

NO. 49
DECEMBER 1986

U.S.A. \$3.50
CANADA \$4.75

THE #1 MAGAZINE FOR ATARI® COMPUTER OWNERS

ANALOG

COMPUTING





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

Captain's Log... War Date 10.01.44

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



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



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

Atari 520ST screens shown



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



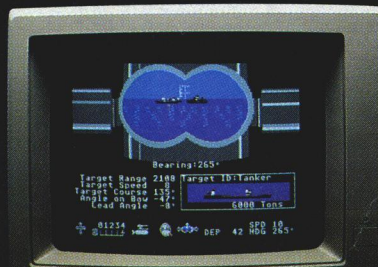
"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."



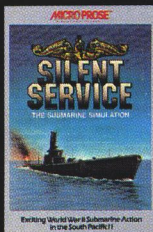
"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly... Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



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



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



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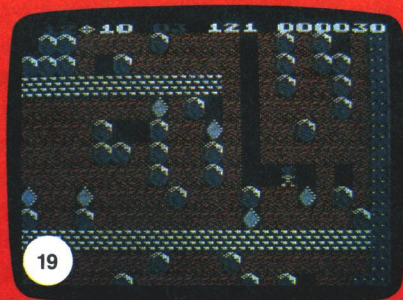
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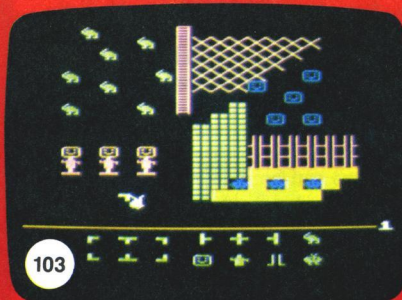
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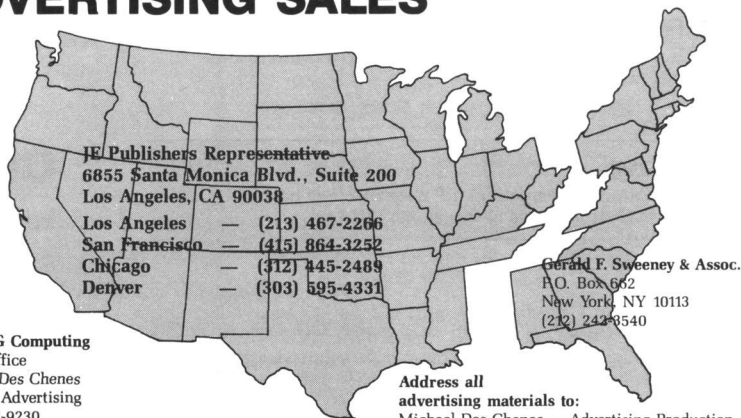
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This does not apply to programs which specifically state that they are not public domain and, thus, are not for public distribution.

In addition, any programs used must state that they are taken from **ANALOG Computing** magazine. For further information, contact **ANALOG Computing** at (617) 892-3488.

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David Young OMNIMON (C)1986
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Editorial

It's hard to believe that this is our last issue of 1986. **ANALOG Computing** has been around for nearly six years—and things have never looked better.

We're proud to have brought more software and more pages of information to the Atari user than anyone else in the industry. That's no small feat. But you ain't seen nothing yet.

We've got even *greater* things planned for 1987. You'll see them, beginning with the January magazine—which, by the way, will be our 50th issue. I don't want to spoil any surprises, so you'll just have to wait till then.

Just in case all of you high rollers and big investors haven't heard the news, Atari Corp. has filed a Registration Statement with the Securities and Exchange Commission, for an initial offering of Common Stock. In other words: Atari's about to go public.

The anticipated price range for Atari Corp. stock is between \$11.50 and \$13.50 a share. The underwriting group will be managed by PaineWebber, Inc. If any readers are interested, a written prospectus with respect to the offering will be available from PaineWebber, Incorporated.

I'm happy to report that the response from our 8-bit readers is finally agreeing with what we've been promising all along: that our 8-bit coverage *hasn't* been diluted because of the ST. In fact, many readers who own both machines have been using their 8-bits more often than they expected to, because of **ANALOG Comput-**

ing's continuing tradition of publishing some of the finest Atari 8-bit software anywhere.

You'll also notice that we've just completed **An Atari 8-bit Extra from ANALOG Computing**. This book's 132 pages (with only cover advertising space, so it's straight text) are loaded with dozens of useful and entertaining utilities, games, applications, tutorials, and more for Atari 8-bit users. Who else in the industry is putting this much time and effort into the Atari 8-bits?

It's gratifying to see our 8-bit readers becoming even more loyal to **ANALOG Computing** than ever before. I was a little disappointed that some readers thought their machines were being classified as second-rate beside the new STs. Hunh-uh. Anything new in this field is exciting, but we still depend on the 8-bits for office work and programming, and as a source of entertainment—not to mention that they're the reason for our magazine's very existence. We wouldn't forget such an important fact.

I also hope you ST owners realize that, because **ST-Log** appears monthly, we'll give you more pages covering the ST than anyone in the field. Don't think, because we cover two different computer lines, that our cover price is twice what you should be paying.

On the contrary. . . take a look at the programs, tutorials and reviews **ST-Log** gives you every month. And most readers think that the price for the disk version is comparatively low, especially when you con-

sider the hours of tedious typing which a disk subscription saves.

I can remember the "olden days" when I would wait for my issue of *Softside* to arrive. It had only one-quarter of its contents devoted to the Atari. Then, after hours of typing, I was faced with such blockbuster programs as Pong II.

Sure, we've spoiled many of you over the years—and you've deserved it. Just wait until 1987. Maybe we'll be spoiling you too much.

Nah.

Michael Des Chenes
Publisher
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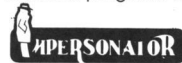
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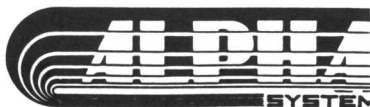
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Reader comment

The global village.

I am an Atari 130XE user, with a data recorder and disk drive. It's a pleasure to use such a wonderful computer, but there is a great problem—software.

In Poland it's hard to get for the Atari. The most popular micro in my country is ZX Spectrum. Ataris are better, but there are only a few in Gliwice.

I'm twenty-five, and my job is to project electric power supplies for new cities. I spend a lot of time trying to "conquer" my computer, but it's difficult without a handbook. I'm trying hard to understand PEEKs and POKEs. Perhaps someone has an old handbook they could send me.

My dream is to have some good programs. I had to save money for two years to buy my computer—no cinema, no new records and other things. Would you be so kind as to send me anything for my computer? Any item will give me a lot.

Sincerely yours,
Marek Horski
Chorzowska 17/19
44-100 Gliwice, Poland

Since I started at the university in 1978, I've been engaged in computing. Now, it's part of my job. All the time I was looking for a really informative and interesting magazine. It seems I've found the right one. As an owner of a 520ST+, I was glad to get yours in our neighborhood.

I'm always interested in contacts to people all over the world, to spread or get information via modem/mailbox. I've built up a small network here and would be glad to get contacts in the U.S., as well.

Peter G. Stiens
Hochofenstrasse 4
4650 Gelsenkirchen, West Germany

I'm an 8-bit computer enthusiast with two systems, an Atari 800XL and Commodore CBM 64. I'd like to contact other 8-bit supporters, particularly in the U.S.

Sadly, the Atari home micros don't get the press support they deserve here. The one magazine's concentration is on games. With this in mind, I'd like to contact 8-bit users interested in serious and business applications for the Atari 800XL/130XE and the 64. One area of special interest to me is desktop and self-publishing, another is home business.

David A. Peers
10F Avenue Crescent
London W3 8EW, England, U.K.

I'm an **ANALOG Computing** reader from Stockholm. As I don't have friends here with Ataris, I'd like to get in touch with other users around the world. (*Även svenskar är välkomna att skriva!*—Even Swedish users are welcome to write!)

Good news from Europe: Atari 520ST+ is number 1 on the German bestselling list of PCs; the 260ST is number 4.

My system consists of an 800XL, a 1050 drive, a 1010 recorder and a Seikosha SP-1000AS printer.

Thank you in advance!
Christian Magnusson
Buntmakarvagen 76
S-141 73 Huddinge, Sweden

In Europe, the 520ST is known as the 520ST+. The 260ST is a 256K model with TOS in ROM.

—Ed.

I've been reading your magazine every month, since issue 14. Atari magazines are rare here in Austria.

I'm thirty, a typesetter in one of the biggest print offices in Vienna. I've owned an

800XL for two years. My hobbies are computing, reading, bowling, surfing and the study of computer languages. I know BASIC, and some assembly and FORTH.

I'm searching for pen pals in the U.S. who would share their information about programming and new products with me.

Thanks to all of your team.

Josef Vransy
Bauerlegasse 23/9
1200 Wien, Austria

Corrections for *La Machine* and *Home Inventory*.

The following lines were missing from issue 46's **La Machine**:

```
5540 DATA 0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,5540
5550 DATA 0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,5550
5560 DATA 0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,5560
```

The following line should be added to the corrections for **Home Inventory** from issue 43. Please be sure to include the corrections that appeared in issues 44 and 46.

4570 GRAPHICS K0:END

A bit from the Brits.

Whilst fighting my way through the droves of people at the September Personal Computer World Show, I noticed a small stand selling **ANALOG Computing**. I immediately bought it, but wasn't able to digest its contents until I got home.

Matt Ratcliff's report on the June CES made good reading, but is the sort of thing that could make a grown man cry—at least if he owns an Atari 800XL! This year's PCW show gave Atari 8-bit owners a little more to look forward to, but some prob-

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Reader comment *continued*

lems need to be sorted out—quickly—if the long-term future is to be secured.

American software comes to our shores via two giant companies, U.S. Gold and AriolaSoft. In the past, these two have ensured that the latest software from your country arrives on U.K. software shelves promptly, and at an affordable price. However, I am somewhat confused as to why neither has licensed smash hit games such as **Karateka**, **Raid Over Moscow**, etc., the C64 versions of which have gone to number one on the software charts.

This has led to the games' being imported in smaller volume by many more dealers. Consequently, the same game can cost twice as much on the Atari as it does on the 64. I hope this is only a short-term problem. (U.S. Gold has rectified the situation for **HardBall!**, which will appear very soon.)

I was interested to read John Skrch's views on cheap software. When will those lads at Atari realize that software sells computers? Cheap software reduces the amount of piracy, which, in turn, increases the volume of software sold. The bigger the rewards for the software houses, the more products they will make.

If software does in fact sell computers, you don't need a brain much bigger than mine to work out that the machine with the most and cheapest software will sell in the largest quantities.

Matt Ratcliff's report also touched upon Mastertronic. They, with Elite, Ocean and Firebird (the founder company of Rainbird), dominate the U.K. market. Let me put things in perspective for you.

Epyx is big. Electronic Arts is big. DataSoft and Mastertronic are big. They may not produce games of quite the same caliber as Ocean or Epyx, but they produce more games on more machines than any other U.K. software house. When Mastertronic announced that they would be supporting the Atari XL/XE computers, it was the biggest boost our machine could have hoped for.

Unfortunately, neither Elite nor Ocean have any Atari games in the pipeline. I was interested to read that DataSoft has an Atari version of **Yie Ar Kung Fu** planned. The 64 version comes courtesy of Ocean, and I can't see them porting the game over.

Firebird's chart-topping 64 hit, **Thrust**, has been translated to the Atari, as has much of their other software (ranging from very bad to very good).

Alligata Software and Bubble Bus, two companies noted over here for quality entertainment products, announced that they would be supporting Atari 8-bits for the first time. Look out for **Loco** and **Starquake** if they come across the water.

Red Rat released **Screaming Wings** and **War Kopter** at the show. Both games feature smooth scrolling and retail here at the reasonable price of about \$15.00.

Much has been written on Epyx's **World Karate Championship**. Over here, it's to be released as **International Karate**, by Activision. I'm not expecting it to be the biggest hit of the year, despite its attributes. It was promised for August 1985, and a lot of people feel let down.

This is unfortunate, since the program's author, Archer Maclean, considers Atari to be the Porsche of home computers. His only other game, **Dropzone** (probably the best shoot-em-up ever written), never sold as many copies as it deserved to, because of poor promotion and misleading packaging.

Maclean also wrote the 64 versions of these games. He says he cannot ignore the 64 for commercial reasons. It would be a tragedy for Atari to lose one of their most talented programmers, who obviously feels deeply about the 8-bits, simply because not enough of his games were bought.

Other news from the show was that Digital Integration (the company which wrote **Fighter Pilot**, a game that eclipsed even **F-15** in the U.K., but may not ever have been released in the States) will be converting **Tomahawk** (a helicopter combat simulation) to the 8-bit Ataris by October 1986.

Finally, Gremlin Graphics announced that they would release the official version of Atari's **Gauntlet** in time for Christmas. The game will be available on most formats, including both the ST and (thankfully) the 8-bit Ataris.

I hope this letter not only puts you in touch with the U.K. scene, but that it brightens your day a little. It should give your 8-bit owners a lot more to smile about. Watch out—the Brits are coming!

Yours faithfully,

Kevin H. Robson

West Wrattling, Cambridgeshire, U.K.

When not at work in Barclays Bank, my main hobby is my Atari. But, like most Englishmen, I enjoy watching a good game of soccer!

A word on **Voice Master**.

In issue 47, Matt Ratcliff wrote a very good review of the COVOX **Voice Master**, with one exception.

In the last portion, he stated that "the recognition portion of **Voice Master** is interesting, but of limited practicality." This is not true.

PCS School, composed of kids ages 9 through 15, has been using **Voice Master** as a method of "driving" CAMLU (stands for Computer-Activated Motorized Lego™ Unit) since March of this year. The students have invented and developed the specialized interface, power supply and sensor units for this project. They can control CAMLU using the keyboard, joystick, touch tablet or **Voice Master** in a variety of languages. They're using an Atari 130XE for CPU control.

Thanks to Kevin Gevatosky of COVOX, who donated some programming time to give us access to the memory address we must use, CAMLU's interface comes out of port 1, and **Voice Master** is used as command input through port 2. Simply speaking "forward," for example, after a training loop makes CAMLU move forward.

Voice Master is the most exciting method of robotic control imaginable.

This is in keeping with the school's motto: "If you can think it... you can do it."

Keep up the good work, **ANALOG Computing**.

Patrick McShane, Director

P-C-S School

Nampa, ID

Double columns on **AtariWriter Plus** and Panasonic printers.

I've been playing with **AtariWriter Plus** and have discovered some useful information.

AWP supports double-column printing, and so does your Panasonic printer. You must lie to the computer and tell it you have an Epson FX-80, but that's okay, because, if you try this with the Panasonic printer-driver file you created, your computer will lock up with no recovery.

In this mode, the printer fonts produce:

```
G1 10 CPI
G2 16 CPI
G3 10 CPI
G4 10 CPI
G5 16 CPI Half-high print Double-strike mode
G6 12 CPI
G7 10 CPI
G8 10 CPI
G9 10 CPI
```

Suggested margins are: L-0, R-39, M-41 and N-80. These produce good-looking print, with no extra margin on the edges of the paper. You can adjust them accordingly. Also, set S to 1 for line-spacing for font G5, or else it will look like it's double spaced.

If you have double-density drives and own **SpartaDOS**, you can run **AWP** from that environment and support all densities of file storage.

Boot your computer with **SpartaDOS** XC23E.DOS and the OPTION key, or use the BASIC OFF command to turn BASIC off. Insert your **AWP** disk into serial drive 1 and type **AUTORUN.SYS**.

There you have it, a great word processor and double density, along with the capability to read all densities without fuss. You cannot write to an Atari DOS 2.5 formatted disk beyond sector 720, but you can read them to sector 1025 (10407). Although **AWP** now supports wild cards when loading files, **SpartaDOS** will not let you use them in destination filenames when adding to a file. You must spell out the complete "filename.ext".

Bernard T. (Butch) Hoffman

APO NY

BASIC German.

I was pleased to read **The Multi-lingual Atari** (issue 45). Especially interesting was Table 1, because I missed this in similar articles of other magazines.

In addition to the BASIC dialects listed in your article, I have another you probably didn't know. It's called **Turbo-BASIC XL 1.5** from Happy Computer, Markt und Technik Verlag AG, Hans-Pinsel-Strasse 2, D-8013 Haar, West Germany.

Not only does it give you a lot more commands, it's also much faster than standard BASIC, plus it has an easy-to-use compiler which increases the speed even more. The additional features include Pascal-like procedures and loops; it accepts hex numbers and some more disk commands.

Yours sincerely,
Martin Wozny
Hamburg, West Germany

Teacher's Pet.

Like most teachers, my first fourteen years of teaching mathematics have often been frustrated by the vast amount of paperwork and recordkeeping needed. Four years ago, I started using computers and felt this might be the solution. But not until recently have I found a commercial program which would meet my needs like **Teacher's Pet** has.

I've successfully run this two-disk program on an 800, 800XL and 130XE. It's a complete grading program with excellent documentation—and with most pertinent information you'll need on-screen while the program is in progress.

(The list of features is too long to publish here, but it's impressive—Ed.) After three months of daily use, I highly recommend this program. I recently received an upgraded version for \$8.00, which eliminated a lot of keystrokes. It's from Someplace Special Software, 11 Woodland Dr., Troy, PA 16947.

If anyone has another program like this one, I'd be interested in hearing from you.

A faithful reader,
William Brooks
Rutland, MA

Piracy—it's everywhere.

Your issue 46 contained numerous editorial comments concerning program piracy and the claimed relationship between that practice and the limited number of new programs for 8-bit Atari computers. As a relatively new Atari user (a little more than a year), this is of major concern to me.

I certainly can sympathize with publishers wishing to avoid, or minimize, unauthorized distribution of programs. However, the (seemingly near-universal) routine practice of copy-protecting programs can not help but create a degree of cynicism in users/purchasers.

How frequently do commercially produced program disks fail? If the failure rate is low, why is there such a substantial charge for replacement? It might be appropriate if failure was caused by the user, but a nondiscriminating charge of \$5.00 to \$10.00 is a bit stiff. Can a user be faulted for trying to protect himself/herself against such a charge (plus shipping charges, delays, etc.)? What is a prudent user to do?

I find even more galling the fact that programs designed for children are copy protected. Recently, I purchased a few disk-based programs for my son, 4½. Two are for ages 4 and up; one, for ages 6 and up. All are copy protected.

Can I really expect that none of these disks will be subject to abuse/misuse, in light of his age? (The fact that he has a younger sister who's sure to ruin any disk

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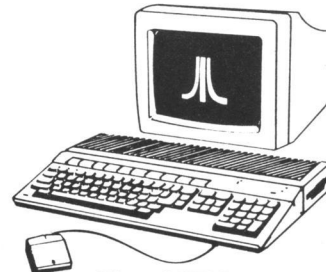
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Reader comment *continued*

within her reach only adds to the problem.) One of the producers provides for a backup copy for \$10.00—more than I paid for the program.

I do not own any pirated software. I'm not sure how I would react if any were offered to me. I've certainly become more cynical about the producers, seeing children's software routinely copy protected. The use of "keys" to run the program, but without any impediment to disk duplication, seems to strike a reasonable balance between interests of the users and the producers.

Yours truly,
Kenneth B. Povodator
Fairfield, CT

I have seen your repeated pleas to help stop Atari 8-bit pirating. I choose to remain anonymous, but the message I bring is for everyone.

I own a modem, and, on nearly every Atari BBS, high-access users can download pirated games. There are even nationwide networks of BBSs solely dedicated to hacking MCI and Sprint codes, and distributing pirated "warez." I know of at least five

pirate boards in my own local calling area alone.

The most difficult aspect in halting piracy is that most everyone pirates, even the well intentioned. There's Mister Innocent on a BBS, and there's the file. He wasn't going to buy it anyway, but now... as long as he can get it with the touch of a few keys, why not? It's not hurting anyone, is it?

Wrong. It's hurting the people who worked so hard to write the stuff. Look:

After the first game, the user sees how easy it is to get more. But in order to get, he has to give, too. It becomes a routine. The user tries to get more and more, in order to trade for even more. Soon, the games are distributed all around. Nobody needs to buy them any more.

I know this, because it happened to me. I have easily 100 games I don't even like—yet I hesitate to delete them. In the years I've owned my 800, I've bought barely five of my hundreds of titles. Now that I see how stupid I was—and what's happened—I feel like a first-class hypocrite. Not to mention guilty. How dare I complain about the lack of new software when I helped to bring about the problem?

I hereby resolve not to download another pirated game. I resolve that, if I do so accidentally, I will delete the file. I will read reviews and buy new games. It may cost more this way, but it's a lot less than buying a new system when my 800 becomes obsolete due to lack of new software.

I thank you for providing a great Atari magazine and for helping me change my mind about pirating. All you pirates reading this (and I know you're there): this probably won't stop you, but maybe you'll feel guilty. I'm doing my part. If that's the most I can do, so be it.

Most sincerely and earnestly,
K.S.

Your issue 45 editorial made the statement that a lot of 520STs have been sold, and not much software. The implication: owners of STs are stealing their software. There's another explanation that may not have occurred to you.

I live in Vernon, Vermont. To the best of my knowledge, I am the only 520ST owner in Windham County. The nearest dealer with any real stock of software is one and a half hours away. There are no Atari user groups within two hours of me.

Thus, I must purchase software by mail. Before buying, I wait to see it reviewed. I made the mistake of purchasing **Final Word** before a review and didn't like it—a quick loss of \$100.00.

So please quit wasting space calling people thieves and review more software, so we can purchase it.

Sincerely yours,
Douglas J. Ervin
Vernon, VT

Points well taken, Mr. Ervin and Mr. Povodator. We're trying to get as much information out as possible, and we dislike copy protection where it's not absolutely necessary. But we also have to agree with K.S.; it's just too easy to get caught up in the system. Ah, for the days when hackers were purists, pure and simple. —Ed.

Upgrading your Parrot.

About the review of the **Parrot** sound digitizer from Alpha Systems (issue 47), I too had problems getting the **Parrot** to pick up anything.

This can be easily solved by connecting the **Parrot** to an amplifier. I used an Archer Mini Amplifier Speaker, available at Radio Shack (277-1008) for \$11.95. With the use of the amplifier, I was able to get results as good as the demos on the disk.

Bill Richardson
Wenatchee, WA

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M/L Editor

For use in machine language entry

by Clayton Walnum

M/L Editor provides an easy method to enter our machine language listings. It won't allow you to skip lines or enter bad data. For convenience, you may enter listings in multiple sittings. When you're through typing a listing with M/L Editor, you'll have a complete, runnable object file on your disk.

There is one hitch: it's for disk users only. My apologies to those with cassette systems. Listing 1 is M/L Editor's BASIC listing. Type it in and, when it's free of typos, save a copy to disk, then run it.

On a first run, you'll be asked if you're starting a new listing or continuing from a previously saved point. Press S to start, or C to continue.

You'll then be asked for a filename. If you're starting a new listing, type in the filename you want to save the program under, then press RETURN. If there's already a file by that name on the disk, you'll be asked if you wish to delete it. Press Y to delete the file, or N to enter a new filename.

If you're continuing a file, type in the name you gave the file when you started it. If the program can't find the file, you'll get an error message and be prompted for another filename. Otherwise, M/L Editor will calculate where you left off, then go on to the data entry screen.

Each machine language program in **ANALOG Computing** is represented by a list of BASIC data statements. Every line contains 16 bytes, plus a checksum. Only the numbers following the word DATA need be considered.

M/L Editor will display, at the top of the screen, the number of the line you're currently working on. As you go through the line, you'll be prompted for each entry. Simply type the number and press RETURN. If you press RETURN without a number, the default is the last value entered.

This feature provides a quick way to type in lines with repetitions of the same number. As an added convenience, the editor will not respond to the letter keys (except Q, for "quit"). You must either enter a number or press RETURN.

When you finish a line, M/L Editor will compare the entries' checksum with the magazine's checksum. If they match, the screen will clear, and you may go on to the next line.

If the checksums don't match, you'll hear a buzzing sound. The screen will turn red, and the cursor will be placed back at the first byte of data. Compare the magazine listing byte by byte with your entries. If a number's correct, press RETURN.

If you find an error, make the correction. When all data's valid, the screen will return to grey, and you'll be allowed begin the next line.

Make sure you leave your disk in the drive while typing. The data is saved continuously.

You may stop at any time (except when you have a red screen) by entering the letter Q for byte #1. The file will be closed, and the program will return you to BASIC. When you've completed a file, exit M/L Editor in the same way.

When you've finished typing a program, the file you've created will be ready to run. In most cases, it should be loaded from DOS via the L option. Some programs may have special loading instructions; be sure to check the program's article.

If you want the program to run automatically when you boot the disk, simply name the file AUTORUN.SYS (make sure you have DOS on the disk).

That's M/L Editor. Use it in good health. **A**

The two-letter checksum code preceding the line numbers here is *not* a part of the BASIC program. For further information, see the *BASIC Editor II*, in issue 47.

Listing 1. BASIC listing.

```
AZ 10 DIM BF(16),N$(4),A$(1),B$(1),F$(15)
LF 11 DIM MOD$(4)
BN 20 LINE=1000:RETRN=155:BACKSP=126:CHK$
UM=0:EDIT=0
GO 30 GOSUB 450:POSITION 10,6:?"Start or
Continue? ";:GOSUB 500:?" CHR$(A)
```

```
ZG 40 POSITION 10,8:?"FILENAME";:INPUT F
S:POKE 752,1:?" "
FE 50 IF LEN(F$)<3 THEN POSITION 20,10:?"
":GOTO 40
NF 60 IF F$(1,2)<>"D:" THEN F1$="D:"F1$(
3)=F$:GOTO 80
KL 70 F1$=F$
TN 80 IF CHR$(A)="S" THEN 120
FD 90 TRAP 430:OPEN #2,4,0,F1$:TRAP 110
HQ 100 FOR X=1 TO 16:GET #2,A:NEXT X:LINE
=LINE+10:GOTO 100
MM 110 CLOSE #2:OPEN #2,3,0,F1$:GOTO 170
VT 120 TRAP 160:OPEN #2,4,0,F1$:GOSUB 440
:POSITION 10,10:?"FILE ALREADY EXISTS
!!!POKE 752,0
ZU 130 POSITION 10,12:?"ERASE IT? ";:GOS
UB 500:POKE 752,1:?" CHR$(A)
UH 140 IF CHR$(A)="N" OR CHR$(A)="n" THEN
CLOSE #2:GOTO 30
QG 150 IF CHR$(A)<>"Y" AND CHR$(A)<>"y" T
HEN 130
BH 160 CLOSE #2:OPEN #2,8,0,F1$
IE 170 GOSUB 450:POSITION 10,1:?"NO MORE
DATA? ";:LINE=CHKSUM=0
GH 180 L=1:FOR X=1 TO 16:POSITION 13*(X
10)+12*(X-9),X+2:POKE 752,0:?"BYTE #
":X:?" ";:GOSUB 310
KH 190 IF EDIT AND L=0 THEN BYTE=BF(X):GO
TO 210
FY 200 BYTE=VAL(N$)
OZ 210 MOD$=N$
BU 220 POSITION 22,X+2:?" BYTE:" "
YZ 230 BF(X)=BYTE:CHKSUM=CHKSUM+BYTE*(X-IF
CHKSUM)9999 THEN CHKSUM=CHKSUM-10000
MS 230 NEXT X:CHKSUM=CHKSUM+LINE:IF CHK$U
M)9999 THEN CHKSUM=CHKSUM-10000
IG 240 POSITION 12,X+2:POKE 752,0:?"CHECK
SUM: ";:L=1:GOSUB 310
EM 250 IF EDIT AND L=0 THEN 270
QM 260 C=VAL(N$)
SY 270 POSITION 22,X+2:?" C:" "
IL 280 IF C=CHKSUM THEN 300
DI 290 GOSUB 440:EDIT=1:CHKSUM=0:GOTO 180
LM 300 FOR X=1 TO 16:PUT #2,BF(X):NEXT X:
LINE=LINE+10:EDIT=0:GOTO 170
FU 310 L=0
LG 320 GOSUB 500:IF A=ASC("Q") AND X=1 AN
D NOT EDIT THEN 420
PO 330 IF A<>RETRN AND A<>BACKSP AND A<>4
0 OR A<>57 THEN 320
DX 330 IF A=RETRN AND N$="" THEN N$=MOD$
TD 335 IF A=RETRN AND L=0 AND X=1 THEN 35
0
JR 340 IF (A=RETRN AND NOT EDIT) OR A=B
ACKSP AND L=0 THEN 320
DW 350 IF A=RETRN THEN POKE 752,1:?" ":R
ETURN
GG 360 IF A<>BACKSP THEN 400
SA 370 IF L>1 THEN N$=N$(1,L-1):GOTO 390
AS 380 N$=""
RE 390 ? CHR$(BACKSP);:L=L-1:GOTO 320
BB 400 L=L+1:IF L>1 THEN A=RETRN:GOTO 35
0
HX 410 N$(L)=CHR$(A):?" CHR$(A);:GOTO 320
KN 420 GRAPHICS 0:END
YT 430 GOSUB 440:POSITION 10,10:?"NO SUC
H FILE!";:FOR X=1 TO 1000:NEXT X:CLOSE
#2:GOTO 30
FD 440 POKE 710,48: SOUND 0,100,12,0:FOR X
=1 TO 50:NEXT X: SOUND 0,0,0,0:RETURN
MY 450 GRAPHICS 23:POKE 16,112:POKE 53774
,112:POKE 559,0:POKE 710,4
XR 460 DL=PEEK(560)+256*PEEK(561)+4:POKE
DL-1,70:POKE DL+2,6
HM 470 FOR X=3 TO 39 STEP 2:POKE DL+X,2:M
EXT X:FOR X=4 TO 40 STEP 2:POKE DL+X,0
:NEXT X
ZM 480 POKE DL+41,65:POKE DL+42,PEEK(560)
:POKE DL+43,PEEK(561):POKE 87,0
AC 490 POSITION 2,0:?"analog ml editor":
POKE 559,34:RETURN
MZ 500 OPEN #1,4,0,"K:";:GET #1,A:CLOSE #1
:RETURN
```

New, improved and better than ever.

by D.F. Scott

This month, we'll focus on upgrades and expansions to every Atari computer currently "out in the field." It appears that, by 1987, if you own an Atari—from a 400 on up to a 1040ST—there will be an Atari-made expansion available for it. New operating systems, new graphics chips and new monitors are to be expected.

Among our sources this month are: John Skruch, manager of Atari's 8-bit product line; Larry Samuels, Director of Sales and Marketing for Atari; and Marty Taucher, Public Relations Manager of Microsoft Corporation in Redmond, Washington. Other sources wish to remain unnamed.

Once again, this portion of the *Status report* gives primarily the Atari 8-bit story. For the total picture, please see the ST section on page 45ST.

At the heart of the XE is an eight-year-old mother board design, in a market that demands faster, brighter, bigger machines. The first attempt to "modernize" the 8-bits, the 1200XL, failed to work—and failed to sell. Once the final versions of the XL were completed, they still retained "incompatibility" problems with the original 400/800s.

