines is about equal to that for any other computer. And the computers themselves can still provide most people with the power that they need at home.

However, time marches on, and the *new* is often seen as the *better*, especially by software publishers. What this means is that now—and even more so in the future—there is going to be less software being made for the Atari 8-bit computers. The last year saw a trickle of significant new titles, programs like **Print Shop**, **HomePak**, **Paper Clip**, to name a few. It's expected that 1986 will be even leaner. Most publishers I talk with tell me that the 8-bit market—Atari, Commodore and even Apple— is dead.

What does that mean to us, dedicated Atari 8-bit computer users? Well, for one thing, it means that there will be a lot of bargain software out there. Just today, I saw **AtariWriter**, **SynCalc** and **SynFile**, all selling for $20 each at my local retailer's.

The other important message is that you should determine what your needs are and buy that 8-bit software while it's still around.

Next month, the **End User** will take a look at good, inexpensive software for 8-bit Atari computers. Until then, use that Atari computer of yours. And you, Atari Corp., work on that end user support. The whole world is watching.

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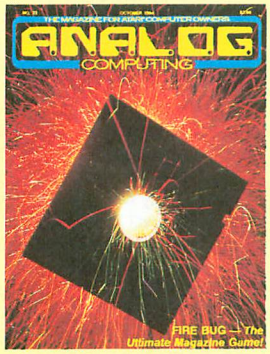

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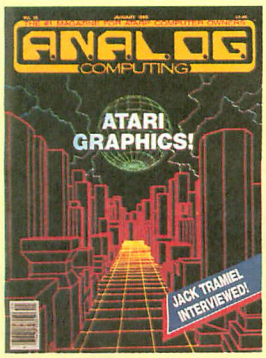

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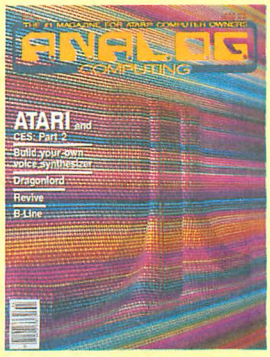

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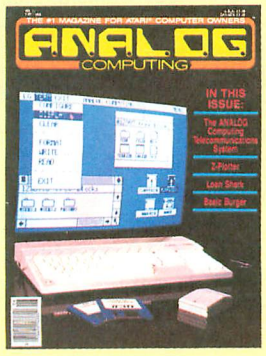

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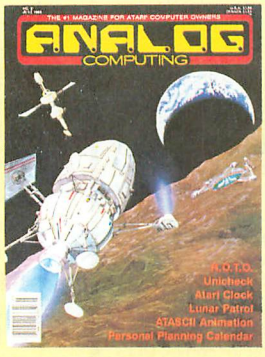

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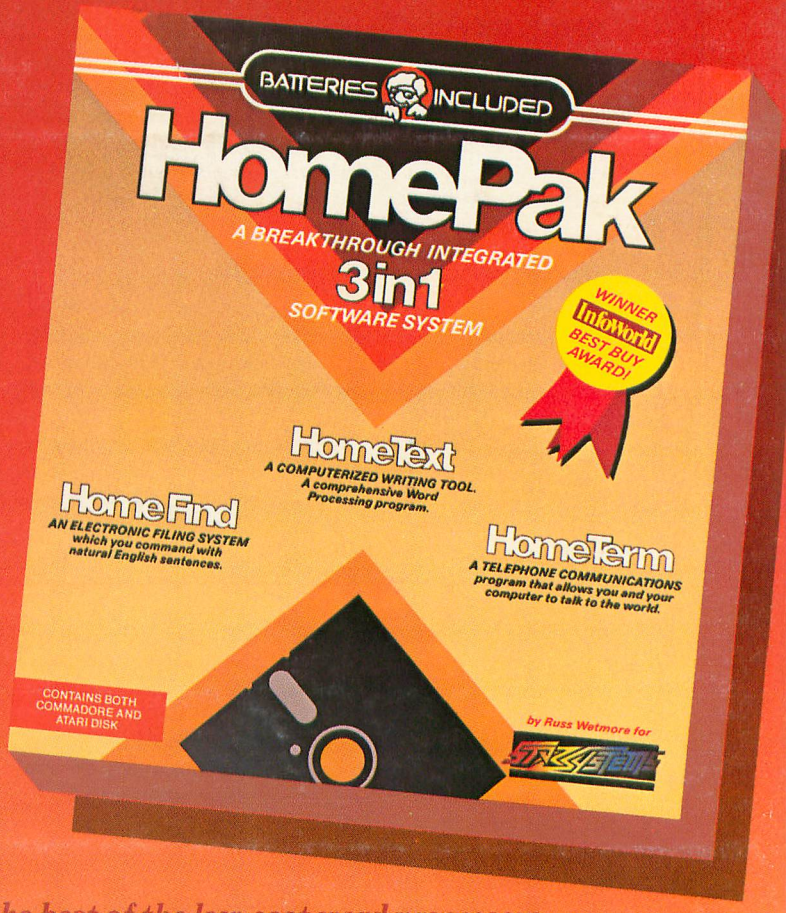

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