I can recall no previous attempt to modernize any 8-bit computer which has resulted in a perfect track record in the software compatibility category. Forever inscribed in the annals of incommunicability with their predecessors are the Apple IIe; the Tandy 4D (formerly a TRS-80); and (in large, bold letters) the Commodore 128. Modernization randomly casts some un-

fortunate programs into the realm of future uselessness. Third-party software producers do not wish to be held captive, waiting for their star programs to be declared useless at the whim of a computer's manufacturer.

Atari's 8-bit development is at an extremely crucial phase. Several software companies are shifting their concentration over to the ST, and others, not ready for the arrival of 16-bit prominence, are shifting their concentration away from Atari. So, in considering ways to make good their investment in the 8-bit line, Atari had to discuss something more than a mere face-lift. In order to win back 8-bit software producers' support, the corporation could not redesign the XE.

Atari has come to a compromise. It feels the best way to expand the XE is externally. A study of external expansion methods resulted in the corporation's asking itself, "Why not provide an expansion to every 8-bit computer in the field?" Surprise, 400/800/XL owners, the 80-column expansion unit is for you, too.

The 80-column box, as yet unnamed, is planned to plug into the joystick port on all 8-bit units—most likely port 2. The SIO (serial input/output) port is thus saved for daisy-chaining through the disk drives. The mother board is left untouched, installation costs are wiped out, and you don't need an 850 interface! All that's required to sell it is a package, a salesman, a good monitor and the usual 90-day manufacturer's warranty.

What will this expansion unit do? Here's what we know: the box connects the micro to a composite monitor, monochrome or

color. General output for graphics and all alphanumerics printed directly to screen memory, besides buffered output through an input/output control block, will still appear in 40-column mode. Only text sent through the control block (IOCB) E:, number 0—called the screen editor—will be converted to 80-column.

At first thought, this might be a disappointment to some who expected an instantaneous improvement in output. Consider, though, the resulting calamity if all text were converted, so that all output flooded just the left half of the screen. Nearly all the 8-bit software currently available is geared toward a 40-column screen; there are a few pieces that offer 60-column emulation.

How many programs can you name that use the screen editor IOCB instead of memory-mapped output? Not even **Atari-Writer Plus** uses E:. Because of this little inconvenience, Atari plans to revise **Atari-Writer Plus** yet again, to a sort of "Double-Plus" version, becoming the first company to capitalize on the new display.

What hasn't been disclosed is whether or not doubling x-axis resolution will have the expansion box providing a new, ST-competitive graphics mode for 8-bits. Such a mode, if feasible, may work like graphics 9-11 does on the GTIA chip, representing a pixel by a letter. If there's an expansion graphics chip in the box (which I'll call the E-box after the E: IOCB), it could receive ATASCII text delivered to it by IOCB 0 (since that's all an IOCB handles) and, after being toggled by a "delimiter" or control character like reverse-%, go to "graphics 12," and convert the datum



Status report

8-BIT SECTION

following the reverse-% to a graphics pixel with a representative color or hue value. Having created a graphics-11-like screen that acts like a 640-column by 200-line text output screen, and with the main computer still under the impression it's operating the screen editor, the data would be output to the monitor in pixel form, positioned by tabs, spaces, line feeds, or the POSITION statement in Atari BASIC.

Again, *Atari has not confirmed* that a new graphics mode will be made available, but it hasn't denied the possibility of one, when asked. A four-color 640x400 8-bit screen would have to have 32K of memory, most likely in the "E-box." The graphics speed would be dependent upon how fast the screen editor wants to work. To provide the mandatory power for a new graphics mode, the E-box would need to be a half-computer itself.

It has a projected price of \$79.95, which should be plenty for half a computer. So "graphics 12" is not out of the question. It would compel 8-bit software producers to treat the XE as a new machine entirely. Perhaps this will generate some new interest in the machine; on the other hand, it might make obsolete the existing software base, and thus reduce the amount of current production. There's still a bit of shaky ground here.

Standing in the way of some producers' decisions over whether to write new XE software may be the announcement that Atari is developing a new 3½-inch disk drive for the 8-bit line. Given our experience with decoding Atari nomenclature, let's call it the XF 351 drive. A new disk format would, of course, require a new

DOS, but one which would be able to accept a transfer of programs between 5¼-inch and 3½-inch formats. If a 640x200 screen is made available, we could see a much more graphic form of DOS. . . Are you thinking what I'm thinking?

If Atari were considering an overall consolidation of the computer line, in operation as well as in appearance, it might consider a graphically-oriented DOS, similar in appearance to GEM on the ST. One report is that Optimized Systems Software is redeveloping its ADOS text-driven system for use with the 3½-inch format. Statements from Atari contradict this, claiming it is developing its own system, but the company is keeping its mouth curiously shut as to what this new DOS should contain and how it will operate. It hasn't denied, though, the possibility of the system's being a graphic one.

Assuming such a system were released, it could not feasibly be implemented as an operating environment, as is ST GEM. Programs could not be run in a "windows" environment unless the environment were part of the program itself. But an alternate operating system called GEOS for the Commodore 64 shows that a point-and-click, "desktop" operating environment is feasible—and good-looking—for 6502-based machines, even if it doesn't speed up such machines.

File-access and storage capacity in the Ataris would most certainly improve, and the current ST mouse can already plug into an 8-bit unit. If the old **AtariWriter** could fit into an 8K ROM cartridge, certainly a super enhanced version with drop-down menus, string search-and-replace and cut-

and-paste could fit into 64K, with plenty of space left over for text, especially on the 130XE. What some people would spend thousands of dollars for when purchasing a Macintosh, they may be able to get at around \$400.00, with color and disk speed as a bonus.

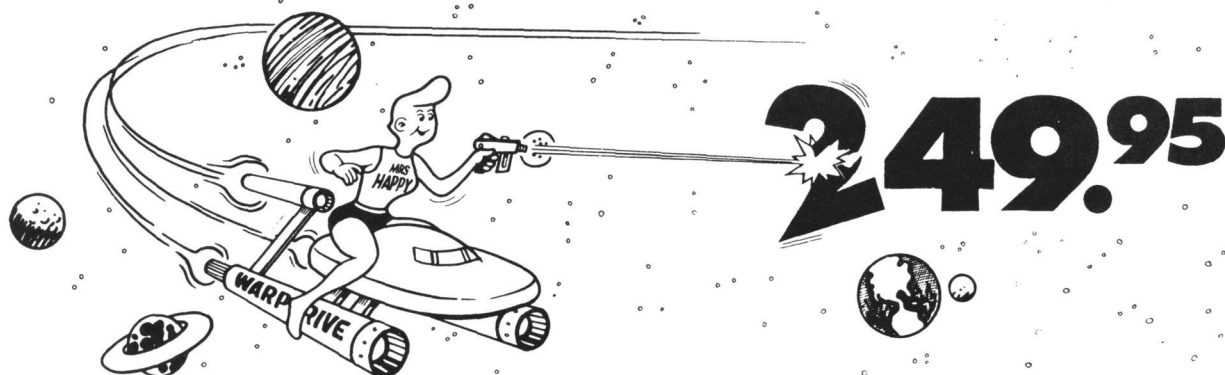
The E-box and the 351 may tempt some current Atari owners to extract their units from closets, where many 8-bits rest in limbo.

There was a time when it was difficult to find a purpose for a home computer. We found out it couldn't walk the dog, hand the kids a diploma, or balance the budget—though it could balance one's checkbook. In eight years, we've been able to clearly define absolute purposes for owning a home computer, and word processing is near the top of Atari's list—though game-playing, as Leonard Tramiel has said, is "what most people use them for."

Ataris certainly aren't deficient at game-playing, but in word-processing, limited disk storage capacity and that 40-column screen are drawbacks to efficient applications. So, certainly, the company is making the right diagnosis and applying the proper solutions. For the Christmas season, the XEs will be in a more competitive stance against such machines as the Laser 128, the low-cost Apple IIc-clone now sold in major department stores.

One important note: Atari no longer has plans to build a monitor (at one time called XC 1411) for the 8-bit line. Anybody wanting a composite monitor to attach to his E-box will have to look to other sources. The 8-bit product line manager, John Skruch, tells us his division has more important

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Status report *continued*

business at hand than to take some other manufacturer's monitor and conceive a fancy box for it.

One more important item is being readied for fall release: the SX 212 modem. To explain the nomenclature here: S=ST, X=XE, 212= Bell 212 modem "compatibility" (and there's that word again). The Bell (AT&T) modem standard set of operating commands is a sort of subset of the Hayes command set. . . or is the Hayes set a superset of the Bell? Whatever, like the low-cost Avatex 1200 it will be competing with, it uses the general set of AT (for "attention") terminal commands.

The SX will feature both RS-232 hookups for the ST and Atari SIO hookups for all existing 8-bits—and, once again, it doesn't require an 850 interface! Atari Corp. feels daisy-chaining is a good idea; why make the customer pay \$150.00, just so he can hook up something else he's bought?

For the ST, programs like **Flash!** and **ST-Talk** should work with the SX, though, since it will operate in a totally different manner for the XE than the XM 301 and its predecessors, Atari will have to come up with a new piece of terminal software

—for both 5¼-inch and 3½-inch disk formats. For the experienced 8-bit modem user, it will have to compare with **1030 Express**.

Following up from last month: Sales and Marketing Director Larry Samuels tells us XE advertising for TV is in production now, with plans currently to buy only into local air time, not expensive national network time. **A**

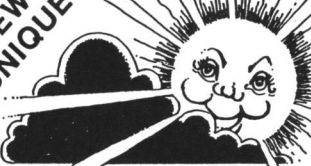
D.F. Scott is an artist, writer, educator and programmer living in Oklahoma City. He is currently engaged in the study of quantum physics, computing and other ways in which elementary particles interact with each other. Otherwise, he fills infinite pieces of paper.

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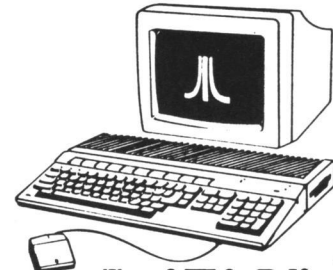
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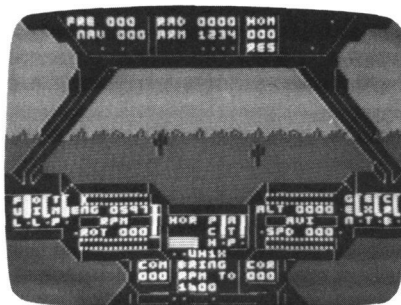
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CIRCLE #112 ON READER SERVICE CARD



8-bit news!



HELO FLIGHT SIMULATOR

The **Super Huey** is a new experimental high-performance helicopter utilizing the latest in electronic control systems and stabilization.

Space-age instruments and controls are at your fingertips, along with your own in-flight computer to assist you when facing the various challenges (such as solo flight, exploration, rescue and combat).

Power-up, takeoff, landing, rescue and exploration routines are explained in detail by your flight manual and briefing card. Color animated graphics give you a pilot's-eye view from the cockpit of your craft.

Retail is \$19.95. For more information, contact Cosmi, 415 North Figueroa Street, Wilmington, CA 90744 — (213) 835-9687.

CIRCLE #191 ON READER SERVICE CARD

EXPANDABLE BBS

The **Carina BBS** is a modular design for bulletin board set-up. The **Carina** is divided into two parts: modem operating environment and BASIC bulletin board modules, made up of five different areas. The system allows easy modification to your individual needs.

Some of its features: upload/download capability, a message board and SYSOP/user chat mode. It's set up for use with most modems, including the Hayes Smartmodem, Q-modem

and MPP 1000C/E, and is known to work with the ATR-8000 and Atari 800 interface.

The BBS is \$55.00. A special handler to provide Hayes compatibility for the MPP modem sells for \$10.00, and there's a similar handler for the 1030/XM301 at \$15.00. For more information, contact Carina Software Systems, 322 Natchez Ct., Jupiter, FL 33477 — (305) 793-2792 (2 p.m. to 6 p.m.)

CIRCLE #192 ON READER SERVICE CARD

SPLIT INK

This printer utility program works with any printer compatible with an Epson, the Pro-writer 8510 series or a NEC 8023A. It also performs with any printer adapters (such as the Panasonic, Citizen, Okidata or Gemini), and can be used with any Atari hardware.

It comes with a slide-show capability, and the picture loader on the slide-show disk will load from **Atari Artist**, **Fun With Art**, **Micro-Illustrator**, **Micro Painter** and **Micro Pace**. It can also flip, move or invert the images thus conjured.

In addition, **Spilt Ink** allows you to create fonts, above and beyond the thirty-two it contains. **Spilt Ink** also has a disk sector editor.

Priced at \$24.95. Digital Arts Software Associates, 3878 Bradwater Street, Fairfax, VA 22031 — (703) 978-3867.

CIRCLE #193 ON READER SERVICE CARD

COMPUTER CROSSWORD

Crosscheck is an on-screen strategy crossword game, with some similarities to Scrabble thrown in.

You throw the "computer dice" to determine the length of your word, solve the clue correctly, then place your first answer on your own starting bar in the center of the screen.

Following the first move, subsequent answers can be placed anywhere on the board, by themselves or with other words, yours or the opponent's.

The goal is to build an unbroken chain connecting your starting bar to the home base. Up to four players may compete individually or in teams, with a point or time limit, or until one player reaches his home base.

Players also have the ability to move from overall board view to a close-up mode. Additional clue libraries are available from the manufacturer.

Priced at \$29.95. Datasoft/Intellicreations, Inc., 19808 Nordhoff Place, Chatsworth, CA 91311 — (818) 886-5922.

CIRCLE #194 ON READER SERVICE CARD

KYAN PASCAL VERSION 1.3

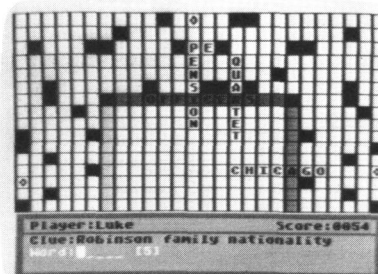
A full implementation of the ISO Pascal language, **Kyan Pascal** (reviewed in **ANALOG Computing's** issue 40) works on any Atari XL or XE computer with a minimum of 48K and a single disk drive.

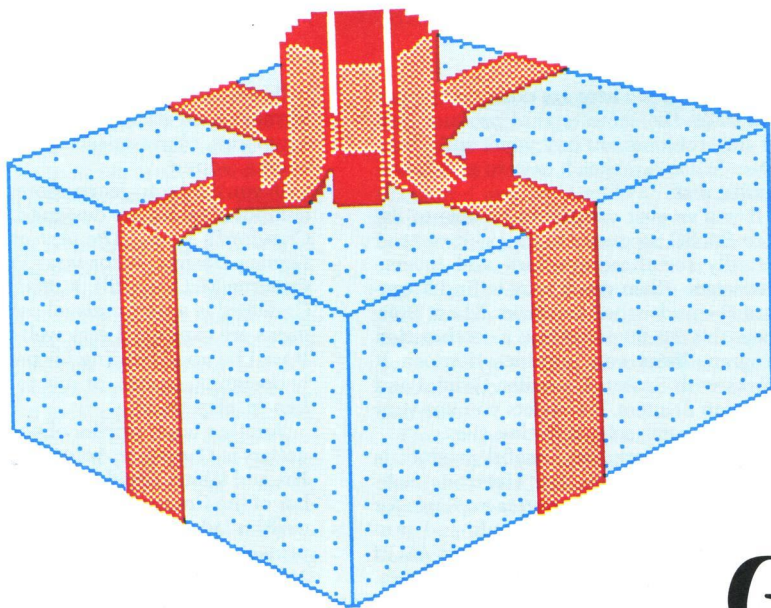
This powerful language features help screens, error messages and command menus. Another important feature of **Kyan Pascal** is KIX, a file management system giving you DOS-like commands directly from a command-line prompt. A full-screen text editor, built-in assembler, machine code compiler and assembler are also included.

Enhancements exclusive to version 1.3 consist of: reduced compiler load time, easier-to-use editing commands, a new 300 page-manual in a three-ring binder, and a full-featured macro-assembler. Besides these updates, sound has been included, and player/missile graphics have been incorporated in the language's Advanced Graphics Toolkit. This version is also portable to most main-frame computers.

Kyan Pascal lists for \$69.95, and information is available from Kyan Software, Inc., 1850 Union Street, San Francisco, CA 94123 — (415) 626-2080.

CIRCLE #119 ON READER SERVICE CARD





The Atari 8-bit Gift Guide

**Almost everything
a user could ask for at the holidays.**

by Arthur Leyenberger

With the holidays approaching, Atarians—like everyone else—are starting to think about what gizmo, gadget, program or other gimcrack they must have in order to make their Atari system complete. Maybe it's that new joystick, to make high game scores the rule rather than the exception. Or perhaps it's an application program finally available for the Atari, that will do everything—including slicing and dicing.

Regardless of how many hours you've logged at the keyboard, chances are there's something that will help you get the most out of your Atari. The problem is, you may not be aware that the product even exists. Worse yet, a gift-giving friend or relative may also be unaware of that special product—or what you want.

To save you the hassle of visiting every computer store in town, then having to actually tell someone what you'd like (how tacky), here's a compilation of goodies for the Atari user. Some of the products I will mention by name, having actually used/ tested/played each of them. Other items will be mentioned in general, with, perhaps, a couple of suggested brand names. A list of the manufacturers and their addresses can be found at the end of this article.

You'll see a lot of so-called brand-Xs here. Why? Because, many times, they offer the most value for the dollar. Also, when I run across an excellent product made by a small company or an individual, I like to give them a plug. Our whole

whacky world of personal computers was started by just this type of folks. Unfortunately, these entrepreneurs are giving way to the IBMs and AT&Ts.

I can't mention every Atari-related product ever made; I can't even mention all of the good Atari products I use or know about. My apologies in advance if I leave out your favorite. As far as objectivity goes, I've been using various computers for over ten years and writing about them for more than four years. What I offer is informed judgment with a deliberate attempt at fairness. Above all, I too am a user.

Inexpensive stocking stuffers.

Do you ever get confused about which key goes with which graphic symbol? Or are you tired of looking up those symbols in your dog-eared, tattered copy of "Your Atari Computer"? The only solution I know of is to spend \$5.00 for a set of **Graph-Fix** keyboard labels. Available from Dovestar Creative Concepts, these self-adhesive labels stick on the front of each key on your Atari. You'll never get those graphics characters confused again. One size fits all—Atari 800, XL or XE computers.

Hey, does your trigger finger ever get tired from constantly pressing the fire button on your joystick? If so, you need a **Pointmaster Fire Control Adapter** from Discwasher. It lists for \$7.00, but I've seen it discounted at toy stores for about three bucks. When this device is inserted between your joystick and computer, holding down the fire button causes a constant stream of pulses to be sent to the computer. It's as if you were pressing the button fifty times a second.

A useful gift to any Atari game player is a new joystick. Epyx has one called the **500XJ**, which is unusual because its shape conforms to the hand. The stick is billed as a high-performance model with a 5-year, 10-million-shot warranty. With the **500XJ** held in the palm of your hand, the fire button is positioned at the index or trigger finger. This so-called Porsche of joysticks can be had for under \$20.00.

Miles Kimball is one of those mail-order companies whose catalog lists the kind of bric-a-brac that eventually ends up at garage sales. However, there is one item that (although not Atari-related per se) would be fun to find in a stocking. It's called the **Personal Computer Clock** and sells for only \$4.00. It looks like a miniature computer, with an LCD clock where the screen would be.

I don't know about you, but no matter how clean I keep my computer room, dust is inevitable. I have covers on just about all my equipment. You can get a whole range of covers for every Atari computer and peripheral made. They usually retail for \$5.00 to \$10.00, and will keep dust, moisture and even a spilled drink from damaging your equipment. Several companies make these covers, and they're readily available in computer stores.

Of course, I'd be remiss if I didn't mention the most valuable accessory for the Atari user. You may have already guessed it, but, if not, look at the cover of what you're holding in your hands. Yup, it's a copy of **ANALOG Computing** magazine. If you're reading this article, then you probably already know how useful **ANALOG**

8-bit Gift Guide *continued*

Computing is. But, for a new user or someone who doesn't know about this magazine, I can't think of a more perfect gift than the latest issue in a stocking.

More goodies.

AtariWriter is still one of the easiest to use word processors around. Like anything else, though, it still requires a certain amount of time to learn. At-A-Glance has a really useful product that will minimize the time required to get up to speed with **AtariWriter**. It's called the **At-A-Glance AtariWriter Template**.

This \$15.00 plastic template fits over the keyboard of Atari 800 and XL series computers, allowing all the keys to be accessible. Printed on the template are various commands, control codes and other information for using **AtariWriter**. It's sort of like having training wheels while you're learning to use the program. At-A-Glance also sells templates for **SynCalc** and **SynFile** (by Synapse), and **Letter Perfect** and **Data Perfect** (by LJK).

If someone wants to get started in telecommunications at a reasonable cost, they could do worse than to buy an Atari **1030 modem**. These go for less than \$50.00 now. To make it upload, download and work like a modem should, you need a more sophisticated terminal program than the one built into the **1030. E.T. Modem** (Sector One International) sells for \$20.00 and will make using an Atari **1030** or **835** modem like driving one of the big rigs. It's easy to use and has just about all the features a novice or experienced user would want.

Two other modems to consider are the Atari **XM301** and the **Avatex 1200**. The **XM301** is a \$50.00, 300-baud modem, that comes with a very good terminal program written by Russ Wetmore. With this modem and the terminal program, you can access any of the telecommunications services, bulletin boards, or even your company's mainframe computer. The **Avatex** modem is a \$99.00, 300/1200-baud modem that's almost 100-percent Hayes compatible. It has no speaker and cannot auto-answer, but, other than that, it probably represents the best modem value today. Production has been stopped, so get an **Avatex 1200** while you can. It's available in retail stores and from a number of the mail-order companies who advertise in **ANALOG Computing**.

As you start to use your Atari, you begin to accumulate things. Cartridges, disks and whatnot appear everywhere. Unless you decide how to organize all of it, you'll soon be unable to find your computer beneath the mess.

A number of companies sell disk and cartridge holders that typically cost anywhere from \$6.00 to \$30.00. I personally like the **Flip 'N File** (Innovative Concepts) flip-up tray and the ten-cartridge **Flip 'N File** flip-up holder. Each lists for \$29.95 and will be quite useful in keeping your

work area tidy. There are other companies that make the same type of product. Just be sure the one you buy won't spill disks when full and makes it easy to grab a particular disk.

If you've ever wanted to be able to list your BASIC programs to the printer—and actually see those graphics and inverse characters—then you'll want to find **Mega-Font II+** under the tree. From XLent Software, this \$25.00 program is a combination program lister and graphics dumper. It works with Epson, Prowriter, Gemini and Riteman printers. It also lets you use your own character sets in listing files.

Another interesting, useful product is called **Genie**, from New Horizons Software. This \$30.00 program is available for the XL and XE computers only and provides a note-taking, calculator and ASCII code capability for any program you use. The program can be called up at any time, even in the middle of another one. DOS functions (such as directory listing, file lock, unlock, and renaming and deleting) are also available. When you've finished with one of the **Genie** functions, you return to exactly where you left off in the main program.

*One of the best
gifts—to give
or to receive—is a
membership in
an Atari user group.*

There are several other, more generic gifts in this price range. One of the best ones you could give or receive is a membership in an Atari user group. There are many fine groups around the country, with memberships usually costing about \$20.00. These groups have monthly meetings, publish newsletters, and often have libraries of public domain software.

Books and magazine subscriptions also make excellent gifts. Several titles spring instantly to mind. The book that's become the Bible for Atari users is **Your Atari Computer** by Poole, McNiff and Cook. It's published by Osborne/McGraw-Hill and will set you back about \$16.00. Another book of equal status is **The Atari User's Encyclopedia** by Gary Phillips and Jerry White. It costs \$20.00 and is published by The Book Company (Arrays). These two belong on every Atari's bookshelf.

One of the best books for learning BASIC on an 800 or XL computer is published by Hayden. Called **Basic Atari BASIC**, it sells for \$15.00 and was written by Jim Coan and Richard Kushner. Not just another BASIC "clone" book, this was specifi-

cally rewritten for the Atari, to include information on such subjects as XL graphics modes, player-missile graphics and, of course, sound.

If you'd like to learn more about how computer games are designed, then Chris Crawford's book, **The Art of Computer Games Design**, is for you. Published by Osborne/McGraw-Hill, it retails for \$15.00. Crawford is a very unusual person, whose views are expressed very well in the book. It will be good reading for people actually designing games, or just for those who like to play them.

Another book worthy of your computer dollars is **Computer Animation Primer** by Fox and Waite. David Fox has been a member of the Computer Games Project at Lucasfilm Ltd. for the last four years and was project leader for **Rescue on Fractalus**. Mitchell Waite is an experienced writer who's been involved in the microcomputer business for a decade. The book is published by BYTE/McGraw-Hill and retails for a hefty \$23.00. But don't let the seemingly high price scare you away; this is a heck of a book.

It provides one of the best introductions to computer animation I've ever seen. There are lots of program examples and plenty of gorgeous pictures. What's more, nearly all of the well-written code examples are in Atari BASIC. That means you can type them right in and see what happens. **Computer Animation Primer** has got to be one of the best-kept secrets of all Ataridom.

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

If you need colored ribbons, Gemini has red, green, blue, brown and purple, to fit a variety of dot-matrix printers. These ribbons sell for \$8.00 each and are available for Epson, Okidata and Prowriter printers (the Panasonic printer ribbon is \$10.00). Colored ribbons are especially useful with such graphics programs as **The Print Shop** from Brotherbund.

Gifts that keep on giving.

There are thousands of products made for the Atari. But some of them are the kind you'll use over and over. They have value and staying power. Here are some suggestions for those types of products.

Aside from being the best game-playing computer on the market, the Atari is well-

suit for more serious endeavors. Word processing on the Atari can be as full featured and easy to perform as on any other computer. Of the dozen or so word processors for Atari, several stand out—each for different reasons.

AtariWriter is the choice for people who do occasional writing. It has all the features of a powerful program and is still simple to use. Not that it can't handle more complex writing needs, but its strength lies in excellent design and implementation. List price has come down to about \$50.00, but I've seen it locally for as little as \$25.00.

Since Atari's APX has gone out of business, **AtariWriter** printer drivers are no longer available. To get full use from an **AtariWriter**, you must have a driver program for your particular printer. At-A-Glance, mentioned earlier for keyboard templates, also sells driver programs for nearly every brand of printer. At \$15.00 (dot matrix) and \$25.00 (letter quality) each, they're available for Epson, Okidata, Prowriter, BMC and Panasonic printers. Contact At-A-Glance for your own, specific printer needs.

Another word processor I highly recommend for someone doing a lot of writing is **The Writer's Tool**, from OSS. It's fairly new, but has so many features designed to make writing easy that it ranks in the top three. It's also very powerful. The cost is \$80.00, and it uses OSS's exclusive bank-selecting Super Cartridge.

The third word processor on my recommended gift list is **Letter Perfect** by LJK (\$80.00). I've been writing about computers for a while now, and **Letter Perfect** has been with me all the way. It and OSS's **Writer's Tool** are equally powerful, but **Letter Perfect** has the advantage of working with either a bit-3, 80-column board or (if you already have one) an Austin-Franklin 80-column card. It also comes with its own spelling-checker program and dictionary disk.

Any one of these word processors would surely make a fine gift. A fourth excellent word processor is **PaperClip** from Batteries Included. Although it works only in 40-column mode, a full page (over 80 columns) can be previewed on your monitor, by scrolling over the text. **PaperClip** comes with its own spelling checker now.

Batteries Included also has what may be one of the best software values around for the Atari 800, XL and XE computers. **HomePak** is three programs in one: a word processor, terminal program and database. The terminal program, **HomeTerm** is clearly the best of its type for Atari 8-bits. The word processor, **HomeText**, is quite good, although it doesn't rank with the programs mentioned previously. Finally, **HomeFind** is an electronic filing system. **HomePak** costs \$50.00 and is worth considering.

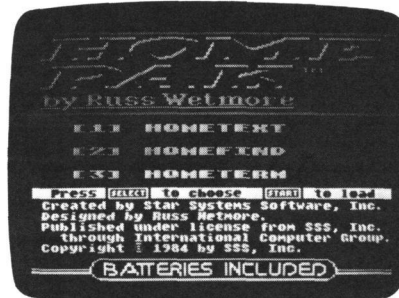
There are two database programs for the Atari that are worth looking at. **SynFile+**

from Synapse is an extremely easy-to-use database program, which is relatively fast. List price is about \$50.00, and it can interface with other Syn-programs (spreadsheet and graphics) and the **AtariWriter**. Definitely a best buy.

The most sophisticated database for the Atari is **Data Perfect** from LJK. It sells for \$99.95 and will interface with **Letter Perfect**. It can be used with the bit-3, 80-column board and has an extensive report generator built in. Learning the ins and outs of it, however, requires some time and patience.

One of the best programs I've ever seen for the Atari (or any other computer) is Synapse's **SynCalc** spreadsheet program. It's very powerful and yet still easy to use. It has both a menu-driven and a command mode of operation, and literally blows **VisiCalc** right out of the water. List price is about \$40.00. **SynCalc** is the kind of program that will find many uses, from preparing income tax forms to budgeting, to recordkeeping.

An excellent companion to **SynCalc** is **Sideprint**, by At-A-Glance. This \$30.00 program allows you to print out extra wide



*HomePak from
Batteries Included.*

reports—without glue, staples or tape. The program works with **VisiCalc**, **SynCalc**, database programs and any application where the printout is too wide to fit on a standard page. **Sideprint** can print output vertically, or up to 600 characters horizontally. It works with Epson, Prowriter, NEC and Gemini or compatible printers.

Another useful program is the Electronic Arts **Financial Cookbook**. For the \$40.00 price tag, this includes dozens of financial "recipes," for calculating everything from mortgages to IRAs. Highly recommended.

The best graphics and statistical analysis package available for the Atari is **B/Graph**, from Batteries Included. With this \$60.00 program, you can make bar charts, histograms, scatter plots and pie charts. Descriptive statistics and multiple regressions can also be performed on the data. It's very easy to use and has excellent documentation that includes tutorials.

To get started with the vast resources of CompuServe Information Service, you'll find the **CompuServe Starter Kit** is a good

value. For \$39.95, you'll receive five hours of connect time and a thorough manual.

Of course, you'll need a modem, and there are several good ones to choose from. Atari's **1030 modem** is a good value, as is the Microbits Peripheral Products **MPP-1100C**. Though Microbits is no longer in business, the newly reorganized company, Supra, is selling the entire MPP line. The cream of the crop is the Hayes **Smartmodem**, but that will set you back about \$300.00 for 300 baud and \$500.00 for 300/1200 baud.

If you want to participate in the world of Atari and **ANALOG Computing**, one of the best ways is through the Delphi telecommunications service. Delphi is a full-service, on-line communication and information network. The Atari User's Group is run by the same folks who bring you **ANALOG Computing** each month. Access charges average as low as ten cents per minute from most parts of the country, and there's no extra charge for high-speed access.

The Atari User's Group on Delphi provides a host of services and features. You can send and receive messages to and from other Atari users worldwide, in the Forum. The database area has thousands of free programs to download, including those presented each month in **ANALOG Computing**. The conference feature allows you to meet electronically with other Atari users.

I have several gift suggestions for the creative individual on your gift list. **Movie Maker** by Electronic Arts (\$49.95) lets you create animated graphics sequences right on your screen. These can be edited, saved and combined to create all kinds of interesting, fun "movies." **Movie Maker** is good for hours of entertaining learning. It's something the whole family will enjoy.

A touch tablet for drawing and "electronic doodling" would be a nice gift for someone of any age. Atari's **Touch Tablet** is now selling for about \$50.00 and is an excellent value. The price includes the easy-to-use **Microillustrator** graphics program in cartridge form. **Koala Pad** also sells for about \$50.00, but has more software available. Either of these graphics tablets would be an excellent gift for a child.

One of the least expensive—and most rewarding—ways to get involved with the music/computer combination is to get an instrument like the Casio **CZ-101 Digital Synthesizer**. This mini-keyboard lists for \$500.00, but can be obtained at discount houses for as low as \$175.00. The **CZ-101** is an eight-voice polyphonic digital synthesizer, with sixteen factory preset "patches," sixteen internal patch memories and the capability for another sixteen patches on a removal RAM cartridge. The supplied patches (or different sounds) range from trumpet, electric piano and organ voicings to far-out sounds you've only heard in your

imagination. Some are more realistic than others.

To turn your Atari into a multi-track tape recorder, a MIDI hardware interface and software like the Hybrid Arts **MIDI-MATE** is required. Although a little on the pricey side—the hardware and software can set you back about \$350.00—the combination of the Casio keyboard and the Hybrid Arts products give you and your 8-bit Atari tremendous capability.

If you want to learn more about synthesizers, I highly recommend three books from GPI publications. These are compilations of articles that have appeared in Keyboard Magazine. Called **Synthesizer Basics**, **Synthesizer Technique** and **Synthesizers and Computers**, each book sells for \$8.95 plus \$1.50 postage.

Games.

No list of gift suggestions for the Atari-an would be complete without a sampling of computer games. There are hundreds now available for the Atari 8-bits, but about a dozen stand out as the very best examples of game or game/educational software.

The best games fall into a handful of categories.

My favorite text-adventure game is **Planetfall** from Infocom. It combines adventure, science fiction and humor into an engrossing example of what's called interactive fiction. For a child, or someone new to the text game genre, I would recommend **Seastalker**, also from Infocom. It isn't as difficult or complex as **Planetfall**, but offers a good challenge—and, like all Infocom games, has excellent documentation. Every Atari-an should own at least one Infocom text-adventure game. Prices range from \$40.00 to \$60.00.

Another excellent text adventure is from a small company called Dynamic Software Design. **Wombats I**, a really funny game, is a parody of text adventures. The author, Alex Leavens, has a strange and wonderful sense of humor. The game is at its best when the player is familiar with the other games in this genre. **Wombats** is somewhat difficult to complete, but has a surprisingly good parser, so it understands your English commands. If you think you've seen

all the games for your 8-bit computer, do check this one out. And beware, **Wombats II** is coming!

For definitive board games, turn to Odesta. Their **Chess**, **Checkers** and **Odin** (Othello) are excellent translations to the video screen, and come with complete documentation. They can be played at fifteen different levels, either with another person or against the computer.

If your gift recipient enjoys crossword puzzles, Softie has a program you should consider. Called **Computer Crosswords**, it provides you with thirty puzzles from Dell, one of the leading crossword puzzle publishers. The puzzles range in difficulty from one to three stars, and the computer implementation adds to the enjoyment of solving them.

It may sound surprising, but some of the best games are also educational. There are two flight simulators for the Atari in this category. **Solo Flight** by MMG (\$30.00) is fun to play, as well as useful in learning about flying. The most complete flight simulation program for the Atari is **Flight**

Firms mentioned in both the Gift Guide sections

Abacus
P.O. Box 7211
Grand Rapids, MI 49510
(616) 241-5510

Action Software
69 Clementina Dept. AS
San Francisco, CA 94105
(415) 974-6638

Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
(415) 960-0410

American Covers, Inc.
P.O. Box 1796
Sandy, Utah 84091
(801) 566-3100

Amiable Computer Enhancements
P.O. Box 10233
Lansing, MI 48901
(517) 483-4253

Atari Corp.
1265 Borregas Ave.
Sunnyvale, CA 94086

At-A-Glance
86 Ridgedale Ave, Dept. L
Cedar Knolls, NJ 07927
(201) 455-7844

Axlon Inc.
1287 Lawrence Station Rd.
Sunnyvale, CA 94089
(408) 747-1900

Batteries Included
30 Mural Street
Richmond Hill
Ontario L4B 1B5 Canada
(416) 881-9941

David Beckemeyer
Development Tools
592 Jean Street #304
Oakland, CA 94610
(415) 658-5318

The Book Company
Division of Arrays
11223 S. Hindry Avenue
Los Angeles, CA 90045
(213) 410-9466

The Catalog
524 Second Street
San Francisco, CA 94107
(914) 957-0886

Central Point Software, Inc.
9700 SW Capitol Highway
Suite 100
Portland, OR 97219
(503) 244-5782

DAK Industries
8200 Remmet Avenue
Canoga Park, CA 91304
(800) DAK-0800

CompuServe Communications
5000 Arlington Center Blvd.
Columbus, OH 43220
(614) 457-0802

Delphi
1-800-544-4005
(in MA, 1-617-491-3393)

Discwasher
1407 N. Providence Rd.
Columbia, MO 65205

Dovestar Creative Concepts
P.O. Box 2109
Nederland, TX 77627

Dynamic Software Design
38660 Lexington St., #486
Fremont, CA 94536
(415) 790-9129

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171

Epyx, Inc.
1043 Kiel Court
Sunnyvale, CA 94089
(408) 745-0700

Firebird Licensees Inc.
P.O. Box 4974
North Central Avenue
Ramsey, NJ 07446
(201) 934-7373

First Star Software
22 East 41st Street
New York, NY 10017
(212) 532-4666

Gamestar Software
1302 State Street
Santa Barbara, CA 93101
(805) 963-3487

Gemini Enterprises
Dept. L86 Ridgedale Avenue
Cedar Knolls, NJ 07927
(201) 267-0988

GPI Books
20085 Stevens Creek
Cupertino, CA 95014

Hayden Books
10 Mulholland Drive
Hasbrouck Heights, NJ 07604
(201) 393-6000

Hippopotamus Software
985 University Avenue
Los Gatos, CA 95030
(408) 395-3190

Houghton-Mifflin Company
2 Park Street
Boston, MA 02108

Hybrid Arts
11920 Olympic Blvd.
Los Angeles, CA 90064
(818) 508-7443

Infocom, Inc.
125 CambridgePark Drive
Cambridge, MA 02140
(800) 262-6868, ext. 17Y

Innovative Concepts, Inc.
2284 Ringwood Avenue
San Jose, CA 95131

Innovative Technologies
5731 La Jolla Blvd.
La Jolla, CA 92037
(800) 525-2226

Kensington Microwave, Ltd.
251 Park Avenue
New York, NY 10010
(212) 475-5200

Koala Technologies Corp.
3100 Patrick Henry Drive
Santa Clara, CA 95052
(800) 562-2327

LJK Enterprises
7852 Big Bend Blvd.
St. Louis, MO 63119
(314) 962-1855

Michtron
576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700

Microprose
120 Lakefront Drive
Hunt Valley, MD 21030
(301) 667-1511

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

Miles Kimball
41 West Eight Avenue
Oshkosh, WI 54901

Mindscape
3444 Dundee Road
Northbrook, IL 60062

MMG Micro Software
Box 131
Marlboro, NJ 07746
(201) 431-3472

New Horizons Software
P.O. Box 180253
Austin, TX 78718
(512) 280-0319

Oasis/FTL Systems
P.O. Box 112489
San Diego, CA 92111

Odesta Software
930 Pittner
Evanston, IL 60202
(312) 498-5615

Osborne/McGraw-Hill
Book Company
2600 Tenth Street
Berkeley, CA 94710

OSS
Optimized Systems Software
1221B Kentwood Avenue
San Jose, CA 95129
(408) 446-3099

Parker Brothers
50 Dunham Road
Beverly, MA 01915

Power Systems
13406 N.E. 84th Street
Redmond, WA 98052
(206) 888-2828

Practical Peripherals
31245 La Baya Drive
Westlake Village, CA 91362
(818) 991-8200

Practical Solutions
18 N. Tuscon Blvd.
Tuscon, AZ 85716

Quantum Microsystems (QMI)
P.O. Box 179
Liverpool, NY 13088

Sector One International
37220 Tricia Drive
Sterling Heights, MI 48077

Silver-Reed America, Inc.
19600 South Vermont Avenue
Torrance, CA 90502
(213) 837-6104

Softie, Inc.
3002 Steiner Street
San Francisco, CA 94123
(800) 345-SOFT

SubLogic
713 Edgebrook Drive
Champagne, IL 61820
(217) 359-8482

Supra Corporation
1133 Commercial Way
Albany, OR 97321
(503) 967-9075

Synapse Software
5221 Central Avenue #200
Richmond, CA 94804
(415) 527-7751

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

VIP Technologies
132 Aero Camino
Santa Barbara, CA 93117
(805) 685-3948

XLent Software
P.O. Box 5228
Springfield, VA 22150
(703) 644-8881

Simulator II by SubLogic (\$49.95). **FS II** is an excellent simulation of flying a single-engine plane. The flight manuals that accompany it are the most extensive I've seen for a home computer. Not only will you learn how to fly with this program, but you'll also have fun doing it.

One of the most creative and innovative games currently available for the Atari is **Pinball Construction Set** from Electronic Arts (\$15.00). Written by Bill Budge, it lets you create your own pinball games from a video parts box. You can then edit and save them for future play.

When a game is fun to play and challenging, I tend to ignore its other attributes. In the case of **Seven Cities of Gold** (\$15.00), also from Electronic Arts, the hidden feature of the game is self-awareness. You play the role of a 16th-century Spanish explorer, searching for new worlds, peoples and glory. Your own personality and belief system determine how you play. It's simply excellent.

Two of the best hopping games are First Star's **Flip and Flop** (\$35.00) with its stunning graphics, and Parker Brothers' cute **Q-Bert** (\$40.00). Most of the hopping games that appeared a year or so ago were merely clones with no staying power. I find myself still playing **Flip and Flop** and **Q-Bert**.

Some of my all-time favorites would make prized gifts: First Star's **BoulderDash** (now distributed by Electronic Arts for \$15.00) and Synapse's **Necromancer** (selling for \$30.00). **BoulderDash** is a climbing/moving game with personality. When it first came out, I played it constantly—for weeks. **Necromancer** is similar, but adds some shoot-'em-up fun to the eerie, other-world quality.

Both of these games are first-rate software. My other favorites include **Frogger** (Parker Brothers, \$40.00) Atari's **Star Raiders** (of course), **Pole Position** and **Centipedes**. The Atari game cartridges originally sold for \$45.00 list, but can now be obtained for as little as \$10.00 to \$15.00 in some stores. This is a good time to pick them up—before they become unavailable. And, for a good game of baseball, Gamestar's **Star League Baseball** (\$30.00) can't be beat.

For the Atari user who has everything.

This last category is comprised of products that are expensive or somewhat unusual. Either way, they'd be fun to give or receive.

The best color monitor available is the **Commodore 1702**. It lists for about \$300.00 but is heavily discounted. It accepts either composite or separate chroma and luminance video signals from the Atari 800, 800XL or 130XE—and displays a beautiful picture. You haven't seen what the Atari can do until you've seen it on the 1702. The quality of the built-in amplifier and

speaker is also excellent. There might be better ways to spend \$300.00, but there's no better monitor for the Atari.

A great bargain in a dot-matrix printer is the C.Itoh **Prowriter Junior**. It's completely Epson compatible, so any escape code sequences intended for the Epson FX-80 printer will work without a problem. It offers a Near-Letter-Quality (NLQ) mode, where the print looks a lot like typewriter print, and proportional spacing. The **Prowriter Junior** also has both friction (single sheets) and tractor (continuous pin-feed) feed capability. One of the best things about this \$300.00 printer is the way it lets you address envelopes, either letter or business size. Simply insert the envelope, crank it up to the starting position, and tell your word processor to print. No fuss, no muss. I haven't seen a printer anywhere that offers hassle-free envelope addressing like this.

An excellent letter-quality printer is the **Silver-Reed EXP-550**. It normally sells for about \$400.00, and is sold under other names (like the **Transtar 130**). The **Silver-Reed** uses changeable daisy wheels, has a

wide carriage and prints at seventeen characters per second. It offers three type pitches (10, 12 and 15), and even proportional spacing. Carbon film ribbons can be used for exceptional quality printing. I've had one now for almost two years—and love it.

Another printer-related item is a printer buffer from Practical Peripherals. The **Microbuffer** comes in either 32K or 64K versions and, simply, works as advertised. The buffer sells for about \$250.00 to \$300.00, and lets you get back to your computer task while the printer's still printing. Very handy.

That wraps up my list of gift ideas for the Atari computer user. As I said at the beginning, this collection of products is a result of personal experience and opinions gained from several years as an Atari enthusiast. I hope I've either given you some useful suggestions for holiday gift-giving, or—if you leave this article open in a strategic place—helped you get what's on your Christmas list. **A**

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VI

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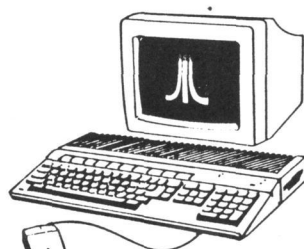
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HardBall!

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 48K Disk \$29.95

by Robert Millard

Through no fault of their own, Atari's sports game enthusiasts are getting out of shape. They weren't invited to Summer Games II. They received no bowl bids to the three newest gridiron contests. A license to fight was denied by Gamestar. Atari athletes warm benches everywhere. But now, thanks to a new software company whose founders have roots in Atari game programming, a state-of-the-art baseball program is available to 8-bit owners. Bob Whitehead of Accolade, who designed four sports cartridges for the 2600 in its heyday, has combined incredible graphics, arcade action and statistics-based strategy in his hit game, **HardBall!**

Those who remember Whitehead's first treatment of baseball, **Home Run**, will be astounded at the principal play screen of **HardBall!** The viewpoint is a zoom lens shot from center field, with the pitcher and mound large in the foreground, and the batter, catcher and umpire a scale 60'6" farther away. On a 13-inch monitor, the pitcher stands 2¾-inches tall; the crouching batter measures nearly 2-inches. Anyone who's squinted himself myopic discerning a 3-millimeter strike zone will love this enlarged viewpoint.

A playing field overview is windowed in the lower corner, to check baserunners. When a ball is hit, the view shifts behind home plate, spanning to the outfield wall, and displaying either left or right field and half of center field, depending on the hit's direction. The split-field screens are disorienting at first, but, in a short time, the gamer will easily adjust. The scale is still

large, though the foreshortened outfielders look small enough to be comfortable playing **Micro League Baseball**.

HardBall!'s batting average is high for playability, as well. Action and menus are controlled via the joystick, in a facile manner.

Limited hitting dynamics have been a problem for some games, usually resulting in too many singles and homers, and too few extra base hits. **HardBall!** eliminates this problem, by starting a throw from the deep outfield at a very slow speed. Unfortunately, this is excruciatingly unrealistic. But the trade-off is worth it. A fly ball is easily tracked and hauled in by outfielders, as it should be. Whitehead clearly studied **HardBall!**'s ancestors' flaws.

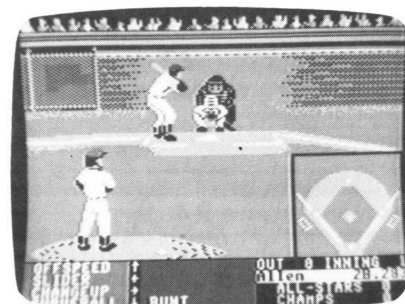
I'll risk redundancy; the animation is also outstanding. The pitcher's wind-up is smoothly sequenced, and the behavior of the chosen pitch is thrillingly accurate. Baserunners slide into bases in a billow of dust—but this has been seen in other programs. Less impressive is the stretch of the fielder to either side when snagging a line drive.

Most impressive is a hit ball's almost unlimited range of trajectories. Line drives zipping down the left or right field foul line may be foul or fair by a hair. Texas leaguers can take strange bounces in front of outfielders. Fly balls can travel anywhere: in the hole, in a deep corner, on the warning track. They even bounce off the outfield wall. While **HardBall!**'s graphics have received the raves, it is superb play dynamics that give this game lasting value.

Purists may be disappointed to learn that the game's statistics are based on fictional ballplayers. One should remember

that this is an arcade game with layers of strategy—not a simulation. Nonetheless, there are players on the two 24-man teams who will come to life. The line-up screen is viewed by pressing the SPACE BAR. No disk access is required to choose a line-up or make a substitution.

Complete players' stats are scrolled at the bottom of the screen, displayed three lines at a time. Since the joystick prowess of each individual differs, one shouldn't expect these stats to duplicate themselves in the box score, though they can (and sometimes do). The intention is to aid strategic decision-making.



HardBall! — a hit for Atari sports enthusiasts.

Once the gamer is familiar with his players, they begin to become real. There's the mercurial Jerry McCall, powerful Willie Barnes, fireball reliever Denny Estrada and forty-seven other unique players. Gamers will surely develop favorites. Rounding out the line-up/roster screen is a menu of defensive options: outfield shift left or right, infield set for double play, and intentional walk.

Tokyo for \$19.95

東京

In the continuing evolution of scenery, SubLOGIC introduces the Japan and San Francisco Bay Area Scenery Disks for Flight Simulator II.

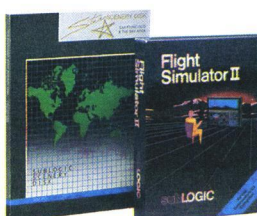
- Tokyo to Osaka is a comfortable 240-mile flight. The natural beauty of the Japanese coastline and mountain ranges complement the standard cross-country details.
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Onto every diamond a little rain must fall. There are two problems with **HardBall!** that must be disclosed. For this reviewer, the computer opponent could be a little tougher, although restarting before the first pitch of each game until the computer rotates to its best starting pitcher will equalize matters. Still, all future **HardBall!** addicts are only going to be sated by the two-player mode.

Second, an ancient computer baseball problem haunts **HardBall!** Base hits to right field are sometimes scooped up by the outfielder and thrown to first for an out. Fortunately, this only happens once or twice a game, but considering **HardBall!**'s overall quality, one must be disappointed that it exists at all.

There are some venial shortcomings. Center field appears more shallow than left or right field, and the computer is indecisive activating outfielders or infielders on shallow flies. On one occasion, the program had to be restarted because of an unretrievable foul bunt. Overall, **HardBall!** is in a league of its own, above all other Atari sports games—simulations excluded. Now, if only there were a state-of-the-art football program. Can you hear the (disgruntled) roar of the (Atari) crowd, Epyx? Imagic? Sublogic? **A**

Editor's note: it appears that someone has heard the disgruntled roar. *Electronic Arts* (of all people) has just released an Atari version of Imagic's **Touchdown Football**, with a price tag of \$14.98.


Robert Millard manages a natural foods warehouse by day and writes sports articles and fiction on his 800XL by night. His favorite sports to cover are boxing and karate. He currently writes press releases for the Professional Karate Commission.

ATTENTION PROGRAMMERS!

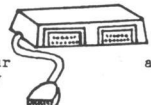
ANALOG Computing is interested in programs, articles, tutorials and hardware/software review submissions dealing with the whole line of Atari personal computers, including the new ST models. If you feel that you can write as well as you can program, then submit those articles and reviews that have been floating around in your head, awaiting publication. This is your opportunity to share your knowledge with the growing family of Atari computer owners.

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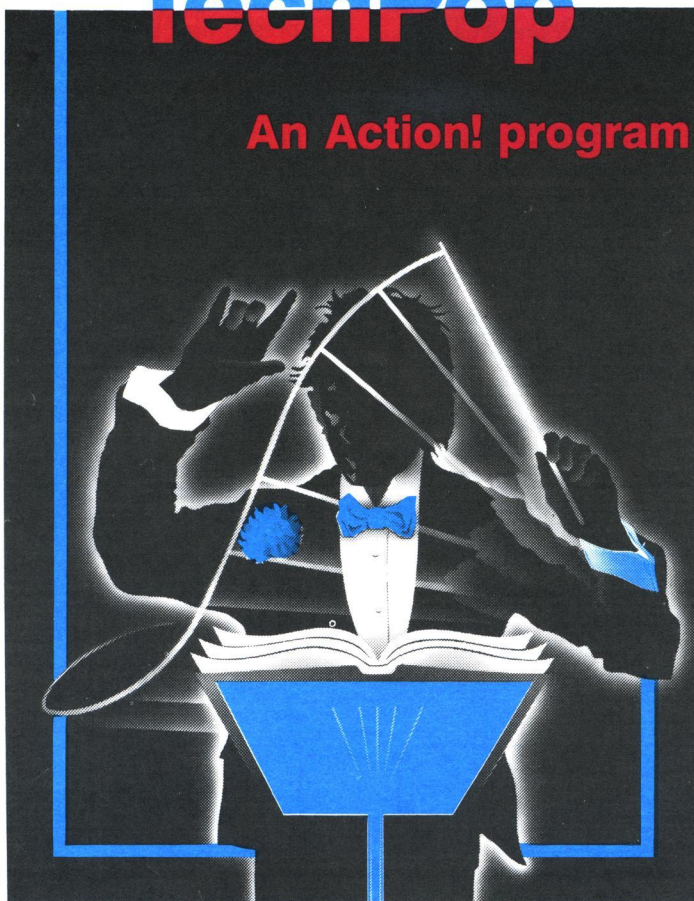
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TechPop

An Action! program to give
your
computer
rhythm.



by Wes Philp

Now, with a little help from your computer, you can play all those percussion sounds you've been hearing on the radio. **TechPop** plays the rhythm patterns and sounds you program into it—and plays them crisply and precisely.

The patterns **TechPop** plays are termed "presets," and are stored in a file. Up to ten presets may be loaded at once. These are selected from the keyboard during play, using keys 0-9. Each preset is a list of instructions describing the pattern to **TechPop**. This instruction list references the sounds to be played, called "timbres," and contains wait instructions that properly space the sounds in time.

Timbres, like presets, are stored in a file of up to 255 definitions. Only timbres referenced by presets will be played. Timbres include: bass, snare and tom drums, cymbals, the cowbell, claps and other sounds—limited only by the imagination.

Using TechPop.

Use the Action! editor to enter and save the files TECHPOP (Listing 1) and TIMBRES (Listing 2), then validate your work with **D:CHECK in Action!** (issue 44). The program contains many comments. Whether or not you type them in is your choice. You may enter as many of the presets as you wish (Listing 3). The first three are marching band rhythms; the remainder are an assortment of

techno-pop patterns. The order of presets in the file determines their assignments to keys. Save them in PRESETS.

Run the program from the Action! monitor (R"D:TECHPOP"). The TIMBRES and PRESETS files will be compiled into the program. When **TechPop** begins, select a preset by pressing a number key; don't press RETURN. Change the tempo with < or >. The pattern repeats automatically until another is selected, or until the program is stopped with the BREAK key. When a new pattern is selected, the current pattern will play through, before the change occurs.

To get the full impact, use the monitor port to connect your computer to a stereo; the 3-inch monitor speaker is a small hole for these sounds.

Customizing presets.

The example presets will get you started, but the fun of **TechPop** lies in customizing. Like other synthesizers, **TechPop** uses the concept of the "quantum," defined as the smallest unit of time needed for a pattern. A waiting period is specified as an integral number of quanta. A metronome rate is supplied for each preset; it is the number of quanta per second. For example, to play at a tempo of 120 quarter notes per minute, where the smallest division needed is the sixteenth note, the rate per second is given by: $120 \text{ quarters/minute} \times 4 \text{ sixteenths/quarter} / 60 = 8$.

Sounds are specified by timbre number. A preset can use any number of timbres, but only two can play simultaneously. Therefore, waits follow every one- or two-timbre number.

The preset format consists of commands, as in Table 1, each followed by a parameter. Commands are separated from each other—and from parameters—by a space.

Table 1.

| | COMMAND | PARAMETER |
|-----|---------------|------------------------|
| M | Metronome | Rate, in quanta/second |
| T | Timbre | Timbre number |
| W | Wait | Wait time, in quanta |
| END | End of preset | None |

As an example, set up a snare (timbre 1) playing quarters with a bass (timbre 0), doubling every fourth note. Use the quanta and rate discussed above. The preset looks like this:

M 8 T 0 T 1 W 4 T 1 W 4 T 1 W 4 T 1 W 4 END

Up to ten presets may be defined. The first will be played with the 0 key, etc.

Customizing timbres.

Each timbre defines two Atari voices, which explains why only two timbres can sound simultaneously. Up to 255

presets may be defined. The first will play when a preset references T 0, and so on. The format of each (of two) sound definitions in a timbre is as follows:

| | |
|--------------|--------------------------------------|
| Distortion | 4-bit distortion for AUDC |
| Frequency | AUDF value |
| Array length | Number of shape array values (0-128) |
| Shape array | Tone envelope |

To silence a voice, use 0 as the array length, or use *quiet*, a predefined string of three 0s. If both voices are silenced, the timbre will make no sound.

When the timbre is played, **TechPop** initiates the sound by setting AUDF as specified. It steps through the shape array, picking up successive values 240 times per second. AUDC is set as the current value from the array ORed with the specified distortion (shifted left 4 bits).

This timbre scheme allows all sorts of sounds. If the distortion is an even number, the shape array provides an envelope controlling the attack and decay. If the distortion is odd, the array values specify actual speaker vibration in Atari volume-only mode. This mode is used to good effect for the bass drum.

This scheme allows **TechPop** to play an accompaniment of notes, as well as percussive effects. Every pitch requires

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its own timbre with distortion 10, the AUDF for the note, and a shape array as desired. Remember, there are two voices per timbre, so the second can add color, for example, by playing the octave.

As you see, **TechPop** presets and timbres let you program your Atari as a music machine, to play the sounds you want to hear. Start with the presets provided, then erase them and have it your way. **A**

With a Ph.D. in physics, Wes Philp is a Senior Associate Principle Engineer with Harris Corporation in Melbourne, Florida. He is an Atari music enthusiast, who uses his two linked 800XLs as his instrument.

Listing 1. Action! listing.

```
;TechPop      Wes Philp
;              160 Sand Pine Road
;              Indialantic, FL 32903
;
;      CHECKSUM DATA
; 196 B5 9D E8 9B 9C E2 55
; 98 7D 25 B4 CC 66 57 80
; C4 B3 75 F9 2A 7E EB 63
; 58 AD BB 7D 1
```

```
DEFINE END="$FE", ;end of preset
T="$FD", ;timbre
W="$FC", ;wait
M="$FB", ;metronome
EOL="$FF", ;end-of-list
A="$A",B="$B",C="$C",D="$D",
E="$E",F="$F",
QUIET="0 0 0"

CARD ARRAY PRESETS(1)=[
INCLUDE "PRESETS"
EOL]
BYTE ARRAY TIMBRES(1)=[
INCLUDE "TIMBRES"
EOL]
;
; TRAP -----
BYTE BRKKEY=$11
PROC TRAP(BYTE N)
;stop on BREAK or any 05 error
BRKKEY=0
RETURN
;
; ALERT -----
PROC ALERT(BYTE ARRAY STRING)
PRINTF("%E%E",STRING)
RETURN
;
; BUILD_DLI -----
MODULE
CARD VDLI_OLD=[0],
CLOCK=[0];counts at 4*frame rate
```



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CIRCLE #120 ON READER SERVICE CARD

```

PROC BUILD_DLI()
;delay list interrupt servicer
;increments 16-bit CLOCK
;
BYTE ARRAY DLISERVE(1)=I
$48          ;PHA
$18          ;CLC
$A9 $01      ;LDA 1
$6D1        ;ADC LSB
BYTE POINTER D1=CLOCK
BYTE ARRAY D2(1)=I
$8D1        ;STA LSB
BYTE POINTER D3=CLOCK
BYTE ARRAY D4(1)=I
$90 $03      ;BCC 3
$EE1        ;INC MSB
BYTE POINTER D5=CLOCK+1
BYTE ARRAY D6(1)=I
$68          ;PLA
$401        ;RTI
;
BYTE ARRAY MOD_LIST(1)=I
0 8 16 24J
BYTE I,
    NMIE=$D40E
CARD VDLI=$200
BYTE POINTER BP
CARD POINTER $DLST=560
;
;install the DLI service routine
VDLI_OLD=VDLI
VDLI=DLISERVE
NMIE=$C0 ;DLI and VBI
;modify the display list
FOR I=0 TO 3 DO
    BP=2+MOD_LIST(I)+$DLST^
    IF MOD_LIST(I)>=2 THEN
        BP==+2
    FI
    BP^==X$80
OD
BP=$DLST^
RETURN

```

```

;
; UNBUILD_DLI -----
PROC UNBUILD_DLI()
BYTE NMIE=$D40E
CARD VDLI=$200
NMIE=$40 ;VBI only
VDLI=VDLI_OLD
GRAPHICS(0)
RETURN
;
; KBD -----
BYTE FUNC KBD(BYTE KCHAN,SCHAN)
;KCHAN=K: channel #
;SCHAN=S: channel #
;RETURN:
; - operator-entered preset # (0-9)
; - $FF no entry
; - $FE BREAK
; - $FD invalid input
; - $FC >
; - $FB <
BYTE CH=$02FC, ;keyboard character
N,
CR=[155J
IF BRKKEY=0 THEN
    ;BREAK key
    N=$FE
    BRKKEY=$FF
ELSEIF CH=$FF THEN
    ;no entry
    N=$FF
ELSE
    ;read the character
    N=GETD(KCHAN)
    IF BRKKEY=0 THEN
        N=$FE
        BRKKEY=$FF
    ELSEIF N='>' THEN
        PUTD(SCHAN,N)
        N=$FC
    ELSEIF N='<' THEN
        PUTD(SCHAN,N)
        N=$FB
    ELSEIF N='0' AND N<='9' THEN
        PUTD(SCHAN,N)
        PUTD(SCHAN,CR)
        N=-'0'
    ELSEIF N=CR THEN
        N=$FF ;ignore RETURN
    ELSE
        N=$FD ;invalid input
    FI
FI
RETURN(N)
;
; FIND_PRESET -----
CARD FUNC FIND_PRESET(BYTE N)
;N=preset # (0,1 ...)
;RETURN:
; - preset data address
; - $FFFF if not found
BYTE I,
PV
CARD POINTER P
P=PRESETS
I=0
DO
    PV=PA ;LSB only
    IF I=N AND PV=EOL THEN
        ;done
        RETURN(P)
    ELSEIF PV=EOL THEN
        ;e.d-of-string found
        RETURN($FFFF)
    ELSEIF PV=END THEN
        I==+1
    FI
    P==+2

```

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CIRCLE #121 ON READER SERVICE CARD

```

OD
;
; PREP_TIMBRE -----
BYTE FUNC PREP_TIMBRE()
;RETURN: number of timbres defined
BYTE NT,
      I,
      DIST,
      L
BYTE POINTER BP
BP=TIMBRES
FOR NT=0 TO 254 DO
  DIST=BP^
  BP==+2
  L=BP^
  BP==+1
  IF DIST=EOL THEN
    NT==RSH 1
    RETURN(NT)
  ELSEIF L>0 THEN
    ;fix shapes by ORing distortion
    DIST==LSH 4
    FOR I=1 TO L DO
      BP^==XDIST
      BP==+1
    OD
  FI
OD
RETURN(0) ;error return
;
; INIT_TIMBRE -----
PROC INIT_TIMBRE(CARD N,U,
                  CARD ARRAY ADDR)
;N=timbre # (0,1 ...)
;U=voice (0 or 1)
;ADDR=addresses of 4 shape strings
;
BYTE I,J,
      L,
      CHAN
BYTE POINTER BP,
      AUDF
BP=TIMBRES
IF N#0 THEN
  ;skip over 2*N timbre arrays
  J=N+N
  FOR I=1 TO J DO
    BP==+2
    L=BP^
    BP==+L+1
  OD
FI
;
FOR I=0 TO 1 DO
  CHAN=U+I ;Atari voice # (0-3)
  BP==+1
  AUDF=CHAN+CHAN ;set AUDF
  AUDF==+$D200
  AUDF^=BP^
  BP==+1
  ADDR(CHAN)=BP ;timbre string address
  L=BP^ ;timbre string length
  BP==+L+1
OD
RETURN
;
; MODULATE -----
PROC MODULATE(CARD ARRAY ADDR,
              BYTE ARRAY OFFSET)
;ADDR=addresses of 4 shape strings
;OFFSET=clock offset for voices 0 & 1
BYTE V,
      IDX,
      LSB,
      I,J,
      L,
      CHAN
BYTE POINTER BP

```

```

BYTE ARRAY AUDC(1)=$D201
CHAN=0 ;0-3
FOR V=0 TO 1 DO
  ;loop over the two voices
  LSB=CLOCK ;compute the shape index
  IDX=LSB-OFFSET(V)
  IF IDX>127 THEN
    IDX=127
    OFFSET(V)=LSB+127
  FI
  FOR I=0 TO 1 DO
    ;loop over two channels per voice
    BP=ADDR(CHAN);timbre string addr
    L=BP^ ;timbre string length
    IF L>0 THEN
      IF IDX<L THEN ;J=MIN(IDX+1,L)
        J=IDX+1
      ELSE
        J=L
      FI
      BP==+J
      J=BP^
    ELSE
      J=0 ;no string - quiet
    FI
    AUDC(CHAN+CHAN)=J
    CHAN==+1
  OD
OD
RETURN
;
; QUANTUM -----
CARD FUNC QUANTUM(CARD R,N)
;R=metronome (quanta/sec)
;N=number of quanta to wait
;RETURN:
; clock at end of wait=current+delta
; where delta=4*60*N/rate
CARD DELTA
IF N>273 THEN
  N=273 ;overflow will occur
FI
DELTA=N*240
IF DELTA>32767 THEN
  DELTA==RSH 1
  R==RSH 1
FI
DELTA==/R
RETURN(DELTA+CLOCK)
;
; CONTINUE -----
BYTE FUNC CONTINUE(CARD ARRAY P,
                   INT SPEED,
                   BYTE N_TIMBRES)
;P=address of preset
;SPEED=operator modification to tempo
;N_TIMBRES=number of timbres defined
;RETURN:
; 0 - normal
; 1 - error
;
BYTE INIT=[1],
      COM,
      VOICE,
      I,
      STATUS
CARD R,
      N,
      NEXT
INT METRO
BYTE ARRAY AUD(1)=$D200,
              OFFSET(2),
              NULL(1)=[QUIET]
CARD ARRAY S_ADDR(4)
CARD POINTER OLD_P=[FFFFF]
;
IF INIT#0 THEN
  ;initialize

```

```

INIT=0
STATUS=0
OLD_P=P
VOICE=0
ZERO(AUD,9)
FOR N=0 TO 3 DO
  S_ADDR(N)=NULL
OD
CLOCK=0
NEXT=CLOCK
FI
;
IF NEXT<=CLOCK THEN
  ;process a command from P array
  COM=OLD_PA
  OLD_P==+2
  IF COM=END THEN
    ;end of preset
    INIT=1
  ELSEIF COM=T THEN
    ;timbre
    VOICE==!1 ;flip between 0 and 1
    I=OLD_PA
    OLD_P==+2
    IF I<N_TIMBRES THEN
      INIT_TIMBRE(I,VOICE,S_ADDR)
      OFFSET(VOICE)=CLOCK ;LSB only
    ELSE
      STATUS=1 ;error
    FI
  ELSEIF COM=W THEN
    ;wait
    R=METRO+SPEED
    IF R>32767 THEN ;negative
      R=2
    FI
    N=OLD_PA
    OLD_P==+2
    NEXT=QUANTUM(R,N)
  ELSEIF COM=M THEN
    ;metronome
    METRO=OLD_PA
    OLD_P==+2
  ELSE
    STATUS=1 ;error
  FI
FI
IF STATUS=0 THEN
  ;continue playing
  MODULATE(S_ADDR,OFFSET)
ELSE
  ;error detected
  INIT=1
FI
RETURN(STATUS)
;
; TECHPOP -----
PROC TECHPOP()
BYTE CLICK=731, ;XL keyclick switch
RATE=730, ;XL cursor rep rate
CRSINH=$02F0, ;cursor inhibit
SKCTL=$D20F, ;serial port cntrl
SSKCTL=$0232, ;... shadow
KCHAN=[7], ;kbd channel #
N,
N_TIMBRES
CARD OLD_ERROR,
P=[FFFF]
INT SPEED=[0]
;
GRAPHICS(0)
OLD_ERROR=ERROR
ERROR=TRAP
CLICK=$FF ;disable XL keyclick
SKCTL=3
SSKCTL=3
DEVICE=0
CLOSE(KCHAN)

```

```

OPEN(KCHAN,"K:",12,0)
BUILD_DLI()
CRSINH=$FF
PRINTF("%E TechPop ")
PRINTF("Synthesizer wp%E")
RATE=3 ;fast key auto-repeat
;
N_TIMBRES=PREP_TIMBRE();setup timbres
IF N_TIMBRES=0 THEN
  ALERT("invalid timbre format")
FI
;
DO
  N=KBD(KCHAN,SCHAN)
  N=KBD(KCHAN,0)
  IF N=$FF THEN
    ;no input
    ELSEIF N=$FE THEN
      ;BREAK key
      EXIT
    ELSEIF N=$FD THEN
      ALERT("?")
    ELSEIF N=$FC THEN
      ;speed up
      SPEED==+1
    ELSEIF N=$FB THEN
      ;slow down
      SPEED==+1
    ELSEIF N=$FF THEN
      ;no entry
    ELSE
      ;startup a new preset
      P=FIND_PRESET(N)
      SPEED=0
      IF P=$FFFF THEN
        ALERT("invalid preset")
      FI
    FI
  IF P=$FFFF THEN
    ;continue playing the preset
    N=CONTINUE(P,SPEED,N_TIMBRES)
    IF N#0 THEN
      ALERT("invalid preset")
      P=$FFFF
    FI
  FI
OD
BRKKEY=$FF
;
ERROR=OLD_ERROR
CLICK=0 ;reenable XL keyclick
UNBUILD_DLI()
SNDST()
RETURN

```

Listing 2.
Action! listing.

```

; CHECKSUM DATA
; [DE 20 CA ]

;timbre 0 - bass (marching band)
1 0 36
F F 0 0 F F 0 0 E E 0 0 C C 0 0
A A 0 0 8 8 0 0 6 6 0 0 4 4 0 0
2 2 0 0
10 255 32
8 8 8 8 7 7 7 7 6 6 6 6 5 5 5 5
4 4 4 4 3 3 3 3 2 2 2 2 1 1 1 1
;timbre 1 - snare (marching band)
1 0 8
F 0 A 0 5 0 2 0
8 5 17
A 5 9 5 8 4 7 4 6 3 5 3 4 2 3 1 0

```

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| | |
|---------|------|
| Okimate | 199 |
| 292 | 499 |
| 293 | 599 |
| 120 NLQ | 205 |
| 182 | 214 |
| 192 | 348 |
| 93 | CALL |

SEIKOSHA

| | |
|----------------------|------|
| SP-1000 A centronics | 165 |
| BP-52001 | 649 |
| BP-1300 | 469 |
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| SP-1000 ribbon | 8.50 |

JUKI

| | |
|---------------------|------|
| Juki 6100 | CALL |
| Juki 5510 | CALL |
| Juki 6300 | CALL |
| RS-232 serial board | 55 |

STAR MICRONICS

| | |
|----------------|------|
| LV 12-10 (New) | CALL |
| NL-10 | CALL |
| NX-10 | CALL |
| NB-15 | CALL |
| SB-15 | CALL |
| SG-15 | 367 |
| SD-10 | 319 |
| SD-15 | 438 |
| SR-10 | 469 |
| SR-15 | 578 |
| SB-10 | 589 |

EPSON

| | |
|--------|------|
| LX80 | CALL |
| FX85 | CALL |
| DX10 | CALL |
| DX20 | CALL |
| DX35 | CALL |
| HI80 | CALL |
| HS80 | CALL |
| FX286 | CALL |
| LQ800 | CALL |
| LQ1000 | CALL |

C. ITOH

| | |
|--------------------|------|
| 1550 SP+ | CALL |
| D 1040 | CALL |
| Prowriter Jr | CALL |
| Prowriter 8510 SP+ | CALL |

SILVER REED

| | |
|----------|-----|
| EXP 420P | 209 |
| EXP 600P | 489 |
| EXP 800P | 649 |
| EXP 770 | 740 |

LEGEND

| | |
|------|-----|
| 808 | 148 |
| 1080 | 199 |
| 1380 | 229 |
| 1385 | 289 |

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| | |
|------------|-----|
| 120-D | 179 |
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THOMPSON

| | |
|------------|------|
| 365 12 RGB | CALL |
|------------|------|

ZENITH

| | |
|----------|----|
| ZVM 1220 | 89 |
| ZVM 1230 | 89 |

PANASONIC

| | |
|-------------|------|
| TR-120 MDPA | CALL |
|-------------|------|

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| 65 XE | CALL |

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AMERICA'S MAIL ORDER HEADQUARTERS

```
;timbre 2 - clap
8 2 2
C 0
8 2 4
0 0 C 0
;timbre 3 - bass (pop)
1 0 16
F F 0 0 F F 0 0 8 8 0 0 4 4 0 0
10 255 16
8 8 7 7 6 6 5 5 4 4 3 3 2 2 1 0
;timbre 4 - snare (pop)
1 0 6
F 0 A 0 5 0
8 5 7
A 5 8 4 6 3 0
;timbre 5 - tom
10 255 13
C B A 9 8 7 6 5 4 3 2 1 0
QUIET
;timbre 6 - cymbal
8 1 11
A 9 8 7 6 5 4 3 2 1 0
8 5 11
A 9 8 7 6 5 4 3 2 1 0
;timbre 7 - cowbell
10 80 17
4 4 4 4 3 3 3 3 2 2 2 2 1 1 1 1 0
10 41 17
8 8 7 7 6 6 5 5 4 4 3 3 2 2 1 1 0
;timbre 8 - ping
6 1 9
8 7 6 5 4 3 2 1 0
6 2 9
8 7 6 5 4 3 2 1 0
```

Listing 3.
Action! listing.

```
; CHECKSUM DATA
;IE1 F4 D9 C4 62 E6 50 03
; 63 E2 D0 4F 3E C8 1

;preset 0 - rolloff
M 32
T 0 T 1 W 8 T 1 W 24 ;1
T 0 T 1 W 8 T 1 W 24 ;1
T 0 T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 0 T 1 W 8 T 1 W 24 ;3
T 0 T 1 W 8 T 1 W 24 ;4
END
;preset 1 - cadence (triple)
M 24
T 0 T 1 W 8 T 1 W 4 T 0 T 1 W 8 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 0 T 1 W 8 T 1 W 4 T 0 T 1 W 8 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 0 T 1 W 4 T 1 W 4 T 1 W 4 ;3
T 0 T 1 W 8 T 1 W 4 T 0 T 1 W 8 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 0 T 1 W 8 T 1 W 4 T 0 T 1 W 8 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;1
T 0 T 1 W 4 T 1 W 4 T 1 W 4 ;3
T 0 T 1 W 20 T 1 W 1 T 1 W 1 ;8
T 1 W 1 T 1 W 1
```

```
END
;preset 2 - cadence (duple)
M 32
T 0 T 1 W 8 T 1 W 8 T 0 W 8 T 1 W 8 ;1
T 0 W 8 T 1 W 8 T 0 W 8 T 1 W 4 ;2
T 1 W 4 ;3
T 0 T 1 W 8 T 1 W 8 T 0 T 1 W 4 ;3
T 1 W 4 T 1 W 4 T 1 W 4 ;3
T 0 T 1 W 8 T 1 W 8 T 0 T 1 W 8 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;4
T 0 T 1 W 8 T 1 W 8 T 0 W 8 T 1 W 8 ;1
T 0 W 8 T 1 W 8 T 0 W 8 T 1 W 4 ;2
T 1 W 4 ;3
T 0 T 1 W 8 T 1 W 8 T 0 T 1 W 4 ;3
T 1 W 4 T 1 W 4 T 1 W 4 ;3
T 0 T 1 W 16 T 0 W 8 ;1
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;8
T 1 W 1 T 1 W 1 T 1 W 1 T 1 W 1 ;8
END
;preset 3
M 12
T 3 W 3 T 3 W 1 T 4 W 1 T 3 W 2 ;1
T 3 W 1 T 3 W 4 T 2 W 2 T 3 W 2 ;1
T 3 W 3 T 3 W 1 T 4 W 1 T 3 W 2 ;1
T 3 W 1 T 3 W 2 T 3 W 2 ;2
T 2 T 3 W 2 T 3 W 2 ;2
T 3 W 3 T 3 W 1 T 4 W 1 T 3 W 2 ;1
T 3 W 1 T 3 W 4 T 2 W 2 T 3 W 2 ;1
T 3 W 3 T 3 W 1 T 4 W 1 T 3 T 4 ;4
W 2 T 3 W 1 T 3 W 2 T 3 W 2 T 2 ;4
T 3 W 4
```

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CIRCLE #123 ON READER SERVICE CARD

;preset 4

```

M 8
T 3 T 5 W 2 T 5 T 6 W 2 T 2 T 5 W 2
T 5 W 2 T 3 T 5 W 2 T 5 W 1 T 5 T 6
W 2 T 2 T 5 W 2 T 5 T 6 W 2 T 5 T 6 ;1
T 3 T 5 W 2 T 3 T 5 W 2 T 5 T 6 W 2
T 5 W 2 T 3 T 5 W 2 T 5 T 6 W 2 T 5 T 6 ;1
W 2 T 2 T 5 W 2 T 5 T 6 W 2 T 5 T 6 ;3
T 3 T 5 W 2 T 5 T 6 W 2 T 5 T 6 W 2
T 5 W 2 T 3 T 5 W 1 T 6 W 1 T 5 T 6
W 1 T 6 W 1 T 2 T 5 W 1 T 6 W 1 T 5 ;4
T 6 W 1 T 6 W 1

```

END

;preset 5

```

M 14
T 1 W 2 T 1 W 2 T 1 W 4 T 5 W 2
T 5 W 2 T 2 W 4 T 3 W 4 ;1
T 1 W 2 T 1 W 2 T 1 W 4 T 3 W 4 ;2
T 2 W 2 T 6 W 1 T 6 W 1 T 5 W 2 ;2
T 1 W 2 T 1 W 2 T 1 W 4 T 5 W 2 ;1
T 5 W 2 T 2 W 4 T 3 W 2
T 1 W 2 T 1 W 2 T 1 W 4 T 3 W 2
T 6 W 1 T 6 W 1 T 2 W 2 T 5 W 1 ;4
T 5 W 1

```

END

;preset 6

```

M 14
T 4 W 2 T 4 W 2 T 2 T 3 W 2 T 4 W 2 ;1
T 4 W 2 T 4 W 2 T 2 T 3 W 2 T 4 T 6 ;2
W 1 T 6 W 1 T 4 W 2 T 2 T 3 W 2 T 4 W 2 ;1
T 4 W 2 T 6 W 2 T 4 W 2 T 6 W 2 ;4

```

END

;preset 7

```

M 16
T 3 T 6 W 4 T 4 W 2 T 3 W 2 T 6 T 3 ;1
W 4 T 4 W 2 T 3 W 2 T 3 W 2 T 6 T 3 ;2
T 3 T 6 W 4 T 4 W 2 T 3 W 2 T 6 T 3 ;1
W 4 T 4 W 2 T 3 W 2 T 3 W 2 T 3 T 4 ;4
W 2 T 6 W 2 T 3 T 4 W 2 T 6 W 2

```

END

;preset 8

```

M 12
T 3 T 4 W 2 T 4 W 2 T 2 T 4 W 2 T 4
W 1 T 4 W 1 T 3 T 4 W 2 T 4 W 2 ;1
W 2 T 2 T 4 W 2 T 4 T 6 W 2 T 4
T 3 T 4 W 2 T 4 W 2 T 2 T 4 W 2 T 4 ;1
W 1 T 4 W 1 T 3 T 4 W 2 T 4 W 2 T 4 ;1
W 2 T 2 T 4 W 2 T 4 T 6 W 2 T 4 ;1
T 3 T 4 W 1 T 4 W 1 T 4 W 1 T 4 W 1
T 2 T 4 W 1 T 4 W 1 T 4 W 1 T 4 W 1
T 5 T 6 W 1 T 5 W 1 T 5 W 1 T 5 W 1 ;4
T 2 T 5 W 1 T 5 W 1 T 5 W 1 T 5 W 1

```

END

;preset 9

```

M 16
T 3 T 6 W 4 T 6 W 4 T 4 T 6 W 4
T 3 T 6 W 4 T 3 T 6 W 4 T 6 W 4 ;1
T 2 T 4 W 4 T 3 T 6 W 4 T 6 W 4 ;2
T 3 T 6 W 4 T 3 T 6 W 4 T 6 W 4 ;1
T 3 T 6 W 4 T 3 T 6 W 4 T 6 W 4 ;1
T 2 T 4 W 4 T 3 T 6 W 2 T 4 T 6
W 2 T 3 T 6 W 4 T 6 W 4 T 4 T 6 W 4 ;2
T 3 T 6 W 4 T 3 T 6 W 4 T 6 W 4 ;1
T 2 T 4 W 4 T 3 T 6 W 4 T 6 W 4 ;1
T 3 T 6 W 4 T 3 T 6 W 4 T 6 W 4 ;4
T 3 W 4 T 6 W 4

```

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ISSUE 9



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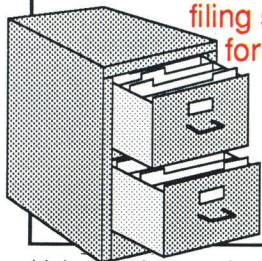
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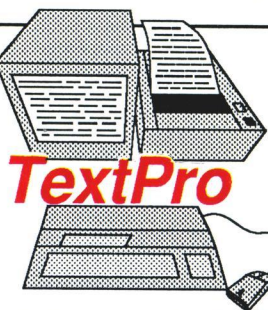
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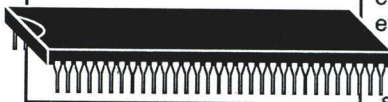
Word processor for the ST

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

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AssemPro

The complete 68000 assembler development package for the ST



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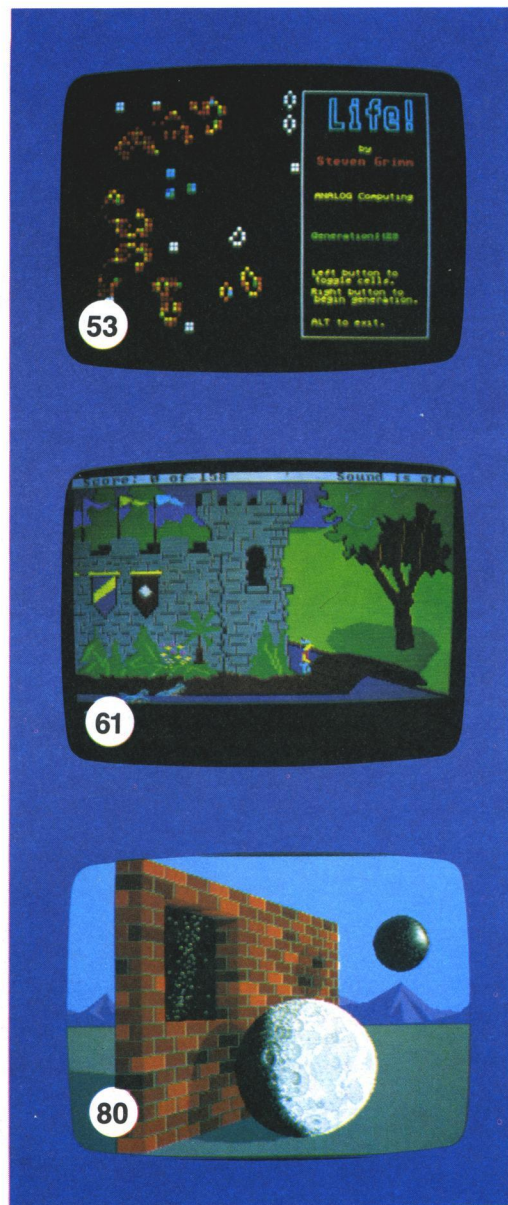
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A favorite simulation seen on computers for years—now in full color on your ST.
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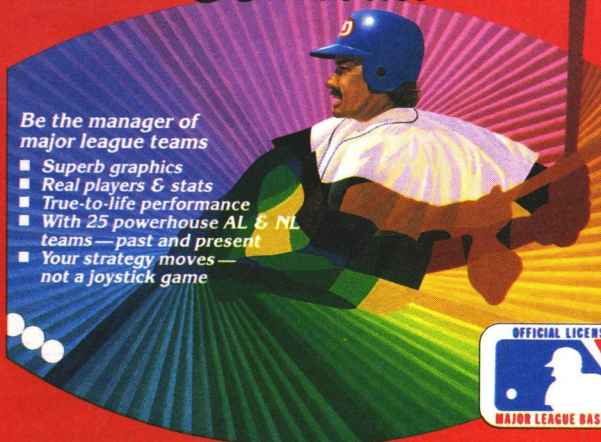
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Status report

ST SECTION

The new, improved ST.

by D.F. Scott

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

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

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

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

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

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

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

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

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

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

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

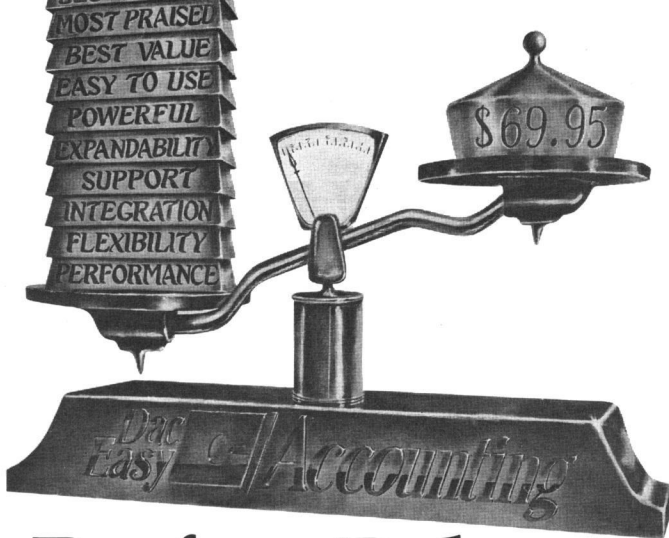
proportionally spaced fonts that work on the screen and on the printer independently. It makes full use of the GEM user interface."

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

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

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

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



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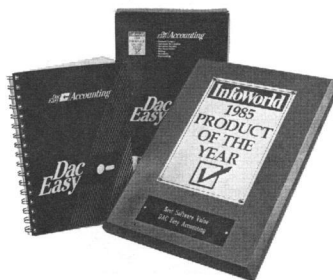
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#447

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

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

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

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

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

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

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

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

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

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

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

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

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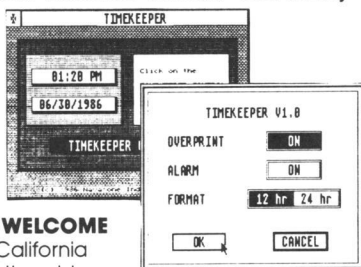
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CIRCLE #131 ON READER SERVICE CARD

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

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

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

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

Conclusion.

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

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

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

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

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

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

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

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

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

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

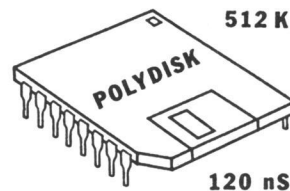


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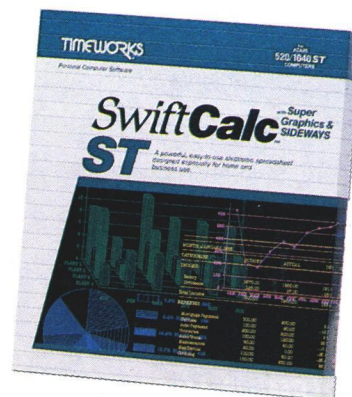
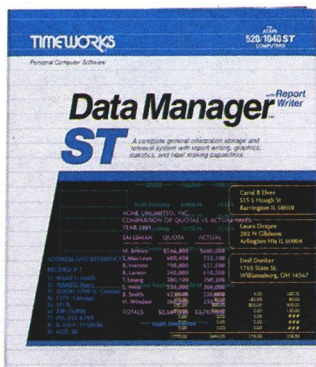
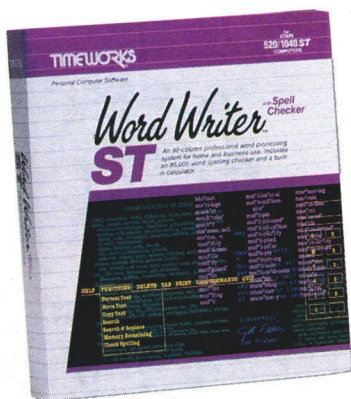


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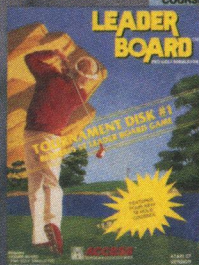
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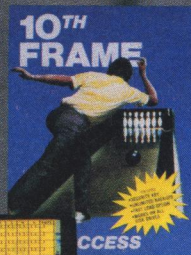
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IAN'S QUEST

ST news and information

by Ian Chadwick

Tinker tinker tinker.

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

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

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

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

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

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

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

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

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

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

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

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

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

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


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

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


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

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

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

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

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



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CIRCLE #134 ON READER SERVICE CARD

Life!

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

by Steven Grimm

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

The game.

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

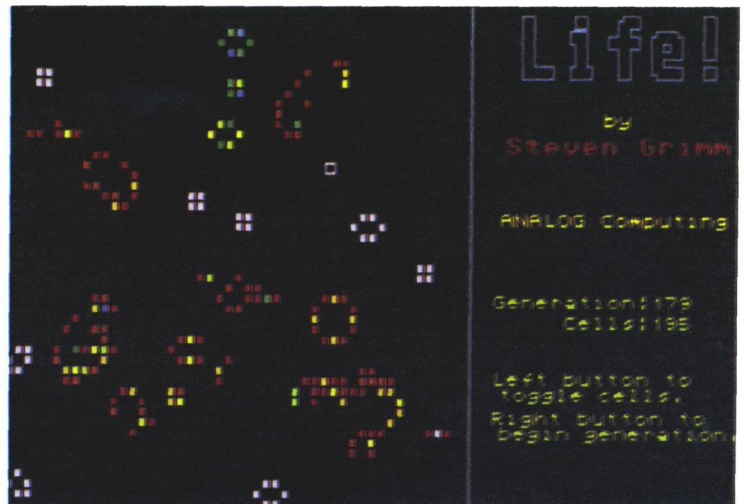
If a cell has two on neighbors, it remains in the same state; an on cell will remain on, and an off cell will remain off. If a cell has three on neighbors, it is turned on. If a cell has less than two or more than three on neighbors, it is turned off.

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

How to operate Life!

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

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



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

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

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

How the program works.

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

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

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

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// Life! continued

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

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

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

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

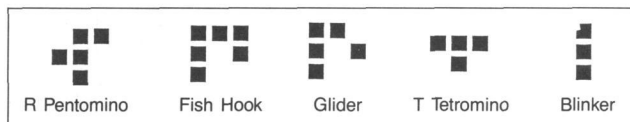
`title()` plots all the text and the box on the right side of the screen. The GEM colors in the `vsf_color()` call don't match the ST colors (in comments to the right), because GEM, for some odd reason, sets the colors up in a different order than the ST hardware. Since the palette is in the ST's order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


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

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

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

Figure 1. — Sample shapes.



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

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

(Listing starts on next page)

Listing 1. C listing.

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

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

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

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

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

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

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

/* Do one generation on the grid. */
do_grid()
{
    register int x,y,xo,n,*aptr,*point;
    int o,t,b,tcol,bcol,ch;
    for (x=1; x<49; ++x)
    {
        if (change[x] == 1) /* Only scan columns that need to be checked. */
        {
            t=tcolumn[x]; b=bcolumn[x];
            tcol=0; bcol=0; ch=0;
            xo=x+52-offset;
            for (y=t; y<=b; ++y)
            {
                aptr=&array[x+offset-1+(y-1)*104]; /* Count neighbors... */
                asm {
                    move.w #0,n /* ... with a fast 68000 routine. */
                    move.w (aptr),D0
                    beq 101
                    addq.w #1,n
                }
                101: move.w 2(aptr),D0
                    beq 102
                    addq.w #1,n
                102: move.w 4(aptr),D0
                    beq 110
                    addq.w #1,n
                110: move.w 208(aptr),D0
                    beq 112
                    addq.w #1,n
                112: move.w 212(aptr),D0
                    beq 120
                    addq.w #1,n
                120: move.w 416(aptr),D0
                    beq 121
                    addq.w #1,n
                121: move.w 418(aptr),D0
                    beq 122
                    addq.w #1,n
                122: move.w 420(aptr),D0
                    beq 1d0
                    addq.w #1,n
            }
            1d0:
            o=array[x+offset+yoff[y]]; /* Get old cell value. */
            point=&array[xo+yoff[y]]; /* Get address of new cell value. */
            if (n == 2) /* 2 neighbors? */
                *point = cotab[o]; /* Yes, continue present state. */
            if (n == 3) /* 3 neighbors? */
                *point = litab[o]; /* Yes, bring to life or keep alive. */
            if ((n<2) || (n>3)) /* Anything else? */
                *point = 0; /* Yes, this cell is DEAD. */
            if (*point != o) /* Did it change? */
            {
                if (*point && (!o)) /* Yes, update cell count. */
                    ++ncells;
                if (!*point)
                    --ncells;
                ++ch;
                plot(x-1,y-1,*point); /* Plot new point. */
                if (tcol == 0) /* Update top and bottom of column. */
                    tcol=topcol[y];
                bcol=botcol[y];
            }
        }
        if (x > 1)
        {
            if ((tcolumn[x-1] < tcol) && (change[x-1] == 1))
                tcol=tcolumn[x-1];
            if ((bcolumn[x-1] > bcol) && (change[x-1] == 1))
                bcol=bcolumn[x-1];
        }
    }
}
```

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CIRCLE #136 ON READER SERVICE CARD

```

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

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

```

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```

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

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

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

edit:
edit_array();

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

/* Plot all the junk on the right side of the screen. */
title()
{
  vsf_color(handle,14); /* ST color 11 */
  pxy[0]=194; pxy[1]=0;
  pxy[2]=194; pxy[3]=199;
  pxy[4]=319; pxy[5]=199;
  pxy[6]=319; pxy[7]=0;
  pxy[8]=194; pxy[9]=0;
  v_pline(handle,5,pxy);
  vst_color(handle,9); /* ST color 8 */
  vst_height(handle,28,&i,&i,&i,&i);
}

```

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```

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

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

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

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

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

```

```

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

```



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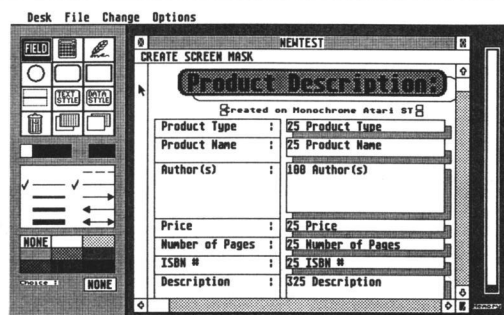
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CIRCLE #165 ON READER SERVICE CARD

ST news!



DATATRIEVE

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

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

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

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

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

CIRCLE #127 ON READER SERVICE CARD

REGENT TRADE-IN

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

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

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

CIRCLE #198 ON READER SERVICE CARD

ON THE WAY FROM FTL

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

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

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

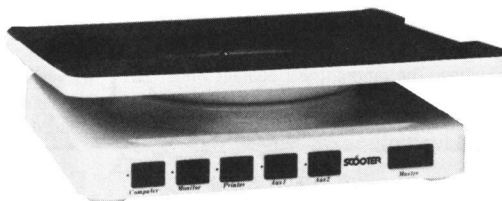
Oasis/FTL Systems, P.O. Box 112489, San Diego, CA 92111. CIRCLE #199 ON READER SERVICE CARD

POWER BASE

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

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

CIRCLE #200 ON READER SERVICE CARD



OTHER NEWS

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

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

CIRCLE #195 ON READER SERVICE CARD

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

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

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

CIRCLE #196 ON READER SERVICE CARD

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

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

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

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

CIRCLE #197 ON READER SERVICE CARD

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

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

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

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| 2 | | Delete | | | | |
| 3 | | Freeze Title | | | | |
| 4 | | Goto | | | | |
| 5 | | Insert | | | | |
| 6 | | Justify | | | | |
| 7 | | Move | | | | |
| 8 | | Note Pad | | | | |
| 9 | | Replicate | | | | |
| 10 | | Replicate Cell | | | | |
| 11 | | Set Column Width | | | | |
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NEW



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

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

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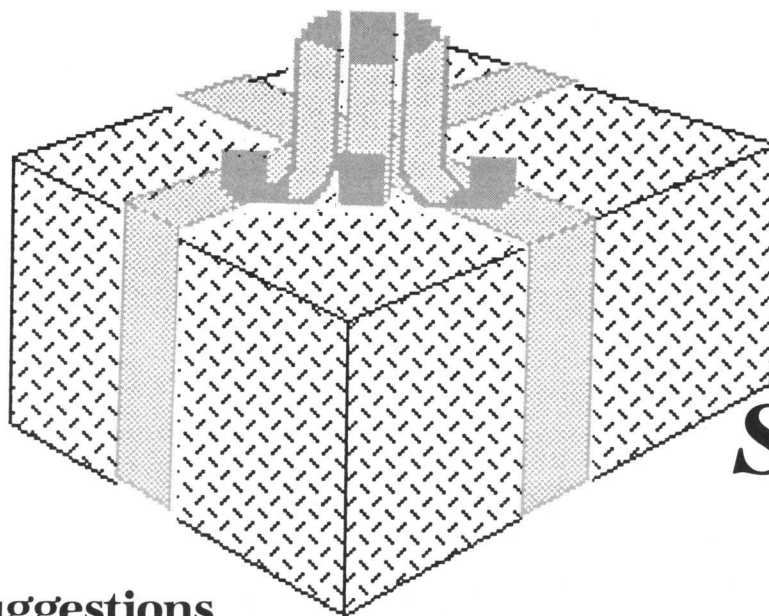
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The Atari ST Gift Guide

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

by Arthur Leyenberger

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

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

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

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

Mouseware.

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

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

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

Inexpensive stocking stuffers.

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

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

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

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

More goodies.

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

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

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

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

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

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

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

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

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

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

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

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

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

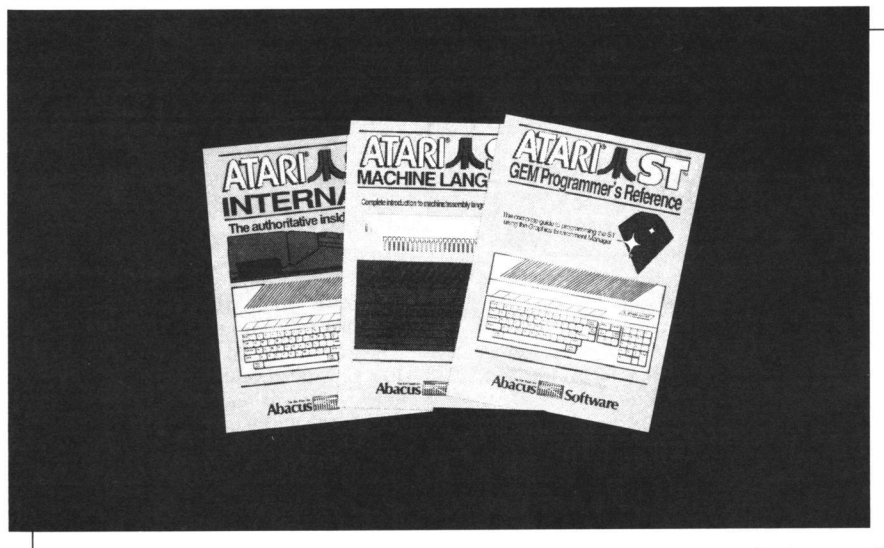
If you'd like to learn more about computer games design, Chris Crawford's, **The Art of Computer Games Design** is for you. Published by Osborne/McGraw-Hill, it sells for \$15.00. Crawford is a very unusual person whose views are expressed very well in his book. It's good reading for those who design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

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

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

Serious stuffers.

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



Any of the Abacus books will make an Atarian happy.

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

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

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

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

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

ming the 68000 microprocessor on your Atari ST. Starting from scratch, with chapters on microcomputer and hardware fundamentals, this book leads the programmer step-by-step into the world of machine language programming.

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

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

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

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

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

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

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

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

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

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

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

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

The **Powerhouse** peripheral attaches to

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

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

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

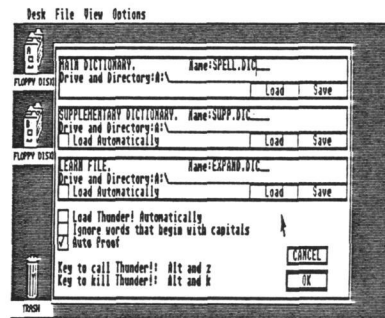
A very useful utility that just came out is **Action Pak**, from Action Software. This \$40.00 (add \$3.00 postage and handling) program is really five GEM-based programs in one. **Action Pak** provides a labeler that lets you custom design and print 3½-inch disk labels on an Epson or Epson-compatible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

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

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

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

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



Thunder! from Batteries Included.

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

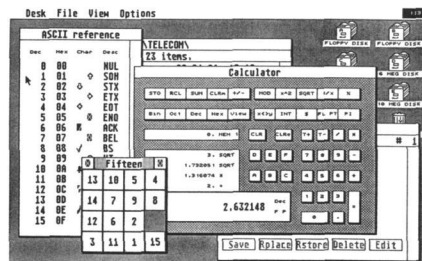
VIP Professional by VIP Technologies is a spreadsheet for the ST, based on the well-known Lotus 1-2-3. An integrated spreadsheet, **Professional** will give you sophisticated spreadsheet, data base and presentation graphics capabilities—in one program. As a Lotus clone, it lets you use the same keystrokes,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

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

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

Gifts that keep on giving.

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



The **Cornerman** desktop utility.

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

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

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

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

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

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

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

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

The cream of the crop is still the Hayes

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

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

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

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

Games.

No list of gift suggestions for the Atari

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

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

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

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

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

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

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

For the ST user who has everything.

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

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

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

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

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

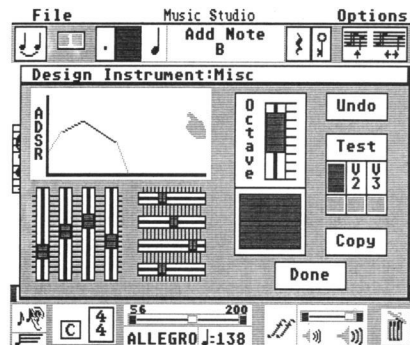
An excellent letter-quality printer is the **Silver-Reed EXP-550**. It normally sells for about \$400.00 and is seen under other names (like **Transtar 130**). The **Silver-Reed** uses changeable daisy wheels, has a wide carriage and prints at 17 characters per second. It offers three type pitches (10,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

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

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

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

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



Activision's Music Studio.

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

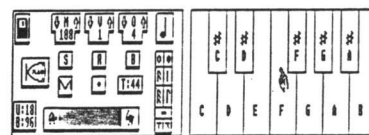
If you want to learn more about synthesizers, I highly recommend three books from GPI publications. They're compilations of articles from Keyboard magazine. Called **Synthesizer Basics**, **Synthesizer Technique**, and **Synthesizers and Computers**, each book sells for \$8.95, plus \$1.50 postage.

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

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

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

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



Music Box from XLent Software.



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Megamax C

for the

Atari ST

Featuring

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

System Includes:

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

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

*Times in seconds. Sieve with register variables.

\$199.95 For more information, call or write:

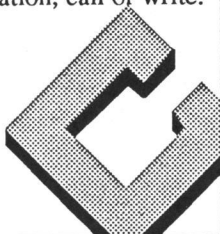
Megamax, Inc

Box 851521

Richardson, TX 75085

(214) 987-4931

VISA, MC, COD ACCEPTED



CIRCLE #145 ON READER SERVICE CARD

ATTN:
PASCAL
USERS

MODULA-2

the successor to Pascal

FOR
ATARI
520ST

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

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

Added features of Modula-2 not found in Pascal

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

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

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

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

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

Product History

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

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

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

Other Modula-2 Products

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



SOFTWARE, INC.

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Telex: 888442

Compuserve Number: 75026,1331

CIRCLE #146 ON READER SERVICE CARD



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

All this for the low, low price of

\$369⁰⁰

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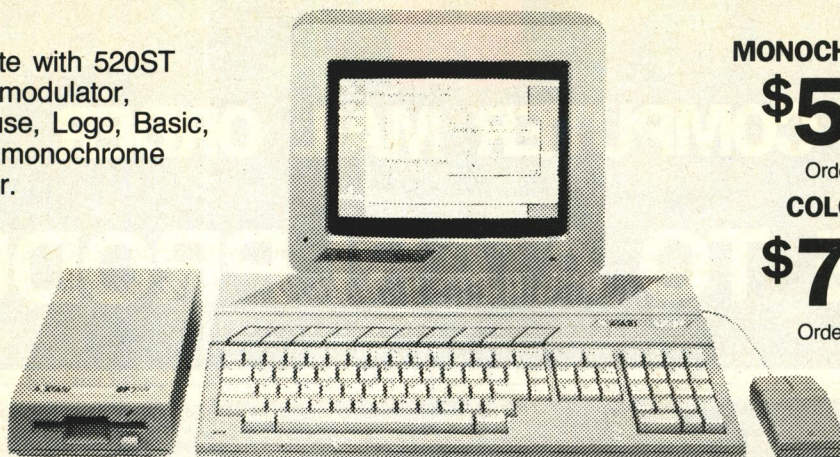
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The Atari 520ST System Package

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



MONOCHROME SYSTEM

\$599⁰⁰

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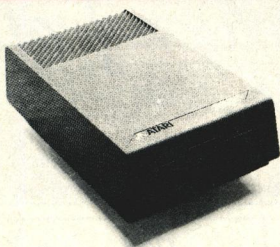
COLOR SYSTEM

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"Call on the new Atari 520ST-FM"

SF314TM Microfloppy Disk Drive

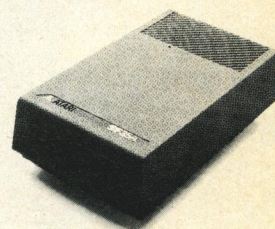


Like the 10ST's internal drive, the SF314 is a double-sided, double-density microfloppy disk drive. Add an additional floppy drive to your 1040ST and reap another 720K (formatted) of available disk storage capacity each time you switch on your computer.

\$219⁰⁰

No. AA314

SF354TM Microfloppy Disk Drive

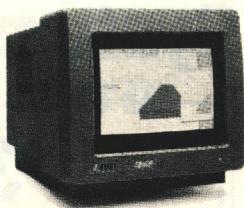


Suppose you want a second disk drive but don't need another 720K of disk storage space. Then the SF354 is just for you. It's a single-sided, double-density drive providing up to 360K (formatted) of storage on each 3 1/2-inch disk.

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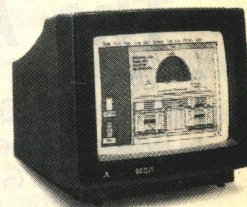


A state-of-the-art monochrome monitor. When you purchase your 520ST or 1040ST systems perhaps you'll choose the color monitor. Well, why not add a high-resolution monochrome display to your system. For word and data processing, there's no clearer, sharper display.

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No. AA5124

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\$Call

No. AA51424



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The 1040ST from Atari

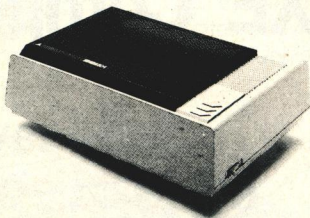
The first one megabyte computer system for under \$1000.

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

\$979⁰⁰



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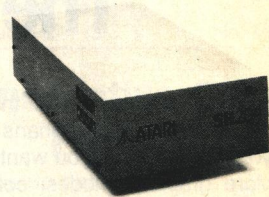


Offering an array of print styles, character pitches, column widths and page-length options, the SMM804 Printer allows you maximum versatility in formatting your written work. Plus—it's uniquely designed to support the 1040ST's print screen utility to transfer hi-res designs and pictures from the computer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

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No. AAXM804

HARD DISK DRIVE



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

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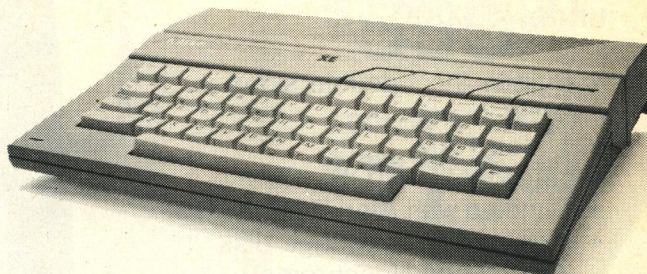
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The Atari 130XE Computer

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



No. AA130XE

\$139.⁰⁰

The Atari 800XL Computer



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

No. AA800X

\$79⁹⁹

The Atari 65XE Computer

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



No. AA65XE

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

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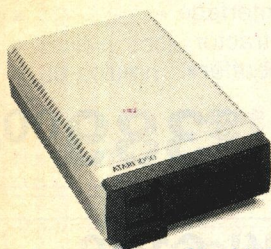
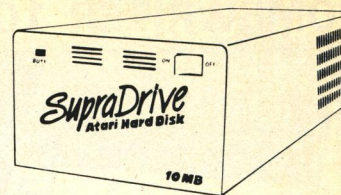
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No. SJHD20ST, **20 MB for ST Series**

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

\$829⁰⁰



No. AA1050

ATARI 1050 Disk Drive

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Single Sided, Double Density

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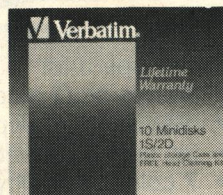
Single Sided, Double Density

5 1/4" Diskettes

Includes plastic storage case & head cleaner kit.

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

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

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ICD Happy Archiver

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

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ICD US Doubler

True double density and high speed for the 1050 drive.

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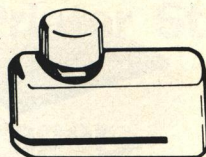
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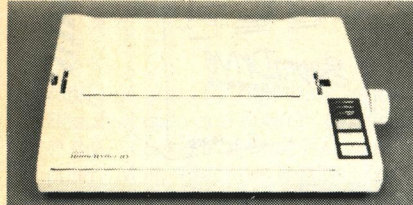


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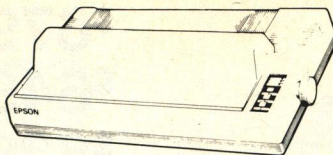
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with purchase of PIC
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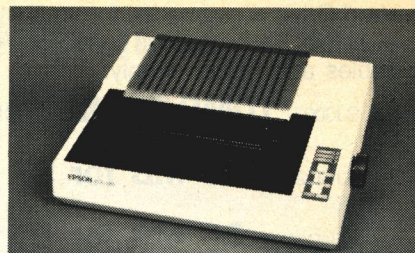
- 120 cps draft
- 16 cps in NLQ mode
- Parallel interface
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No. EPLX86

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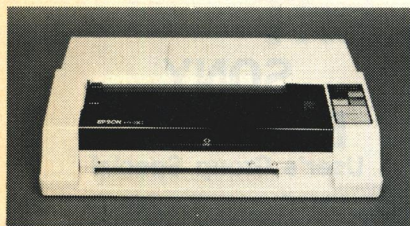


- 160 cps draft
- 32 cps in NLQ mode
- Parallel interface
- Optional tractor
- 8K RAM buffer

\$389⁰⁰

No. EPF85

EPSON HI-80

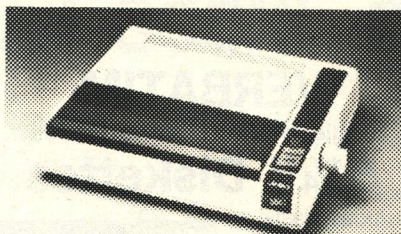


- Uses 4 pens at a time with 10 colors available
- Draws at 9" per second
- Includes HPGL
- Parallel interface

\$359⁰⁰

No. EPHI80

JUKI 5510C



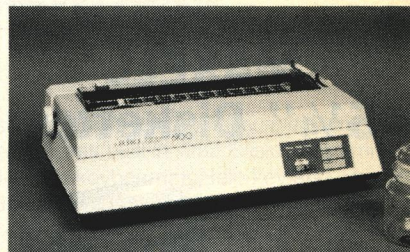
- 180 cps draft
- 30 cps NLQ mode
- IBM/Epson compatible
- 3K buffer expandable to 15K
- 7 color capability

COLOR!

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JUKI 6100



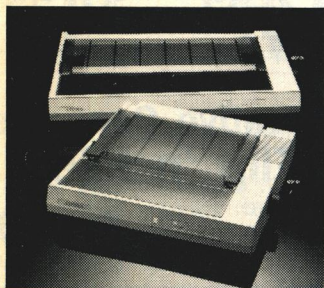
- 18 cps
- 2K Buffer standard
- 2400 MTBF rated
- Parallel interface

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QUALITY!**

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No. JU6100

CITIZEN MSP



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

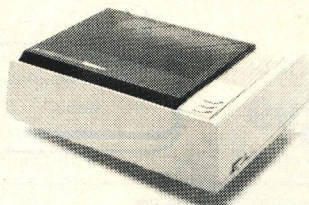
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No. CZMSP10 (80 col.)

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



ATARI's NEW DOT MATRIX
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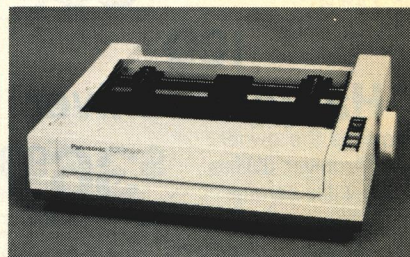
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No. AAXM801

\$189⁰⁰

No. AAXM804

PANASONIC KX-1091

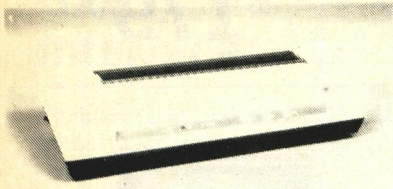


- 120 cps, multiple mode NLQ
- 80 column, 1K buffer
- Tractor and friction feed

\$229⁰⁰

No. PA1091

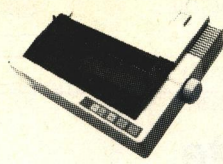
STAR LV1210 PRINTER



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

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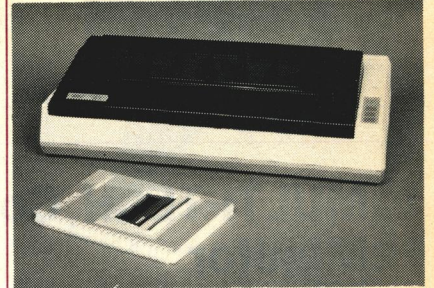
STAR NX-10 PRINTER



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

No. SGNX10 **\$239⁰⁰**

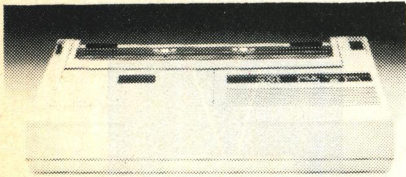
STAR SG-15 PRINTER



- 120 cps • 16K Buffer
- Wide Carriage

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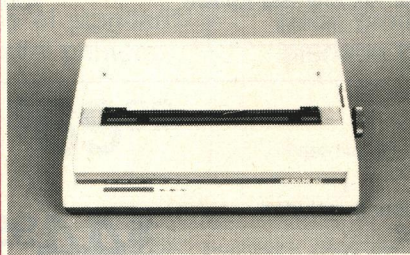
OKIDATA OKIMATE 20



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

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w/purchase of Interface

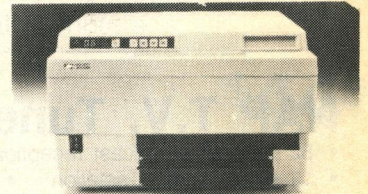
OKIDATA 182



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

No. OK182 **\$219⁰⁰**

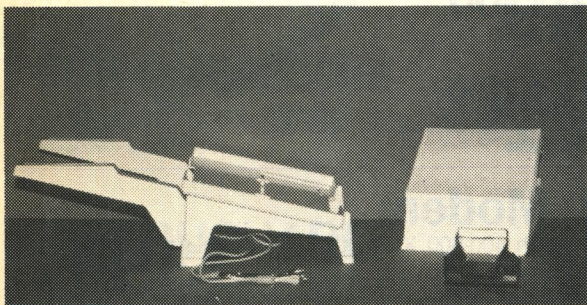
CANON LASER LBP-8A1



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

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

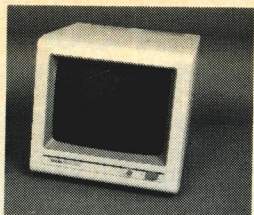


Printer Stands **\$14⁹⁹**
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Paper **\$12⁹⁹**
No. RF591, 8½" x 11" Fan Fold

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Interfaces - See page 9.



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- 14" Composite with audio
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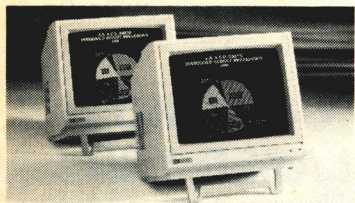
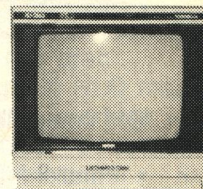
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MULTI-TECH Composite Monitor

- 13" Composite Color with non-glare filter

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NAP Amber/Green Composite

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

Order No. NAP7522 (Amber)

Order No. NAP7552 (Green)

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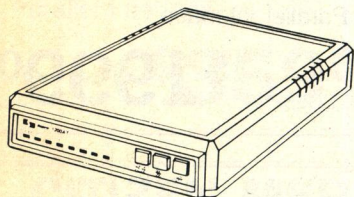
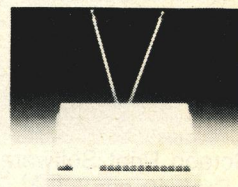
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NAP T.V. Tuner

- 82 channel broadcast reception
- 12 station pre-set selection
- Rod antenna included
- Works with any composite color monitor

Order No. NAP7300

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SUPRA 1200AT Modem

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

Order No. SJ1200AT (LX & XE)

Order No. SJ1200ST (ST)

YOUR CHOICE

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ANCHOR 520 Modem

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

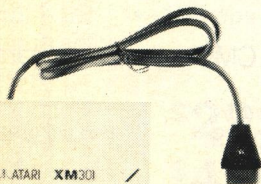
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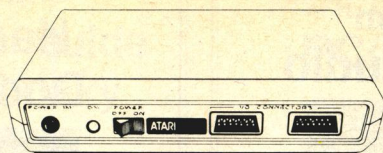
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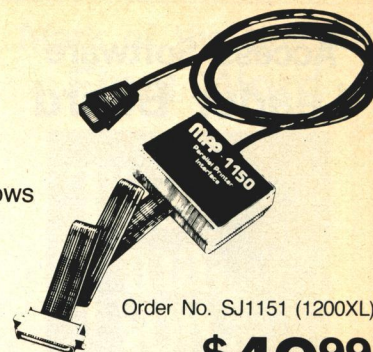
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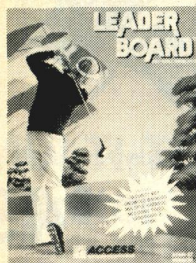
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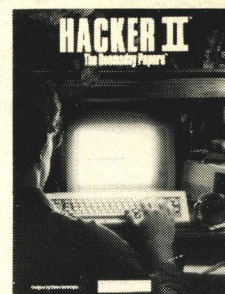
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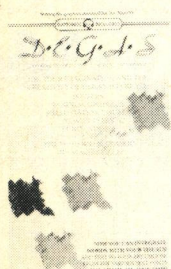
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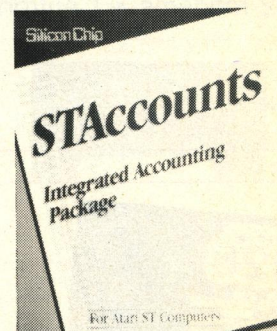
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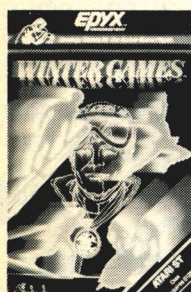
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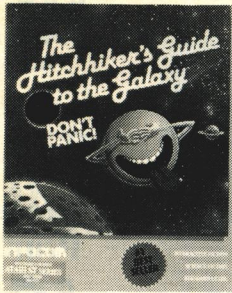
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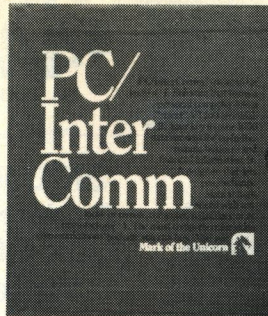
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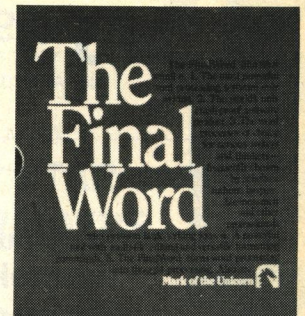
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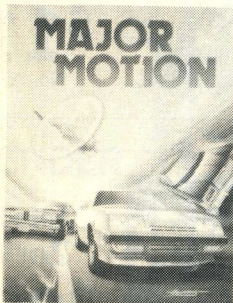
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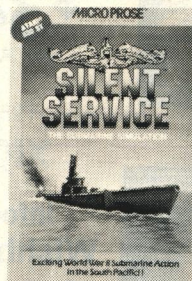
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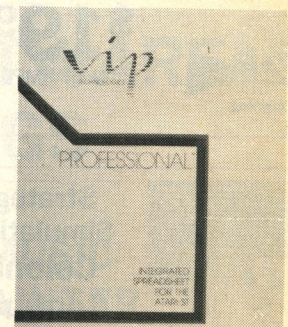
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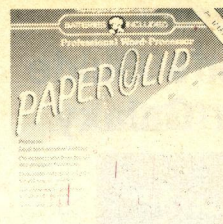
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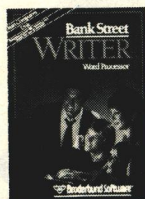
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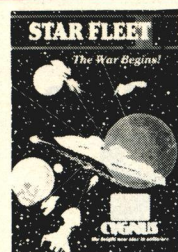


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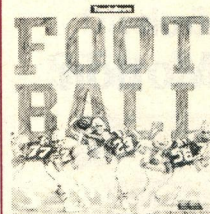
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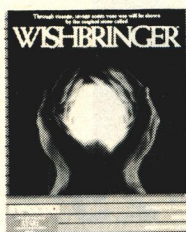
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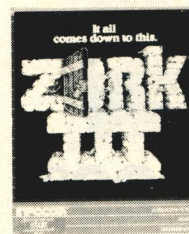
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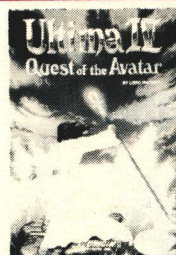
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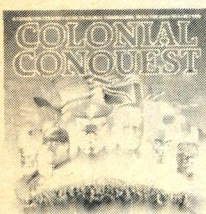
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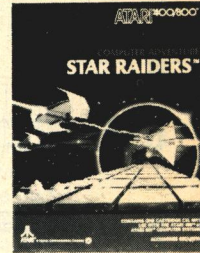
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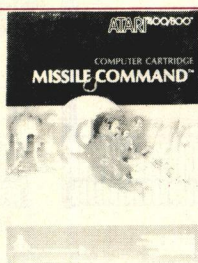
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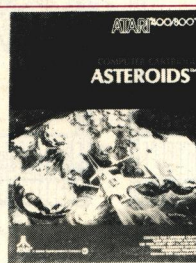
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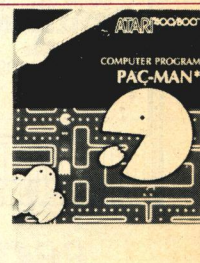
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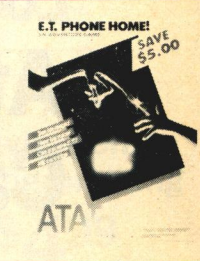
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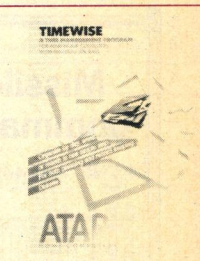
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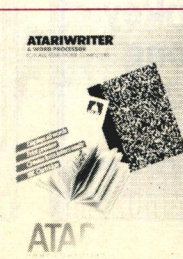
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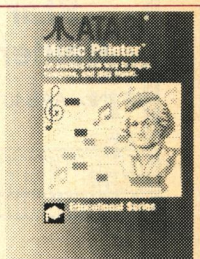
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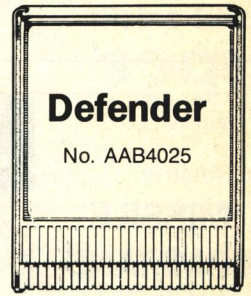
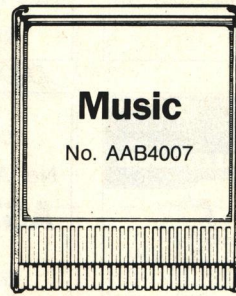
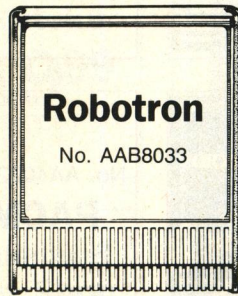
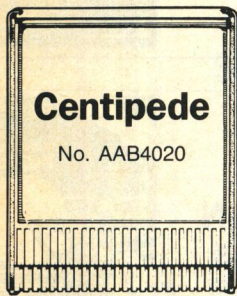
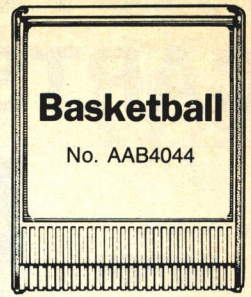
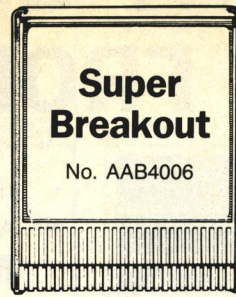
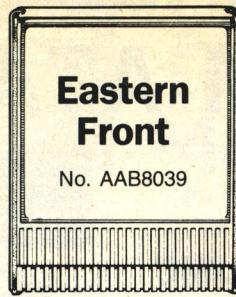
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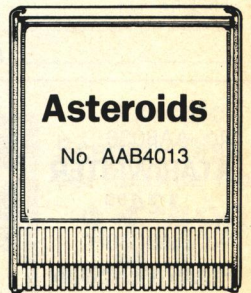
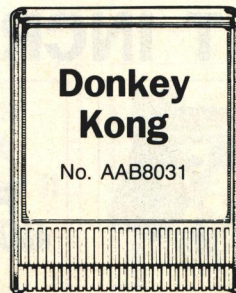
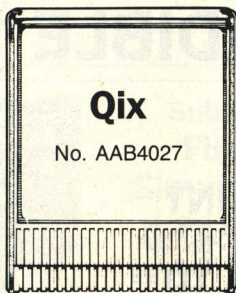
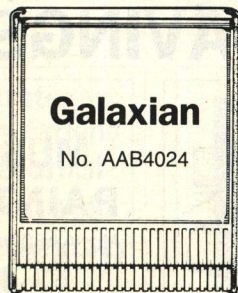
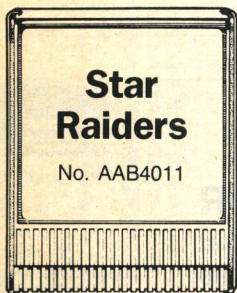
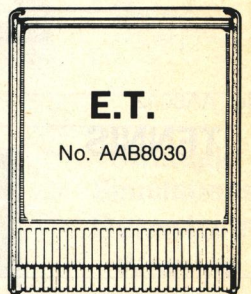
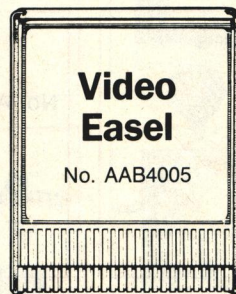
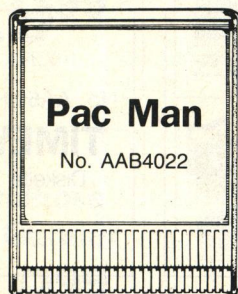
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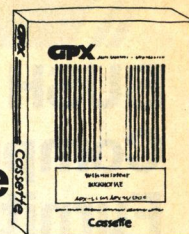


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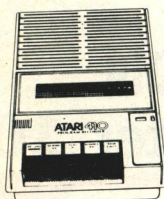
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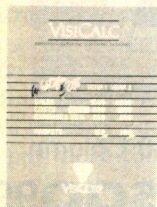
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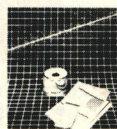
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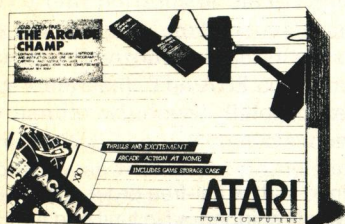
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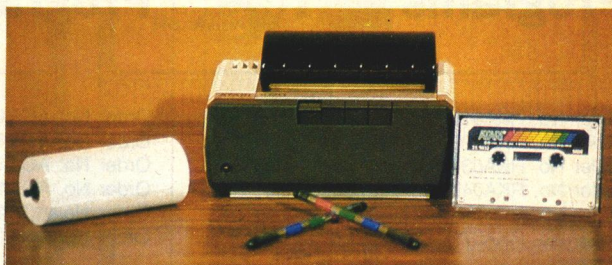
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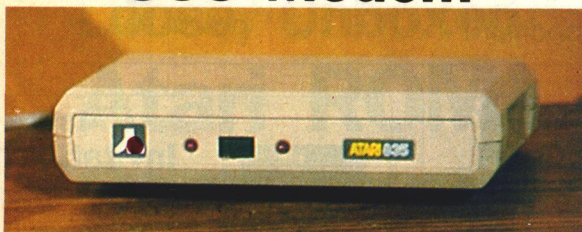
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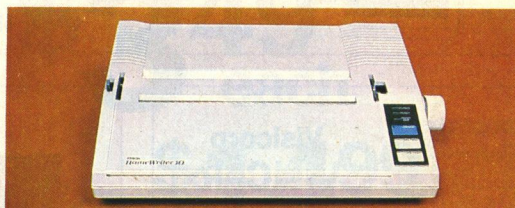


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C-MANSHIP

by Clayton Walnum

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

A review of GEM.

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

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

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

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

vironment, so your programming efforts are even more valuable.

Presenting the VDI.

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

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

The VDI functions.

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

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

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

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

// C-manship *continued*

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

The sample program.

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

```
appl_init();
```

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

Next, we must make the call:

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

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

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

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

Let's get virtual.

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

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

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

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

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

Polylines.

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

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

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

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

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

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

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

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

We set the color with:

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

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

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

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

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

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

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

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

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

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

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

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

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

Rounded rectangles.

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

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

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

Filled rounded rectangles.

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

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

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

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

Circles.

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

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

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

Polymarkers.

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

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

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

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

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

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

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

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

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

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

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



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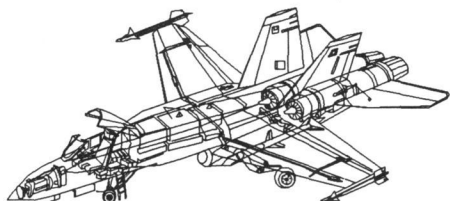
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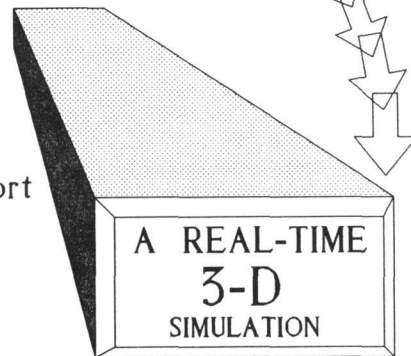
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//C-manship *continued*

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

Filled rectangles.

Solid rectangles can be drawn with the call:

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

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

Ellipses.

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

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

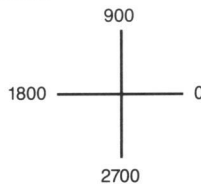
Here, the integers x and y denote the ellipse's center point, and the integers xrad and yrad are the X- and Y-radii in pixels. Once again, the active fill attributes are used.

Arcs.

Arcs are simple to draw, with this call:

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

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



Pie slices.

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

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

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

Fill patterns.

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

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

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

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

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

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

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

The color of your fill is selected with the call:

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

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

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

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

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

Use those tools!

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

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

(Listing starts on next page)

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Listing 1.
C listing.

```

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

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

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

open_vwork()
{
    int i;

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

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

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

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

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

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

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

```

WHAT IS ST-CHECK?

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

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

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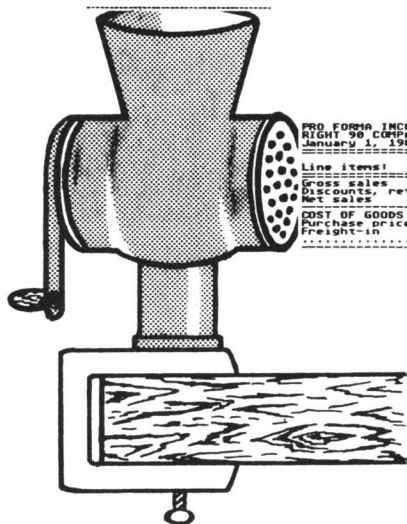
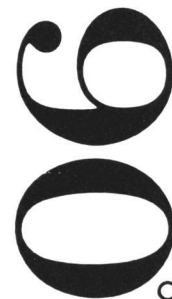
Line Items: Month: Jan-85
Gross sales \$38,000
Discounts, returns & allow. 500
Net sales 37500

COST OF GOODS SOLD
Purchase price 22000
Freight-in 500

WRITE

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RIGHT 90 COMPANY
January 1, 1985 to December 31, 1985

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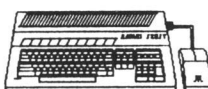
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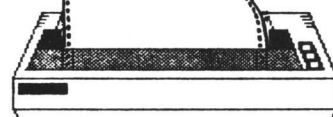
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```

    v_rfbbox(handle,pxy);
    pxy[0] += 20; pxy[1] += 20;
    pxy[2] -= 10; pxy[3] -= 10;
}
cconin();
}
do_circle()
{
    int color, radius;
    v_clrwk(handle);
    radius = 100;
    for (color=1; color<8; ++color) {
        vsf_color(handle,color);
        v_circle(handle,150,100,radius);
        radius -= 15;
    }
    cconin();
}
do_pmarker()
{
    int color, height, type;
    int pxy[2];
    v_clrwk(handle);
    pxy[1] = 10;
    for (type=1; type<7; ++type) {
        vsm_type(handle,type);
        height = 2; pxy[0] = 10;
        for (color=1; color<6; ++color) {
            vsm_color(handle,color);
            vsm_height(handle,height);
            v_pmarker(handle,1,pxy);
            height += 16; pxy[0] += 60;
        }
        pxy[1] += 35;
    }
    cconin();
}
do_bar()
{
    int pxy[4], color;
    pxy[0] = 10; pxy[1] = 190;
    pxy[2] = 300; pxy[3] = 10;
    v_clrwk(handle);
    for (color=1; color<6; ++color) {
        vsf_color(handle,color);
        v_bar(handle,pxy);
        pxy[0] += 25; pxy[1] -= 20;
        pxy[2] -= 20; pxy[3] += 10;
    }
    cconin();
}
do_ellipse()
{
    int color, xradius, yradius;
    v_clrwk(handle);
    xradius = 150; yradius = 100;
    for (color=1; color<11; ++color) {
        vsf_color(handle,color);
        v_ellipse(handle,150,100,xradius,yradius);
        xradius -= 15;
    }
    cconin();
}
do_arc()
{
    int color, radius, bang, eang;
    v_clrwk(handle);
    vsi_width(handle,3);
    bang = 900; eang = 0; radius = 10;
    for (color=1; color<6; ++color) {
        vsi_color(handle,color);
        v_arc(handle,150,100,radius,bang,eang);
        bang += 60; eang -= 60; radius += 20;
    }
    cconin();
}
do_pieslice()
{
    int color, radius, bang, eang;
    v_clrwk(handle);
    radius = 100; bang = 3200; eang = 600;
    for (color=1; color<6; ++color) {
        vsf_color(handle,color);
        v_pieslice(handle,150,100,radius,bang,eang);
        radius -= 15; bang -= 200; eang -= 100;
    }
    cconin();
}
do_fills()
{
    int pxy[4], style, i, num, x;
    pxy[0] = 50; pxy[1] = 30;

```

```

    pxy[2] = 250; pxy[3] = 170; num = 25;
    for (i=2; i<4; ++i) {
        vsf_color(handle,i);
        vsf_interior(handle,i);
        for (style=1; style<num; ++style) {
            vsf_style(handle,style);
            v_clrwk(handle);
            v_bar(handle,pxy);
            for (x=0; x<3200; ++x);
        }
        num = 13;
    }
    cconin();
}

```

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**ST**

The best ST games of 1986

by Bill Kunkel, Arnie Katz and Joyce Worley

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

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

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

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

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

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

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

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

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

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

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

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

King's Quest II.



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



Mean 18.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

// Best ST games of 1986 *continued*

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

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

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

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

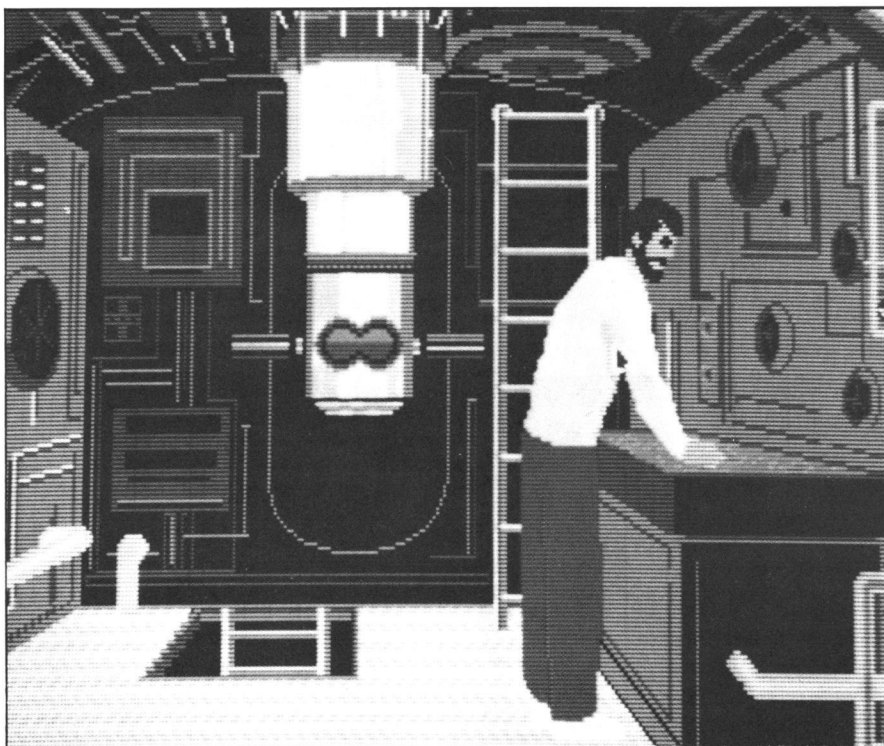
As always, Infocom games are not to every taste. Many players prefer adventures with full sound and graphics. But for those who enjoy a first-rate text adventure in which the scenes unfold inside the computerist's head, **A Mind Forever Voyaging** provides a literate and adult playing experience. Infocom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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

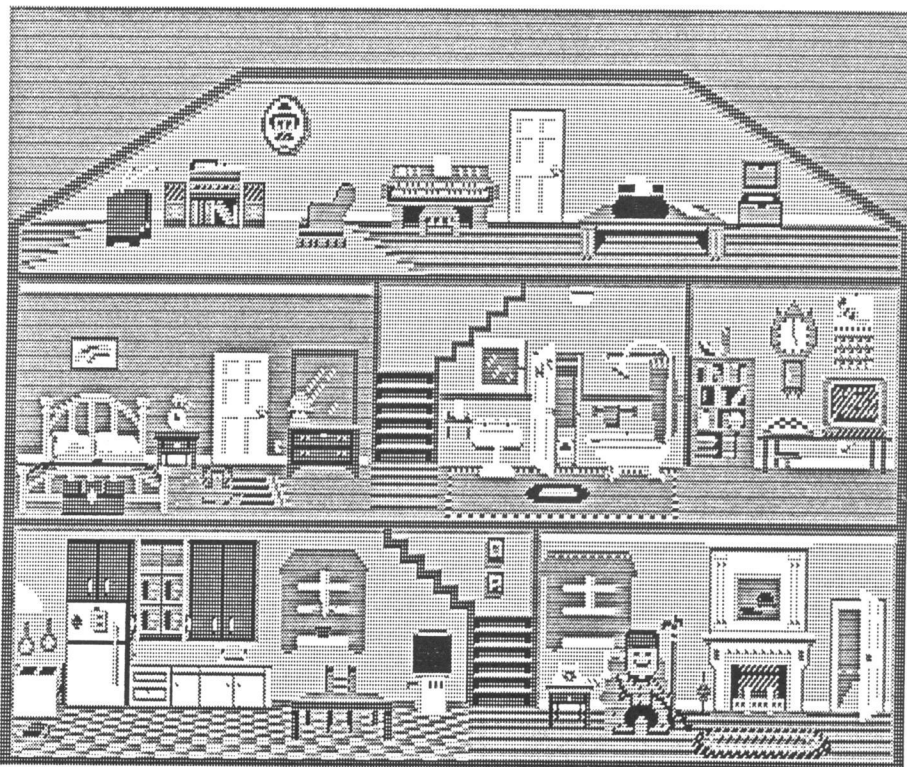
Acquiring this program incurs some responsibility. You've got to treat your Little Person right, or he'll move out.

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

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

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

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



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

No sweat!

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

by Steve Rehrauer

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

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

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

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

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

For starters.

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

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

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

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

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

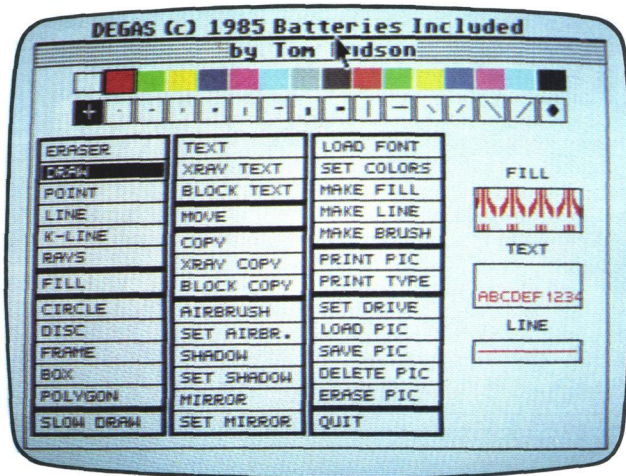
Medium-resolution mode (color) is often a kind of orphan among **DEGAS** users. You

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

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

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

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



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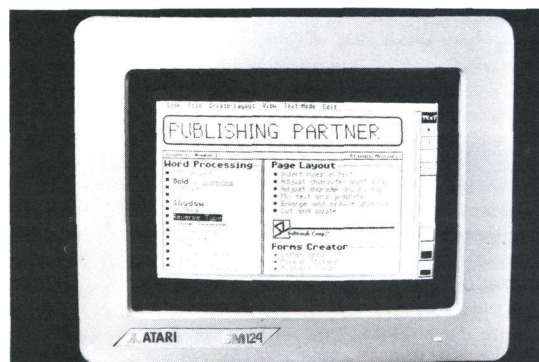
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// DEGAS? No sweat! *continued*

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

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

In general...

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

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

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

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

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

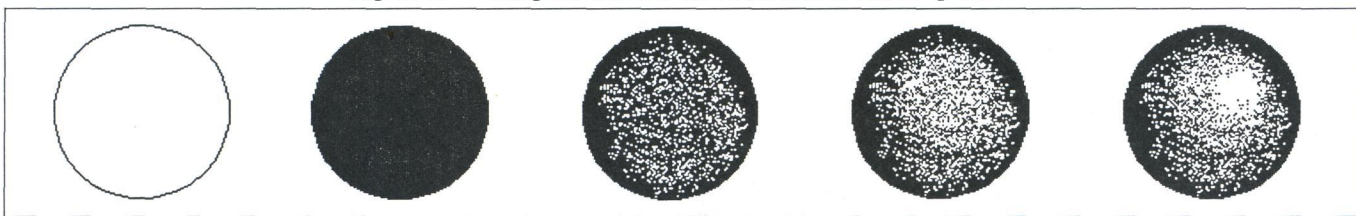
This draws a frameless box filled with the background color—one dab of a giant

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

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

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

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



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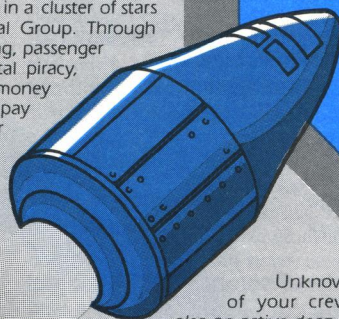
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For really detailed, realistic work, you must often (alas) resort to using the magnifier. Doing justice to something which is essentially a repeating pattern, like the scales of a fish, is especially tedious. A customized fill pattern sometimes looks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

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

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

Some color-only tidbits.

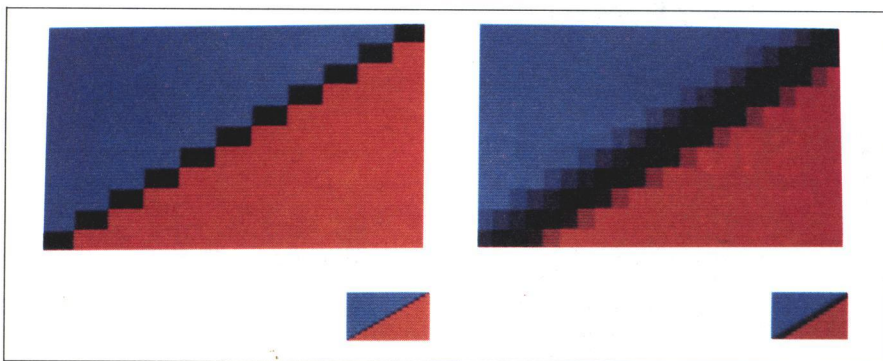
Sometimes you plan to set your background color to a very dark color, or black. But it isn't always convenient to work that way; it can make the **DEGAS** menu-screen difficult to read. You may plan to set the background color as the last step. If so, be aware that the background color can have a strong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

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

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

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

Figure 2. — Anti-aliasing in detail.



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

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

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

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


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Universe II

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by Andy Eddy

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

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

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

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

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

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

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

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

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

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

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

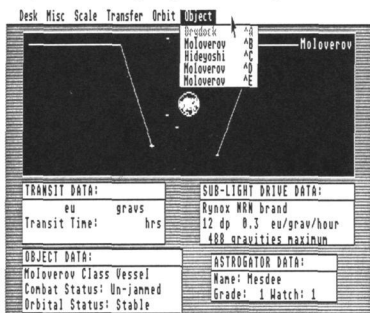
Another method of acquiring wealth is to buy and sell goods from one star group to another. This relies concurrently on the sophistication of the item and the planet you're buying from or selling to. As explained in the manual, it's unwise to try to sell materials too far above or below the technological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

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

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

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

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



Universe II — new worlds to conquer.

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

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

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

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

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

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

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

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

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

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DEGAS? No sweat!

continued from page 83ST

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

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

The problem is called aliasing. It plagues

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

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

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

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

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

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FAX

BONUS DISK PROGRAM

A GEM text screen dump.

by Douglas Weir

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

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

acter data which is only a byte wide anyway.

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

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

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

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

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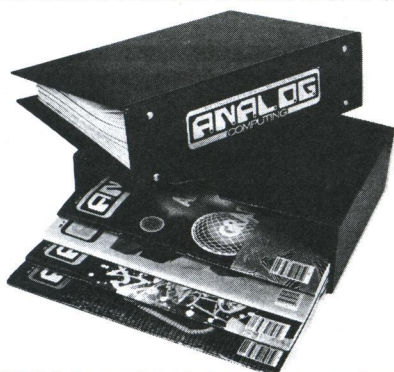
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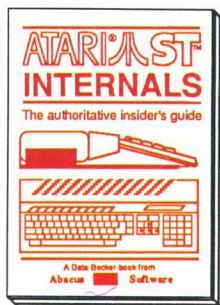
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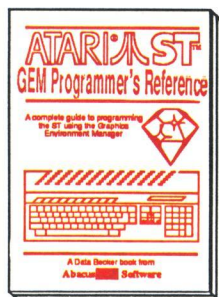
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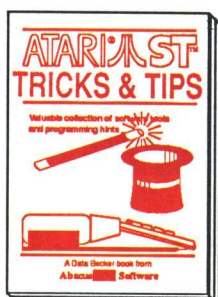
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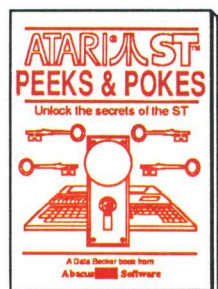
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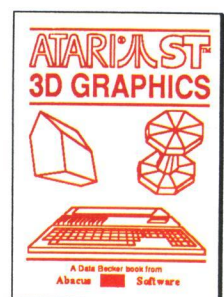
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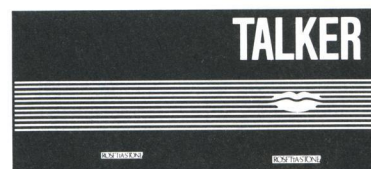
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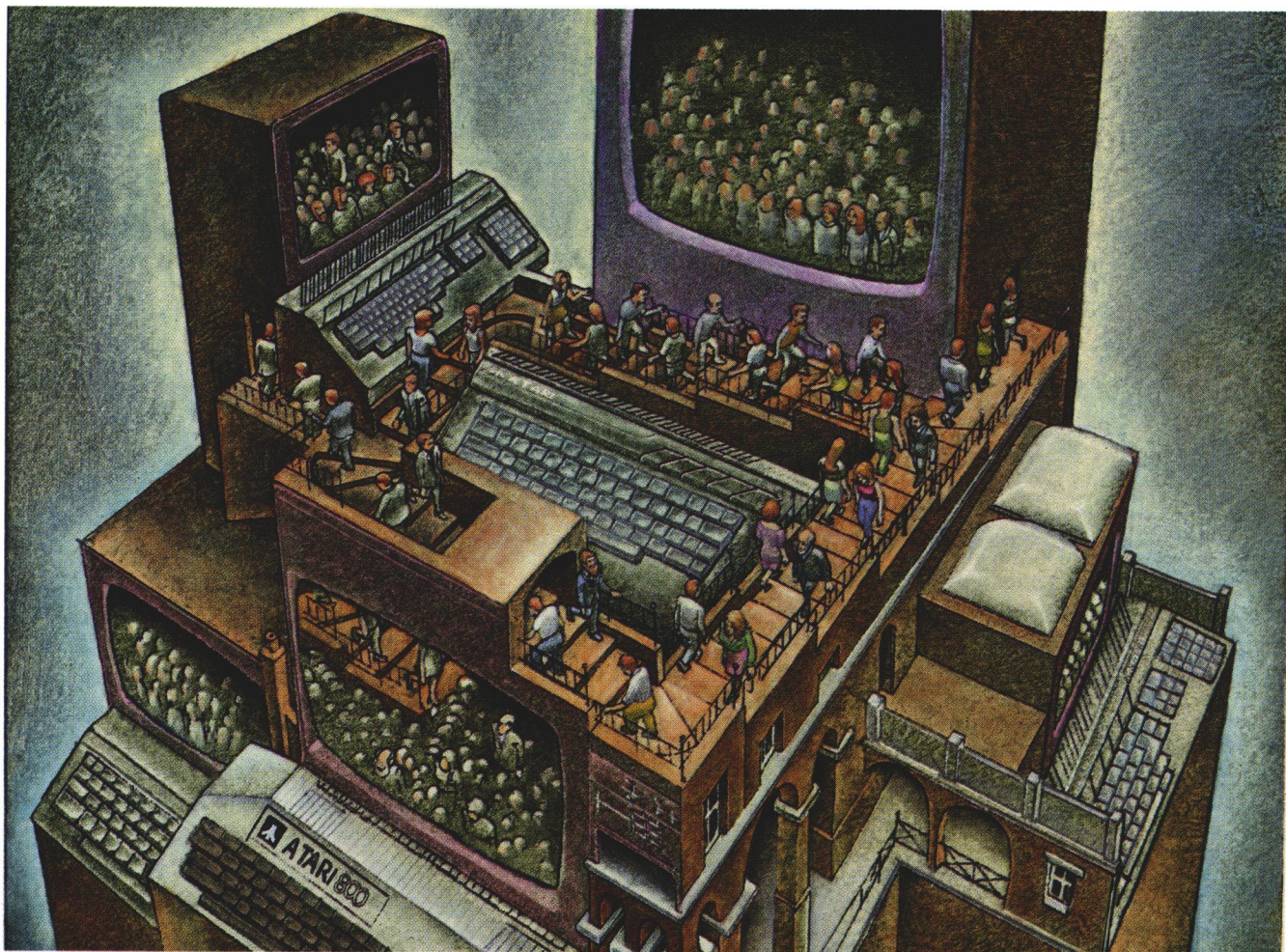
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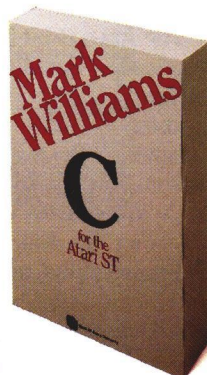
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Smiles and other facial wrinkles

How do you make your own software *really* entertaining?

by Clayton Walnum

Boy, I've got a lot of nerve, huh?

I'm not a psychologist; I barely know my id from my ego. The closest I've come to being a professional entertainer was my fifteen-year stint as a part-time musician, playing rock and roll in seedy bars, where the most intelligent comment you could expect from the clientele was, "Hey, man, I think I'm going to puke!"

So how can I be so arrogant as to sit down and pound out an article on the art of entertainment? Easy. I'm an expert.

Wait! Don't get the wrong idea. You're an expert, too. We *all* are. We've spent a good deal of our lives being entertained, developing a sense of humor, learning what makes us laugh or cry—what makes the hours buzz by. No one has to remind us to smile when the guy next door dumps a bucket of paint on his head (oh, you run over and give him a hand, express concern for his well-being, but all the while, inside, you laugh until you're numb). In short, you and I are virtuosos in the art of *consuming* entertainment.

Yet how many of us have sat down and considered *exactly* what makes something entertaining? How much time have you spent translating those ideas into usable guidelines? And what does any of this have to do with programming, anyway? I can't answer the first two questions, but the last is easy: software developers are in the business of *creating* entertainment.

Why bother?

But didn't I just say we were experts? Surely an expert doesn't have to step back to basic concepts. A concert pianist plays

from the heart, not the head. He learned the basics of his art years before, and now must only apply them. Since we've spent our lives developing our sense of entertainment, can't we just go to it?

Yes. And you might even be successful. You may end up relying on clichés, copying earlier work. That isn't necessarily bad, as long as you've added your own touch and somehow made the end result better. Writing **Moonlord**, I didn't start off with a very original idea. But I tried to add my own flare and correct what I thought were deficiencies in the original concept.

You'll have a greater chance at success, however, if you really *think* about what you're doing and apply the principles of entertainment creatively. Your expertise as a consumer can then evolve into expertise as a developer.

The types of entertainment software.

Entertainment software can be divided into two major categories: recreational and creativity. Recreational software includes all games and simulations, even those of the educational variety. They're basically pastimes, which leave you with nothing more than you started with (at least, in a physical sense). After an evening of alien blasting, you've got nothing to show for your time—except a grin and a throbbing trigger finger (possibly even a destroyed joystick, if you handle those suckers the way I do). I don't mean this in a negative way; that grin is gold.

Creativity software, on the other hand, allows you to use the tools provided to perform or devise something that's uniquely you (like a piece of music or a picture). Time spent with these products yields a

new piece of work, something you can share with others.

Then there's the software that falls into both categories equally, Electronic Arts' **Pinball Construction Set**, for one.

The computer and the mind.

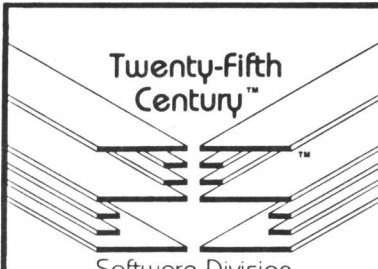
Virtually every piece of software has to be written on two levels: hardware and human. In a sense, computer programs are ridiculously redundant, containing "duplicate" code to satisfy both machine and user. The computer couldn't care less what is printed to the screen. All it wants to know about is the river of 0s and 1s rushing through its data busses. All the aliens boogying down your screen are there for one reason only: to symbolize the computer's activities.

What you see as a globular gourmand buzzing through a maze, gobbling everything in its path, is "thought" of by your computer as a series of numbers in player/missile memory. When you think of that critter as being in the center of the screen, the computer thinks in X,Y-coordinates.

Numbers, all numbers, more boring than an evening with an insurance salesman showing his New Jersey vacation slides. What changes the game to something we perceive as fun? Symbols.

Games as fiction.

Now, we know the interface between a computer and our mind is symbolic in nature. Everything the computer does has to be presented as an object we can relate to. We can think of these symbols as elements in a piece of fiction. Games have many of the elements found in a short story or film: characterization, plot, action (a close relative of plot), and even scenes, theme and the suspension-of-disbelief.



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Smiles *continued*

Perhaps the best way to discuss these is to look at some software that's proven superior in entertainment quality. As far as arcade games go, **Super BoulderDash** from Electronic Arts tops the list.

Characterization is incorporated in the guise of Rockford, one of the cutest little guys you're ever going to find scampering across your monitor's screen. Not only is his basic form lovable, but the author has supplied him with such endearing actions as impatient foot tapping and the ability to blink his oversized, wistful eyes.

The plot is simple. Rockford explores a network of caves in a paroxysm of greed, scrabbling up diamonds by the dozens, while simultaneously determining a route through the caverns that won't force him to take up residence beneath one of the myriad boulders eager to come crashing down on his head. Not abounding in originality, but this simplicity in plot is made up for by a strong realism—suspension-of-disbelief takes over.

The world of **BoulderDash** is so realistic it's unnerving. The first time I played, I was entranced for most of the night. Even after going to bed, I found it hard to clear from my head. The graphics are nicely detailed, but more important—and frequently overlooked in software—the sounds of the game bring the caverns to life, reverberating with such realism you'll be dropping a trail of bread crumbs, to find your way out (you should've seen me trying to explain the ripped up mound of bread in front of my computer).

One way to make software entertaining, then, is to create as real a fantasy world as possible for the gamer. Make your players *believe*.

A laugh a day keeps the blues away.

One sure way to beef up a piece of entertainment is to throw in a liberal dose of humor. *Everyone* likes to laugh (if you don't, you're probably helping pay for your psychiatrist's Mercedes). Humor is such a potent factor in entertainment, it can frequently survive on its own, without things like characterization and suspension-of-disbelief. A stand-up comic doesn't need much theme to make us pass Coke through our noses. He tells the jokes, and we turn our sinuses into soda dispensers.

Look at the charming Infocom board game **Fooblitzsky**. It takes full advantage of that muscular twitch known as the smile, incorporating dozens of witty and engaging animated graphics. How can you avoid laughing at a cocky canine that grins as money is placed in his wallet, and makes "yucky" faces when the cash flows in the other direction? Infocom has always been known for their games' sharp sense of humor, and **Fooblitzsky**, their first graphic-style game, follows in the smile-inducing tradition.

These comical graphics are all extras;

the mechanics of the game don't require them. Infocom could have settled for text messages, such as *You lose 6 Foobles!*—but then maybe we'd be making the yucky faces.

A different sort of reality.

It's ironic that a game such as Electronic Arts' **M.U.L.E.**, which I consider one of the finest computer games ever written, would handle its messages in exactly the same manner I just whined about. Messages such as *Your mule just won the colony tap dancing contest. You receive \$100.00* are scrolled across the bottom of the screen in text form.

But, although a graphic would have been nice, the statement itself is pretty darn funny. I mean, do you know what one of those mules looks like? A robot/horse combo that tapdances? And wins??

M.U.L.E. is as much a simulation as it is a game. So most of what contributes to its entertainment value is the realism of its world. This isn't visual realism. **M.U.L.E.** uses a lot of graphics and sound, sure, but for the most part, they're heavily symbolic in nature. The town is a series of colored rectangles labeled with the names of establishments they're supposed to represent. The auction looks more like racing than bidding.

M.U.L.E.'s realism relies on its authors' the careful attention to creating a system of economics that mirrors the real world as closely as possible. All facets of economics are considered: supply and demand, economies of scale, learning-curve theory, diminishing returns. If you haven't played **M.U.L.E.**, you're probably thinking that it sounds like a yawner of a game. Not true. You get so caught up in the competitive aspects that you learn those fancy economic rules, just to get an edge over other, less knowledgeable players. Painless learning—my favorite kind.

If you're writing a simulation in the future, get a copy of **M.U.L.E.** and see how it *should* be done.

Pulling hair and gnashing teeth.

We all react differently to frustration. Some of us get stubborn and see a challenge to be conquered, while others avoid the source of frustration like a gasoline-drenched man avoids a match.

A word to the wise: those who persevere are a minority. In our time-conscious society, few people want to stick with anything that doesn't give them immediate pleasure. Novels must involve us in the first chapter; movies have to grab us in the first scene.

The same holds true for games. Kill off the novice before he gets a chance to move his joystick, and you might as well turn in your computer. Get a job stuffing envelopes, cleaning zoos, or doing something that doesn't require insight into the way people think, because one thing is for sure: that game you spent months programming

will stick around about as long as snow in Florida. You must snatch the player's attention immediately—and keep it.

Take **Pac-Man**, for instance. It's gotten so popular, has been released in so many versions, that it's become a computer cliché. Just like The Beatles—there isn't a person in the civilized world who hasn't heard of it, and few haven't played it (or watched someone play it).

It's difficult, if not impossible, to identify the magic ingredient which generates that kind of success. If we could, everything would be a bestseller. Still, we can identify some of the ingredients that make a game popular (or earn a contract from your favorite computer magazine).

The first of these—the addiction index—is most important. Like potato chips and pretzels, your game should draw the player back for more. It's the salt, you know—those tiny crystals that, on contact with your tongue, provide an instant burst of pleasure. Make the new player smile as soon as he touches the joystick, and he'll become a glutton. He won't be able to help himself. It's that darned salt.

With a game like **Pac-Man**, we learn the strategies nearly unconsciously. We're having so much fun sucking down pellets and chasing ghosts that we almost have to get good—we're practicing like crazy.

But you can't stop with the salt. Once you've got a player addicted, there has to be something of substance beneath. None of us (I hope) sits around emptying saltshakers down his throat, and none of us is going to keep playing a game that doesn't offer some subtleties. A good game provides many depths of play. Always remember, while the first-time user wants immediate rewards for his fumbling efforts, the experienced player wants new strategies to improve his play.

Ego and the act of creation.

So far, we've spent a lot of time talking about games, and with good reason. Most entertainment software falls into the game category. But there's an alternative.

Creativity software is unique in that it lets the genius within us display those bits of brilliance which might otherwise sleep forever. It's a godlike thing, this power of creation, a chance at immortality, an ability to add something special to the world, something that's *ours*, something...

Okay, okay. Let's say it the simple way: we all love to show off. It's practically an instinct. Children present adults with crazy scrawls sure to generate an "ooh" or an "ah," and it doesn't take too long for the child to think, "Hey! This is a great way to get attention!" And it sticks. We're all bucking for notice.

Creativity software can be an attention-getting vehicle, and it even lets us produce something worthwhile along the way. The entertainment value's virtually built in, but there are still some rules. No longer wor-

ried about characterization, plot, scenes, suspension-of-disbelief, we have to make sure the computer becomes invisible, presenting as few operating barriers as possible. The number one rule here? Ease of use.

The program should be constructed so the user can concentrate on creating, instead of on working out software mechanics. If he has to fumble around to get things to work, or has to perform a lot of tasks the computer's capable of handling on its own, the program has flunked the ease-of-use test. *Convenience* is the key word.

Take the Atari **Music Painter**. You don't have to know much about music—and you don't have to futz around with a lot of program options—to get good results. Tones are created by painting lines of varying length on the musical staff. The longer the line, the longer the note. You may paint notes using various instruments, as well, each creating a different color line.

What would you think of a music program using text prompts, like those below to get information from the musician?

```
INPUT INSTRUMENT: 1
INPUT NOTE:       A
INPUT OCTAVE:     2
INPUT NOTE VALUE: QUARTER
```

Talk about tedious! Imagine entering a full-length song. You'd be half done when they dragged you, babbling and drooling, to a place with soft walls.

Looking good.

Graphics are the programmer's most effective tool in presenting an abstract idea to the user. Not too long ago, graphics were considered the game programmer's domain and, as a result, were given less status than was fair. It was thought that "serious" software didn't resort to flashy graphics. This kept the shelves packed with *boring* business and home applications, software that could've been much more usable and attractive if the programmer's (and users) hadn't been such fuddy-duddies.

Now, finally, even chairmen-of-the-board are discovering that colorful graphs with fancy labels are a lot more pleasant to look at than is a long list of numbers.

But heed this warning: use graphics to make your program attractive, but don't overdo it. Your art program doesn't need a border of paintbrushes doing the Charleston, and your music program doesn't need a screenful of notes grinning and winking. Graphics should be used to organize the program in an attractive, logical manner—not to trivialize it.

A universal hatred: manuals.

Put a dozen people into a room with a dozen computers and give them a dozen copies of a new software package. And just watch.

What happened? I'll bet my next paycheck that eleven out of them booted the program without even glancing at the manual. I'll further bet the majority will

continue to ignore it, trying to figure out the program for themselves.

What's the point? I mentioned a frustration factor earlier. This factor increases in direct proportion to the number of "hidden" options your program contains. If most people don't like to look at a manual the first time they run a program, how many do you think are going to write you love letters about having to reference the manual continually?

If a program is to entertain, it must be frustration free. And there's nothing more frustrating than stopping work every five minutes to find out how to load a file, or print the screen, or get back to the main display—or perform any of a hundred other functions. Give me a program that denies the simple courtesy of an option menu (or at least a help screen), and I'll show you new fuel for the fireplace.

A good example of frustration-free software is the Broderbund **Print Shop**. Once the program's configured for your system, you can forget the manual. Anything you need is displayed on the main screen or a help screen. You can move effortlessly through the steps needed to create a greeting card or sign. It's no surprise to me that **The Print Shop** is so successful.

Entertain me.

We haven't discussed every factor in creating entertainment, but I think we've hit most of the biggies. Of course, even if you follow every rule and guideline given here, there's no guarantee. There are still those elements that can't be quantified, the elusive bits of magic which make the difference between a grin and a frown, that little something extra man has searched for since he first became aware of himself and his talents.

It won't be easy to get the formula right. You'll have to work different combinations of ideas into your programs, honing them closer and closer to the ideal, incorporating what works, discarding what doesn't. It takes patience and perseverance. But you'll know when you've got it.

You'll see all the smiles. **A**



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Panak strikes!

Reviews of the latest software

by Steve Panak

It's hard to believe another year has gone by, but one trip to the crowded shopping centers confirms the suspicion. Whether you'll be making the list for yourself, or for that certain special someone, I'm sure you'll find something here to satisfy that peculiar, twisted need. I know I did.

Beach-Head II

by Roger and Bruce Carver
ACCESS SOFTWARE, INC.
2561 South 1560 West
Woods Cross, UT 84087
(801) 298-9077
48K Disk \$34.95

Way back in issue 30, I took a look at what I considered a rather mediocre game called **Beach-Head**. Little did I know that over a year later I'd be looking at its sequel. There's got to be some clever cliché for this situation, but (probably due to this game) my mental facilities have just about dropped off the bottom of the scale, and I can't seem to come up with it.

Beach-Head II is neither good nor bad; it's merely more of the same... more of **Beach-Head**, when I hoped the original had said it all. And more of the stream of dull arcade-action games which flow through my machine. Perhaps the most refreshing part of the game was the honesty of its crude selling method.

The packaging, subtitled "*The Dictator Strikes Back*" (or "out," depending on your point of view) appeals to the primal, red-meat-eating, killer instinct so prevalent in recent vengeful war movies. The cover por-

trait of a gun-toting, buxom babe beside a heavily armed warrior type is bound to get some people's blood pumping.

The hero, John P. Stryker—codename STRIKE (or could it be STRIKE-OUT?)—is basically a video version of *Rambo*. At any rate, his picture is. This image, unfortunately, is not fleshed out in the game. This kind of character is usually extremely violent and full of action—and **Beach-Head II** is not.

What little action there is takes place in a series of four screens representing the attack, rescue, escape, and battle phases of the encounter. In each of these phases, one or two players may choose the role of either the Dictator or the Allies. Each level contains a large number of factors you control, enough so you won't get bored for a couple of weeks.

For example, in the attack phase, the Allies attempt to drop troops in by helicopter, while the Dictator tries to pick them off with his forever fully-loaded machine gun before they reach the second wall. If any survive the mad dash, they're joined by reinforcements for the rescue phase, and so on.

The graphics are acceptable. They're really not too bad, but I'm a little spoiled

by ST images. While the control here is very difficult to learn (there's a lot to control in this one, like throwing hand grenades and sending troops over the wall), it's clean and quick; I rarely felt cheated.

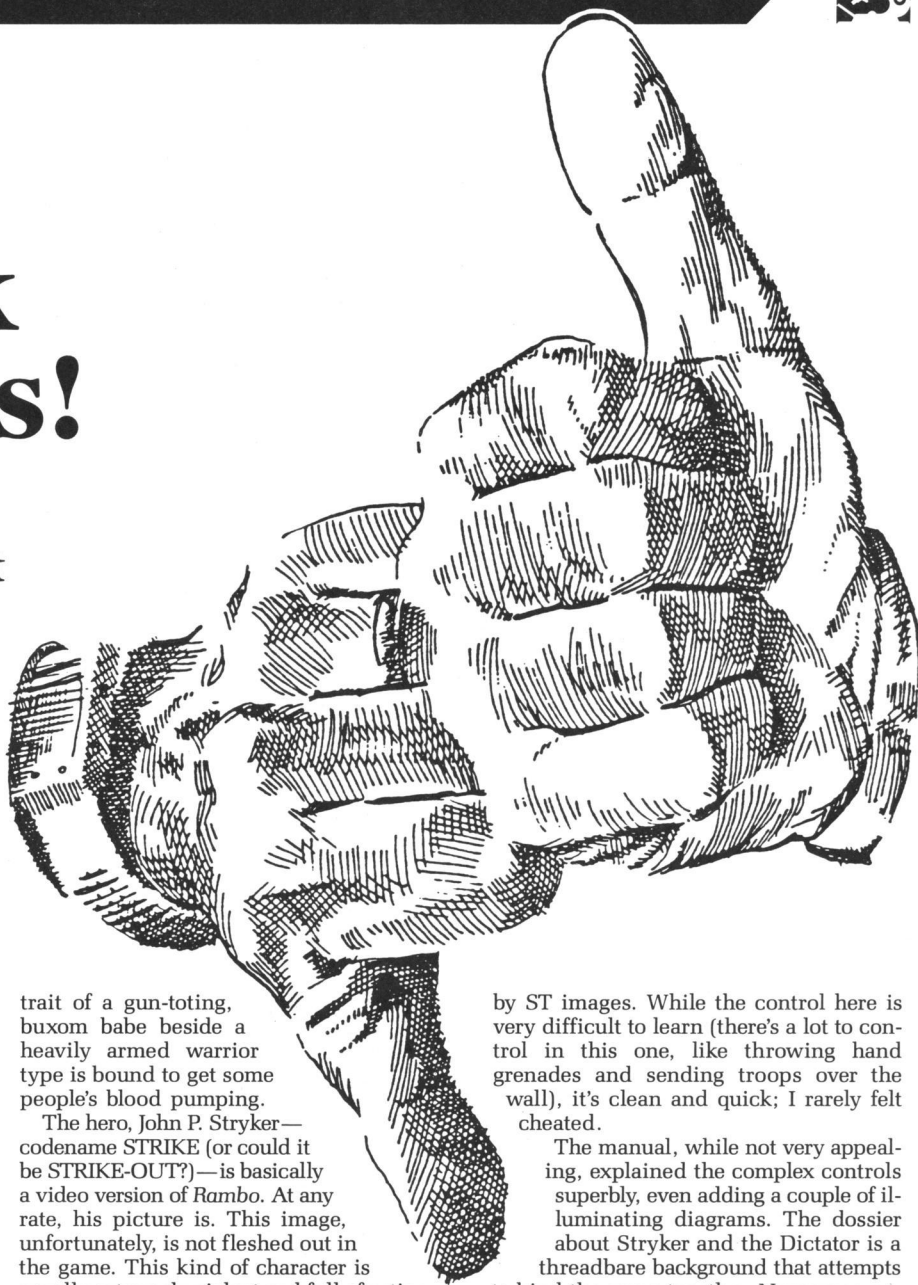
The manual, while not very appealing, explained the complex controls superbly, even adding a couple of illuminating diagrams. The dossier about Stryker and the Dictator is a threadbare background that attempts to bind the game together. Numerous options, such as three levels and a practice mode, will keep the stale challenge difficult.

Overall, I was not impressed by **Beach-Head II**. It isn't a bad game, and many of its aspects, while old and unoriginal, are still appealing for some. And that's the most important thing—whether you like the game. As for me, I thought **Beach-Head II** was all washed up.

Wizard's Crown

by Paul Murray & Keith Brors
SSI
1046 N. Rengstorff Avenue
Mountain View, CA 94043
48K Disk \$39.95

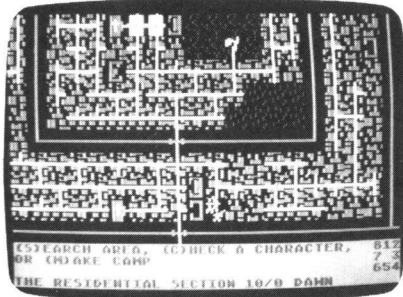
While I've examined a lot of fantasy role-playing games over the last few months, not many of them have paralleled the true





Panak strikes! *continued*

D&D™ formula. That is, until **The Wizard's Crown**. Let's hope we get a few more of these in the future. **Wizard's Crown** is a character-based role adventure, where you move through a world, gaining strength, experience and riches by overcoming adversity.



Live the fantasy in **Wizard's Crown**, a character-based role adventure.

Each character has four attributes (life, intelligence, dexterity, and strength) which determine the sundry skills. These skills are as varied as searching for traps, casting spells, fighting (with different weapons) and swimming. Finally, he has experience points. These increase in moving through successful encounters. As experience grows, so do the skills.

When the game begins, your band of eight characters is at the Inn, eager to begin their exploits. You might start by creating your own characters, but it's faster to use the eight standard characters. These have a wide range of skills to help you gain experience with the program.

The Inn is used as a home base, where the characters eat, drink and rest. The options available to you vary according to your location. The Inn, the dungeons and the outside world all have their own peculiar dangers and treasures. Regardless of your location, all commands are easily issued from the keyboard. However, movement is a bit awkward, as you must use the numbers 1 to 8, which correspond to eight compass points. But this is more than made up for by the combat modes.

One feature of **The Wizard's Crown** is availability of two different battle modes. This allows both the hard-core simulator and the quick-resolution enthusiast to enjoy the same game. If you're of the impatient camp, switch the program to quick combat and have your confrontations immediately resolved. For those who wish to control every aspect of the encounter, normal combat's 20- to 30-minute timespan crams in enough action to satisfy even the most demanding customer.

The documentation is up to SSI's usual high standards. The manual is chock-full of details and instructions, although it's easy to get bogged down in the verbosity. The lack of a reference card was also a drawback. Fortunately, dark-shaded blocks

of text contain the information you'll need to quickly get into the game. And, once you're in it, it's unlikely you'll soon escape its captivating grasp.

I know this because, after my first 12-hour bout, I suffered one of life's unavoidable inconveniences—a disk failure. Fortunately, a new disk rapidly replaced the defective one. I was up and running again, but those were a tense few moments.

The graphics are acceptable, since their only purpose should be to stimulate the imagination. The bulk of the screen is a map of your region; the bottom contains commands prompts. In quick combat, the screen provides only battle information. In slow combat, the images of your warriors are shown. You then arrange them into battle formation. The worst part of the game was the 10-minute disk-swapping nightmare necessary to set up the three game disks. With one drive, the chore is agonizing.

This is only a slight blemish on an otherwise superb game. The **Wizard's Crown** is a true gem, an addictive game which you'll find yourself playing day in and day out. Just remember to eat occasionally.

Transylvania
and
The Crimson Crown
by Antonio Antiochia
POLARWARE
830 Fourth Avenue
P.O. Box 311
Geneva, IL 60134
(312) 232-1984
ST Disks \$19.95

Although I usually dread having to test graphics adventures, I must admit that I looked forward to walking through these two environments. This is mostly due to the superior graphics of the ST; seeing high-quality images on it still gets my adrenaline pumping. In that aspect, these games succeed. However, as stories, they failed to engage me.

I'm not really sure why this happened, because it didn't have to. Program design is excellent, overall quality and value are great. Images are unparalleled. There just wasn't much of a story line. The game was simply a search for items, which, when used in the correct way, produced the desired results. The problem was that I (as an avid reader) was looking for more, and I (as an adult) was far above the target age. I'm not sure what this age might be, but it's probably closer to half my twenty-four years.

If you're near that age, **Transylvania** and **The Crimson Crown** will provide you with low-cost adventuring, through a colorful, highly detailed land of dangers straight from your worst nightmares.

In **Transylvania**, King John the Good has sent out a message to all travelers in

the Kingdom of Wallachia (and to you in particular): "Help me find the fair princess Sabrina. He who finds her and rescues her from the Evil that has imprisoned her will surely be honored as a hero." Being a brave soul, and not wanting to have wasted the price of admission, you venture forth to fight vampire and werewolf in pursuit of your princess.

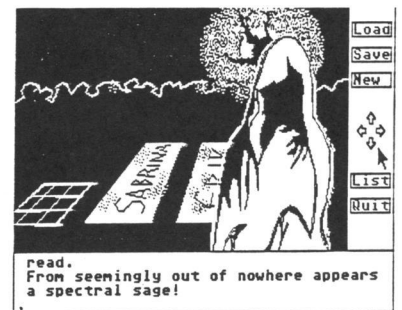
In the sequel, **The Crimson Crown**, the kingdom again implores you to come to its aid. Well, no one said the life of a hero was going to be easy.

A murderous Vampyr is terrorizing the land and plans to seize power from Crown Prince Erik, rightful heir to the throne. The fiend is in possession of the magical Crimson Crown, and should the villain discover its powers, the kingdom will surely be doomed. So, accompanied by Prince Erik and Princess Sabrina, you're off again, for several hours of slaying dragons and saving maidens.

The graphics are great. Colorful and highly detailed, they rapidly load onto the screen. They can be turned off by tapping RETURN, letting you see commands from your recent past, as well as speeding play.

Considering that movement direction commands are used most in interactive fiction, Polarware was creative in their simplification. Using the mouse, you move the arrow to any of the four compass points along the right border of the screen, and tap to move in that direction. Save, load, quit, list (inventory) and new (game) are also only a tap away.

Both games have closely followed Info-com's recipe for producing classic works of fiction. Perhaps this is proof of the theory that it's the cooks, not the ingredients, which make great culinary delights.



Transylvania — Good versus Evil.
The story continues in **The Crimson Crown**.

The parser in both these games is first-rate. Rather than limiting you to simple subject/verb commands like most graphic adventures do, both programs understand complex sentences. *Get in the wagon and examine the coffin* is child's play for the program, although the resulting *It's closed* is less than satisfying. And don't bother opening it—it's nailed shut.

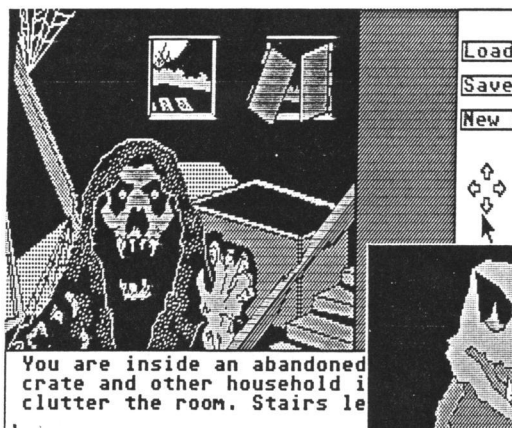
Packaging, too, is first rate. SSI's colorful box contains numerous bits of para-

phernalia to enhance the game. **Transylvania** has a local newspaper and a letter requesting aid for the lost princess. **The Crimson Crown** gives you a journal, map and poster. All these items are of the highest quality and add immeasurably to the game.

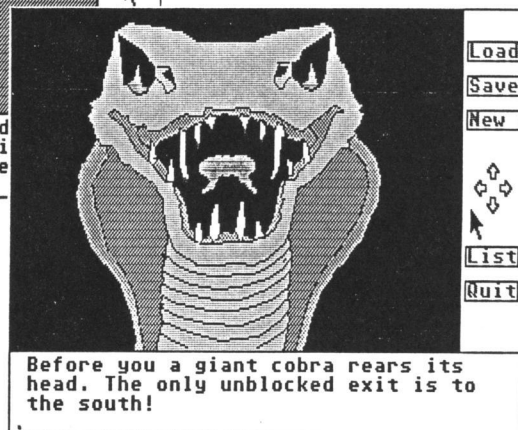
While the manual itself is rather sparse, it completely explains the game, and provides such useful information as how to place your display into low resolution (a color monitor is required), and which icon to click on to start play. For those unable to complete these games, a self-addressed, stamped envelope will get you hint sheets, which, when deciphered, help walk you through the games.

Given the superb images, well-designed programming, the high-quality packaging and the very reasonable price of these two games, **Transylvania** and **The Crimson Crown** should be first on your gift list of ST graphic adventures. **A**

The author wishes to express his appreciation to The Magic One Computer Shop of Barberton, Ohio for their constant support in the creation of this series.



More views from Polarware's
The Crimson Crown.



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CIRCLE #175 ON READER SERVICE CARD

Database Delphi

News and updates about the *ANALOG* Computing Atari Users' Group on Delphi

by Matthew J.W. Ratcliff

Delphi has certainly been busy this past month. For one thing, we have a special new feature for you called the "Story Board." I'll give you all the juicy details on that, and we'll also wrap up a couple of polls, as well as offering a brief tutorial on downloading from the Delphi databases.

Nosy polls.

DIGITA (Chuck Walbourn) had a poll up for several months, about what language 8-bit Atari owners prefer. The winner was OSS BASIC XL/XE at 33 percent, followed by Action! and plain Atari BASIC at 25 percent. MAC/65 from OSS rated a mere 4 percent, as did FORTH. Microsoft BASIC came in at 3 percent, and C followed at 1 percent.

RICKB (Richard Brodeur) echoed the sentiments of many, "Action! is a good language. . . easy to learn and fast! I really like it; it's the alternative to assembly language." From some of the comments I've read, Action! is growing in popularity because of its similarity to Pascal and C, which are quite popular on the ST. And most 8-bit Atarians hope to move up to the ST, sooner or later. As STEVEKP (Stephen Kump) put it, "apparently, anything from OSS is pure gold."

I asked ST owners what software they'd recently bought, and what they thought of it. The top three were **DEGAS** (20 percent), **FLASH** (23 percent), and **Pascal** (20 percent). All got high marks for providing fair to good documentation, high functionality and a good value.

Story time.

Thanks to PEABO, the Story Board is alive and well. When you get into the Atari SIG, enter the **STORY** command. You'll be given a brief explanation of the current tale under construction. Once there, you can read the story "from the beginning" (just enter the first word of each command). Here, you'll be able to read all chapters already posted. If you scan through them and find that you want to read the last three messages, numbered 5 through 7, you can enter **READ 5,6,7** to read all three chapters.

You can control the flow of the text with **AS** to pause and **AQ** to continue, or just turn on the capture buffer and print it out later. (To read continuously, enter a **/length 0** before entering the **READ 5,6,7**. This will get your chapters up nonstop, with no **MORE?** prompts. . . the fastest way to get caught up with the story.)

The most current additions to the story can be found in the "new chapters" section. After you've read the most recent chapter, you can post an addition, if you like. It's quite similar to entering a message into the Forum.

We're currently building a story around the misadventures of Lars Kranston, a space traveler on a mission of grand importance. It's developing into a B-movie-quality script, like an inexpensive clone of a *Star Wars* movie. Needless to say, Lars' adventures have taken some interesting twists lately.

The download adventure.

Most people are paying their bucks for one thing: to download programs. It is a bit confusing for beginners, however. The

following "tutorial" should help those unfamiliar with the system.

At the main prompt—**ANALOG >What do you want to do?**—enter the **DATABASE** command. (**DA** will suffice. At any menu in the system, you need enter only enough characters of a particular command to distinguish it from the rest.) Next, you'll be prompted for a **TOPIC** of interest. The sections "**ST Programs**" and "**DEGAS Pictures**" are the only ST-specific databases. You'll find there are some ST and some 8-bit Atari files in the "**Reviews & News**" section. All the other sections are 8-bit-specific files. Let's say you want to go to the "**General Interests**" section. Enter **GE** and press **RETURN**.

Your next prompt will read **DBASES: Gen > (Dir, Read, Set, Exit)**. If this is your first visit to our hallowed halls, you'll need to get a directory. It's best to turn on the capture buffer and print the directory out for future reference.

Let's say you're interested in **Boot Camp** from issue 43. Looking through the directory, you see **BOOT CAMP - ISSUE 43**. There are also several other **Boot Camps** in here, so you'll have to type the entire name when ever you refer to it. You'll enter the command: **READ BOOT CAMP - ISSUE 43**.

A brief description of this section will be sent to your monitor. Following this will be a table of contents that looks like the information below:

- 1 DOCUMENTATION (Size: 21141)
- 2 LISTING 1 (MAC/65 SOURCE) (Size: 1515)
- 3 LISTING 2 (MAC/65 SOURCE) (Size: 8321)

This certainly looks confusing, doesn't it? Following this will be an **ACTION>**

(Next, Down, Xm, List) prompt. Each item can be referred to by the number at the beginning of that line. Let's say you want Listing 2. You can enter the command XM 2, for the Xmodem download of the second file. Delphi may then tell you that a particular filename is recommended (for storage on your disk). Immediately following this information, you'll be prompted:

Type three consecutive <Control-C>'s to abort.
Ok, receive! (1152 bytes = 9 xmodem blocks, non-text)

Now, Delphi is ready to send you the file. Get your terminal program ready to receive a file using Xmodem. Once ready, START your transfer. If you realize you don't have a formatted disk handy, press CTRL-C three times to abort the transfer.

It seems to be a bit involved, but isn't so bad once you get accustomed to it. Once a transfer is complete and you're back at the ACTION prompt, you may enter EX, in order to exit to the previous menu. If you'd like to get to a different database

without returning to the main menu, use the SET command.

If you want all the files related to a particular READ, just enter XM at the ACTION prompt. Delphi will then prepare to send you the first file. Use the typical Xmodem download procedure to acquire the file. After the transfer is complete, simply press RETURN to initiate the next download.

If you have any questions or comments about a particular file, you can enter the REPLY command at the ACTION prompt, also. You'll be bumped into EMAIL briefly, so you can send kudos to the file's author.

Log off.

That covers it for this month. Next time, I'll give you a few more pointers on using Delphi, and the latest news from the Forum. Until then, see you on-line. **A**



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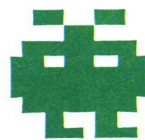
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Brickworks



**Basic building blocks
for your graphic use and enjoyment.**



by Chris York

Brickworks is a unique hybrid of a drawing program and a construction set. It allows you to build pictures on the screen using predefined "bricks." Once you've drawn a picture, you may edit and even animate it.

Brickworks is written entirely in machine language. To use it, you need at least 48K and a disk drive for your Atari, as well as a joystick plugged into port 1.

Making your program disk.

Listing 1 is the BASIC data used to create your copy of **Brickworks**. Please refer to the **M/L Editor** on page 11 for typing instructions. You should name the resultant file **AUTORUN.SYS**.

To load the program, turn off your computer and make sure the **Brickworks** disk is in the drive. Turn on the computer. After a few seconds, you should see the title screen. After six seconds, you'll be switched to the drawing screen.

Let's draw a picture.

If you look at the upper left corner of the screen, you'll see a hand with a pointing finger. You'll use this hand to manipulate the shapes, and to perform other functions via the joystick. Move the hand around the screen a little bit, to get the feel of it.

You'll notice the screen is divided into two parts. The top part is the drawing window; the bottom section is the shape library. To draw, you must pick up one of the bricks. Just move your hand down to the shape library and position the hand so it's on top of the brick you want to use. Press the button.

Now try moving the hand around again. You will have "picked up" the shape. Move the hand to the drawing window and press the button. When you move the hand again, you'll see that you placed a brick where you pressed the button. If you hold the button down and move the hand around the drawing window, you're able to draw using the shape. To pick up another shape, move the hand on top of another brick in the shape library and press the button. Presto! You have a new shape.

If you make a mistake in your drawing, there's no need to worry. Just point at any blank spot in the shape library and press the button. You'll end up empty-handed. Now, move to the drawing window and position the hand over the brick you want to erase, then press the button. To erase a large area, just hold down the button as you move the hand around.

More bricks, more colors.

You'll probably get tired of using the same bricks after a short time. For that reason, you'll be glad to know there are more bricks in the library than meet the eye. Try pressing the **SELECT** key. You'll see some different shapes. Press it again, and again... and again. You should now be looking at the original set of shapes. You've cycled through the fifty-five shapes in the shape library.

Now, for another treat—press the **OPTION** key. The shape library changes color. Press the **OPTION** key a few times to cycle through the four colors. Counting different shapes and different colors, you have a grand total of 220 different bricks to use in building your pictures.

But I don't like the built-in colors.

If you get tired of the four colors used for the bricks, or if you don't like the black background, you can easily

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change these. To change a color: first, use the OPTION key to put the color you want changed in the shape library window. Press the SPACE BAR, and your hand (the one on the computer screen, that is) will disappear. To change color, move the joystick left or right. To change brightness, move the joystick forward or back. When the color you want is displayed, press the button. You'll hear a beep, and your hand will reappear. Continue drawing.

To change the color of the background, press the B key. The rest of this procedure is the same as the one above.

If you want to clear the entire screen, press either SHIFT-CLEAR or CTRL-CLEAR. It's as simple as that.

Lights, camera, action!

Brickworks can be used to make a short computer movie. By now, you've noticed there's a 1 in the lower right corner of the drawing window. This is because there are eight screens available for your use, numbered from 1 to 8. To view and work on any of the screens, just press the number on the keyboard that corresponds to the screen you want to use.

Another way to change between the screens is to use the "greater than" (>) and "less than" (<) keys. The < key moves you back one screen, and the > key moves you ahead one screen. After screen 8, you'll wrap around to screen 1, and (going backward) after screen 1, you'll wrap around to screen 8.

You can use the different screens to animate in a manner similar to drawing on several sheets of paper and flipping through them. By holding down either the > or < keys, you can rapidly flip through the screens.

You don't have to use the eight screens for animation, however. You could use them just to hold eight different masterpieces.

Cut and paste.

Brickworks includes "cut" and "paste," two very powerful features that go hand in hand. They're used to move large sections of the screen from one place to another. To enter the cut mode, press C. You'll see the word cut in the lower left corner of the drawing window. You can now cut out a rectangle of the screen, or even the whole screen.

Move the hand to the upper left corner of the rectangle you want to cut out. Press the button, and you'll hear a short beep. Move the hand to the lower right corner of the rectangle you want to cut out, and press the button. You will hear another short beep, and the word cut will disappear. The rectangle you cut out will remain where it is; however, the rectangle will be in the cut buffer.

The paste function will put the rectangle back on the screen. To enter the paste function, press P. The word paste will appear in the lower left corner of the drawing window. Position the hand so that the finger is pointing to the upper left corner of the position where you want the rectangle in the buffer to be placed. Press the button on the joystick.

You'll hear a short beep, and the word paste will disappear. The rectangle will be placed in the drawing. To paste the same thing over again in a different location, repeat this process. There's no need to cut the same block out again.

If you try to paste a block and find that it won't go into place, you may be too close to the right side or the bottom of the screen for the entire paste rectangle to fit. If this is the case, either move to the left, or up, or both, so that the whole block is able to fit.

When cutting or pasting, you should be on the screen you want before entering either function, since you can't switch screens from inside cut or paste.

Saving and loading.

You can save your picture sets to the disk drive. To do this, press CTRL-S. The screen will clear, and you'll see a prompt that says FNAME? The asterisk is your cursor.

You may type an eight-letter filename. Only the letters A through Z are allowed. There's no need to type the D: prefix; it's added automatically. If you make a mistake, use the BACKSPACE. When you've typed the filename you want to use, press RETURN. Your screens will be saved to disk. It only takes a few seconds. When the pictures are saved, you'll be returned to where you left off on your drawings.

To load a set of screens from the disk, press CTRL-L. You'll get the same prompt as when you're saving screens. Just type the filename of the screens you want to load in and press RETURN. When the pictures are through loading, you'll be returned to the drawing mode.

There are two special notes regarding the load and save functions. First, when you save a picture set to the disk, the extender .PIC is added to the filename. There's no need to type this when you load. Second, if there's ever a disk error, you'll be returned to the drawing screen—with no change made. Just try again. A disk error could occur if you tried to load a file that's not on the disk in the drive.

It's also possible to cut and paste between two different sets of drawings. You can cut a block out of a drawing, load in a new set of screens, and then paste the block on to the new set.

I hope you get many hours of enjoyment from playing with your graphics via **Brickworks**. ■

*Chris York has been involved in computers for four years, and **Brickworks** is his second major machine language project. Contrary to popular opinion, he is not from a small planet somewhere in the vicinity of Betelgeuse (at least, he claims he isn't).*

Listing 1.

```

1000 DATA 255,255,0,96,251,96,0,0,0,0,
0,0,0,85,170,7975
1010 DATA 85,170,85,170,85,170,187,238
,187,238,187,238,187,238,238,238,9145
1020 DATA 238,0,238,238,238,0,255,255,
255,255,255,255,255,170,170,804
1030 DATA 170,170,85,85,85,85,170,170,
170,170,170,170,170,255,129,3239
1040 DATA 129,129,129,129,129,255,0,12
6,66,66,66,66,126,0,255,153,6196
1050 DATA 153,255,255,153,153,255,51,2
04,51,204,51,204,51,204,60,60,8261
1060 DATA 255,255,255,255,195,195,255,
129,129,255,255,129,129,255,255,0,5708
1070 DATA 255,0,255,0,255,0,255,254,25
2,248,240,224,192,128,255,127,7403

```

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| Templates | \$ 14.77 |
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|----------------------------------------------------------------------------------|----------|
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1080 DATA 63,31,15,7,3,1,255,130,132,1
36,144,160,192,128,255,65,9329
1090 DATA 33,17,9,5,3,1,0,0,0,24,60,
126,255,128,192,2409
1100 DATA 224,240,240,224,192,128,24,3
6,66,129,129,66,36,24,128,192,5495
1110 DATA 224,240,248,252,254,255,1,3,
7,15,31,63,127,255,128,192,7920
1120 DATA 160,144,136,132,130,255,1,3,
5,9,17,33,65,255,255,126,5689
1130 DATA 60,24,0,0,0,0,1,3,7,15,15,7,
3,1,24,60,3104
1140 DATA 126,255,255,126,60,24,0,0,0,
230,230,255,255,255,0,0,8264
1150 DATA 0,103,103,255,255,255,124,25
4,254,254,254,254,124,0,24,24,1414
1160 DATA 24,24,252,96,247,97,24,24,24
24,3,7,14,28,56,112,8328
1170 DATA 224,192,0,126,129,0,0,129,12
6,0,129,66,36,24,24,36,9044
1180 DATA 66,129,0,0,0,102,255,255
255,0,0,0,219,219,255,146
1190 DATA 255,255,124,254,254,238,254,
254,124,0,0,0,0,255,255,0,8362
1200 DATA 0,0,192,224,112,56,28,14,7,3
0,126,165,36,36,165,1310
1210 DATA 126,0,126,66,126,66,126,66,1
26,66,0,0,0,31,31,24,7491
1220 DATA 24,24,0,0,0,255,255,24,24,24
0,0,0,248,248,24,2831
1230 DATA 24,24,24,24,24,31,31,24,24,2
4,24,24,24,255,255,24,1284
1240 DATA 24,24,24,24,24,248,248,24,24
24,32,64,184,252,126,62,5394
1250 DATA 18,54,24,24,24,31,31,0,0,0,2
4,24,24,255,255,0,326
1260 DATA 0,0,24,24,24,248,248,0,0,0,1
26,129,165,129,165,153,6580
1270 DATA 129,126,24,24,188,255,61,60,
60,60,36,36,36,36,9252
1280 DATA 36,231,20,8,126,235,255,126,
36,54,0,126,126,96,96,126,5517
1290 DATA 126,0,0,102,102,102,102,126,
126,0,0,126,126,24,24,32
1300 DATA 24,0,0,126,102,102,126,96,96
0,0,126,102,102,126,102,3252
1310 DATA 102,0,0,126,96,126,126,6,126
0,0,126,96,126,126,96,3166
1320 DATA 126,0,248,97,255,97,0,0,0,0,
255,0,0,0,31,6,7801
1330 DATA 50,6,0,128,224,129,192,131,1
60,133,128,135,96,137,64,139,8338
1340 DATA 32,141,0,143,224,144,0,70,13
70,0,0,0,64,33,18,7266
1350 DATA 10,14,30,62,62,61,26,4,0,74,
251,74,216,32,79,74,2630
1360 DATA 169,49,32,12,79,32,107,74,32
1,88,32,107,74,32,151,672
1370 DATA 74,169,51,141,0,6,169,32,141
1,6,169,0,141,7,6,9522
1380 DATA 141,8,6,32,132,77,169,96,141
244,2,32,153,76,32,247,6356
1390 DATA 76,172,12,6,174,13,6,169,7,3
2,92,228,32,86,76,32,1615
1400 DATA 42,78,32,199,76,32,76,78,76,
64,74,173,48,2,133,203,4327
1410 DATA 173,49,2,133,204,160,3,169,7
0,145,203,160,6,169,6,145,6659
1420 DATA 203,200,192,29,208,249,96,16
9,0,160,0,145,88,200,192,240,1277
1430 DATA 208,249,165,88,133,203,165,8
9,133,204,24,165,203,105,240,133,2051
1440 DATA 203,165,204,105,0,133,204,16
9,0,160,0,145,203,200,192,240,2082
1450 DATA 208,249,96,169,62,141,47,2,1
69,3,141,29,208,169,64,141,6357
1460 DATA 7,212,169,1,141,111,2,169,12
141,192,2,141,194,2,169,6076

1470 DATA 200,141,2,208,96,169,0,133,2
0,228,20,208,252,96,173,8,7867
1480 DATA 6,201,0,240,6,32,246,74,206,
8,6,96,173,8,6,201,4203
1490 DATA 23,240,6,32,179,75,238,8,6,9
6,173,7,6,201,19,240,5232
1500 DATA 16,173,8,6,201,0,240,9,32,20
7,75,238,7,6,206,8,4099
1510 DATA 6,96,169,8,141,3,6,172,252,7
4,247,75,1,6,136,140,5390
1520 DATA 1,6,162,1,32,185,74,206,3,6,
173,3,6,201,0,208,3705
1530 DATA 234,96,169,8,141,3,6,172,0,6
200,140,0,6,172,1,1256
1540 DATA 6,200,140,1,6,162,1,32,185,7
4,206,3,6,173,3,6,983
1550 DATA 201,0,208,227,96,169,8,141,3
6,172,0,6,136,140,0,2022
1560 DATA 6,172,1,6,200,140,1,6,162,1,
32,185,74,206,3,6,1859
1570 DATA 173,3,6,201,0,208,227,96,169
8,141,3,6,172,0,6,1946
1580 DATA 136,140,0,6,172,1,6,136,140,
1,6,162,1,32,185,74,1716
1590 DATA 206,3,6,173,3,6,201,0,208,22
7,96,169,8,141,3,6,3415
1600 DATA 172,0,6,136,140,0,6,162,1,32
185,74,206,3,6,173,3202
1610 DATA 3,6,201,0,208,234,96,169,8,1
41,3,6,172,0,6,200,3809
1620 DATA 140,0,6,162,1,32,185,74,206,
3,6,173,3,6,201,0,1674
1630 DATA 208,234,96,169,8,141,3,6,172
1,6,200,140,1,6,162,2765
1640 DATA 1,32,185,74,206,3,6,173,3,6,
201,0,208,234,96,169,7452
1650 DATA 8,141,3,6,172,0,6,200,140,0,
6,172,1,6,136,140,2242
1660 DATA 1,6,162,1,32,185,74,206,3,6,
173,3,6,201,0,208,3845
1670 DATA 227,96,173,7,6,201,19,240,24
8,75,243,76,6,32,151,75,6483
1680 DATA 238,7,6,96,173,7,6,201,0,240
6,32,123,75,206,7,3592
1690 DATA 6,96,173,7,6,201,19,240,16,1
73,8,6,201,23,240,9,4437
1700 DATA 32,18,75,238,7,6,238,8,6,96,
173,7,6,201,0,240,4479
1710 DATA 16,173,8,6,201,23,240,9,32,5
3,75,206,7,6,238,8,3003
1720 DATA 6,96,173,7,6,201,0,240,16,17
3,8,6,201,0,240,9,4012
1730 DATA 32,88,75,206,7,6,206,8,6,96,
173,120,2,201,14,208,5299
1740 DATA 4,32,194,74,96,201,6,208,4,3
2,222,74,96,201,7,208,7259
1750 DATA 4,32,242,75,96,201,5,208,4,3
2,14,76,96,201,13,208,5236
1760 DATA 4,32,208,74,96,201,9,208,4,3
2,38,76,96,201,11,208,5402
1770 DATA 4,32,0,76,96,201,10,208,3,32
62,76,96,165,88,133,4509
1780 DATA 203,165,89,133,204,24,165,20
3,105,200,133,203,165,204,105,0,475
1790 DATA 133,204,24,165,203,105,200,1
33,203,165,204,105,0,133,204,169,1779
1800 DATA 63,160,0,145,203,200,192,19,
208,249,96,173,31,208,201,7,410
1810 DATA 208,1,96,201,3,208,12,24,173
4,6,105,64,141,4,6,536
1820 DATA 76,247,76,201,5,208,19,24,17
3,5,6,105,14,24,201,44,2190
1830 DATA 144,2,169,0,141,5,6,76,244,7
6,239,77,247,76,96,24,6478
1840 DATA 173,4,6,109,5,6,141,6,6,165,
88,133,203,165,89,133,6251
1850 DATA 204,24,165,203,105,210,133,2
03,165,204,105,0,133,204,24,165,14



1860 DATA 203,105,213,133,203,165,204,
105,0,133,204,160,0,174,6,6,5833
1870 DATA 138,145,203,200,200,232,192,
14,208,246,24,165,203,105,40,133,968
1880 DATA 203,165,204,105,0,133,204,16
0,0,138,145,203,200,200,232,192,4314
1890 DATA 14,208,246,173,31,208,201,7,
208,249,76,246,76,165,88,133,1512
1900 DATA 203,165,89,133,204,160,0,204
8,6,240,17,24,165,203,105,7167
1910 DATA 20,133,203,165,204,105,0,133
204,200,76,95,77,24,165,203,9051
1920 DATA 109,7,6,133,203,165,204,105,
0,133,204,96,32,85,77,160,6913
1930 DATA 0,177,203,141,9,6,41,63,141,
11,6,160,0,132,205,172,5369
1940 DATA 244,2,132,206,160,0,204,11,6
240,17,24,165,205,105,8,5371
1950 DATA 133,205,165,206,105,0,133,20
6,200,76,158,77,160,0,177,205,153
1960 DATA 153,14,6,200,192,8,208,246,1
73,4,6,201,0,208,6,173,7236
1970 DATA 196,2,141,193,2,173,4,6,201,
64,208,6,173,197,2,141,6591
1980 DATA 193,2,173,4,6,201,128,208,6,
173,198,2,141,193,2,173,7827
1990 DATA 4,6,201,192,208,6,173,199,24
0,77,235,78,2,141,193,2,8634
2000 DATA 96,174,0,6,142,0,208,202,202
202,142,1,208,169,0,160,9292
2010 DATA 30,153,0,69,153,0,68,200,192
230,208,245,174,1,6,160,9645
2020 DATA 0,185,14,6,157,0,69,185,0,70
157,0,68,200,232,192,7867
2030 DATA 14,208,238,76,98,228,173,132
2,201,0,240,1,96,173,8,6591
2040 DATA 6,24,201,20,208,1,96,144,4,3
2,132,77,96,32,85,77,2582
2050 DATA 160,0,173,9,6,145,203,96,162
16,169,3,157,66,3,169,5081
2060 DATA 4,157,74,3,169,0,157,75,3,76
99,78,75,58,0,169,2459
2070 DATA 96,157,68,3,169,78,157,69,3,
32,86,228,173,252,2,201,8712
2080 DATA 255,208,11,162,16,169,12,157
66,3,32,86,228,96,162,16,4868
2090 DATA 169,7,157,66,3,169,29,157,68
3,169,6,157,69,3,169,3825
2100 DATA 1,157,72,3,169,0,157,73,3,32
86,228,162,16,169,12,4257
2110 DATA 157,66,3,32,86,228,173,29,6,
201,125,208,3,76,2,79,4109
2120 DATA 24,201,49,144,8,24,201,57,17
6,3,76,12,79,201,60,208,5979
2130 DATA 3,76,104,79,201,62,208,3,76,
122,79,201,19,208,3,76,5375
2140 DATA 134,81,201,12,208,3,76,214,8
3,201,67,208,3,76,38,86,5428
2150 DATA 201,80,208,3,76,215,86,201,2
36,78,225,79,32,208,3,76,7943
2160 DATA 95,88,201,66,208,5,160,4,76,
127,88,234,169,255,141,252,3164
2170 DATA 2,96,32,107,74,32,153,76,32,
247,76,96,24,233,48,141,6425
2180 DATA 30,6,173,30,6,10,170,189,31,
6,133,88,232,189,31,6,4734
2190 DATA 133,89,173,48,2,133,176,173,
49,2,133,177,24,165,176,105,7626
2200 DATA 4,133,176,165,177,105,0,133,
177,202,160,0,189,31,6,145,6911
2210 DATA 176,200,232,189,31,6,145,176
32,153,76,32,247,76,32,82,5957
2220 DATA 79,96,173,30,6,10,10,168,
162,0,185,136,224,157,192,9053
2230 DATA 70,200,232,224,8,208,244,96,
206,30,6,173,30,6,201,255,9921
2240 DATA 208,5,169,7,141,30,6,76,18,7
9,238,30,6,173,30,6,1504

2250 DATA 201,8,208,5,169,0,141,30,6,7
6,18,79,165,88,141,59,3579
2260 DATA 6,165,89,141,60,6,169,128,13
3,88,169,150,133,89,173,48,8044
2270 DATA 2,133,184,173,49,2,133,185,2
4,165,184,105,4,133,184,165,8914
2280 DATA 185,105,0,133,185,160,0,165,
88,145,184,165,89,200,145,184,1734
2290 DATA 32,107,74,165,88,133,184,165
89,133,185,24,165,184,105,200,1214
2300 DATA 133,184,165,185,105,0,133,18
5,169,224,141,244,2,76,247,79,1271
2310 DATA 68,58,234,79,229,80,46,80,73
67,155,166,174,161,173,165,874
2320 DATA 159,0,10,169,32,160,0,153,22
6,79,200,192,8,208,248,160,2153
2330 DATA 0,162,0,185,239,79,145,184,2
00,192,8,208,246,160,7,140,1637
2340 DATA 62,6,142,63,6,162,16,169,3,1
57,66,3,169,4,157,74,3709
2350 DATA 3,169,0,157,75,3,76,48,80,75
58,0,169,45,157,68,3006
2360 DATA 3,169,80,157,69,3,32,86,228,
162,16,169,7,157,66,3,4047
2370 DATA 169,61,157,68,3,169,6,157,69
3,169,1,157,72,3,169,4051
2380 DATA 0,157,73,3,32,86,228,162,16,
169,12,157,66,3,32,86,3099
2390 DATA 228,172,62,6,174,63,6,173,61
6,201,126,208,3,76,3,4112
2400 DATA 81,201,155,208,3,76,32,81,24
201,65,144,146,201,91,176,9085
2410 DATA 142,24,233,31,145,184,24,105
32,157,226,79,169,10,200,232,601
2420 DATA 145,184,224,8,240,3,76,19,80
140,62,6,142,63,6,162,3823
2430 DATA 16,169,3,157,66,3,169,4,157,
74,3,169,0,157,75,3,2569
2440 DATA 76,186,80,75,58,0,169,183,15
7,68,3,169,80,157,69,3,4840
2450 DATA 32,86,228,162,16,169,7,157,6
6,3,169,61,157,68,3,169,5342
2460 DATA 6,157,69,3,169,1,157,72,3,16
9,0,157,73,3,32,86,1973
2470 DATA 228,162,230,80,133,81,16,169
12,157,66,3,32,86,228,172,6879
2480 DATA 62,6,174,63,6,173,61,6,201,1
26,240,7,201,155,240,32,9559
2490 DATA 76,157,80,192,7,208,3,76,19,
80,169,32,24,233,31,145,5373
2500 DATA 184,24,105,31,157,226,79,202
136,169,10,145,184,76,19,80,7266
2510 DATA 192,7,208,6,104,104,32,76,81
96,169,0,145,184,169,46,6620
2520 DATA 157,226,79,232,169,80,157,22
6,79,232,169,73,157,226,79,232,4394
2530 DATA 169,67,157,226,79,232,169,15
5,157,226,79,96,173,59,6,133,9405
2540 DATA 88,173,60,6,133,89,173,48,2,
133,184,173,49,2,133,185,7040
2550 DATA 24,165,184,105,4,133,184,165
185,105,0,133,185,160,0,173,9026
2560 DATA 59,6,145,184,200,173,60,6,14
5,184,169,96,141,244,2,32,8255
2570 DATA 153,76,32,247,76,96,134,81,1
29,82,32,140,79,162,16,169,6753
2580 DATA 3,157,66,3,169,8,157,74,3,16
9,0,157,75,3,169,224,6428
2590 DATA 157,68,3,169,79,157,69,3,32,
86,228,16,3,76,76,81,2799
2600 DATA 162,16,169,11,157,66,3,169,0
157,68,3,169,128,157,69,5701
2610 DATA 3,169,255,157,72,3,169,0,157
73,3,32,86,228,162,16,5461
2620 DATA 169,11,157,66,3,169,255,157,
68,3,169,128,157,69,3,169,7409
2630 DATA 255,157,72,3,169,0,157,73,3,
32,86,228,162,16,169,11,5025

2640 DATA 157,66,3,169,254,157,68,3,16
 9,129,157,69,3,169,255,157,434
 2650 DATA 72,3,169,0,157,73,3,32,86,22
 8,162,16,169,11,157,66,5525
 2660 DATA 3,169,253,157,68,3,169,130,1
 57,69,3,169,255,157,72,3,7774
 2670 DATA 169,0,157,73,3,32,86,228,162
 ,16,169,11,157,66,3,169,5558
 2680 DATA 252,157,68,3,169,131,157,69,
 3,169,255,157,72,3,169,0,6663
 2690 DATA 157,73,3,32,86,228,162,16,16
 9,11,157,66,3,169,251,157,9022
 2700 DATA 68,3,169,132,157,69,3,169,25
 5,157,72,3,169,0,157,73,6794
 2710 DATA 3,32,86,228,162,16,169,11,15
 7,66,3,169,250,157,68,3,6774
 2720 DATA 169,133,157,69,3,169,255,157
 ,72,3,169,0,157,73,3,32,4129
 2730 DATA 86,228,162,16,169,11,130,82,
 125,83,157,66,3,169,249,157,9425
 2740 DATA 68,3,169,134,157,69,3,169,25
 5,157,72,3,169,0,157,73,6842
 2750 DATA 3,32,86,228,162,16,169,11,15
 7,66,3,169,248,157,68,3,6788
 2760 DATA 169,135,157,69,3,169,255,157
 ,72,3,169,0,157,73,3,32,4173
 2770 DATA 86,228,162,16,169,11,157,66,
 3,169,247,157,68,3,169,136,8355
 2780 DATA 157,69,3,169,255,157,72,3,16
 9,0,157,73,3,32,86,228,6054
 2790 DATA 162,16,169,11,157,66,3,169,2
 46,157,68,3,169,137,157,69,8231
 2800 DATA 3,169,255,157,72,3,169,0,157
 ,73,3,32,86,228,162,16,5651
 2810 DATA 169,11,157,66,3,169,245,157,
 68,3,169,138,157,69,3,169,7649
 2820 DATA 255,157,72,3,169,0,157,73,3,
 32,86,228,162,16,169,11,5215
 2830 DATA 157,66,3,169,244,157,68,3,16
 9,139,157,69,3,169,255,157,674
 2840 DATA 72,3,169,0,157,73,3,32,86,22
 8,162,16,169,11,157,66,5715
 2850 DATA 3,169,243,157,68,3,169,140,1
 57,69,3,169,255,157,72,3,8014
 2860 DATA 169,0,157,73,3,32,86,228,162
 ,16,169,11,157,66,3,169,5748
 2870 DATA 242,157,68,3,169,141,157,69,
 3,169,255,157,72,3,169,0,6903
 2880 DATA 157,73,3,32,86,228,162,16,16
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 2890 DATA 68,3,169,142,157,69,126,83,1
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 2900 DATA 169,0,157,73,3,32,86,228,162
 ,16,169,11,157,66,3,169,5788
 2910 DATA 240,157,68,3,169,143,157,69,
 3,169,255,157,72,3,169,0,6953
 2920 DATA 157,73,3,32,86,228,162,16,16
 9,11,157,66,3,169,196,157,8427
 2930 DATA 68,3,169,2,157,69,3,169,5,15
 7,72,3,169,0,157,73,4254
 2940 DATA 3,32,86,228,200,83,195,84,16
 2,16,169,12,157,66,3,32,4855
 2950 DATA 86,228,32,76,81,96,32,140,79
 ,162,16,169,3,157,66,3,4027
 2960 DATA 169,4,157,74,3,169,0,157,75,
 3,169,224,157,68,3,169,7183
 2970 DATA 79,157,69,3,32,86,228,16,3,7
 6,76,81,162,16,169,7,3554
 2980 DATA 157,66,3,169,0,157,68,3,169,
 128,157,69,3,169,255,157,9494
 2990 DATA 72,3,169,0,157,73,3,32,86,22
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 3000 DATA 3,169,255,157,68,3,169,128,1
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 3010 DATA 169,0,157,73,3,32,86,228,162
 ,16,169,7,157,66,3,169,5850
 3020 DATA 254,157,68,3,169,129,157,69,
 3,169,255,157,72,3,169,0,6993

3030 DATA 157,73,3,32,86,228,162,16,16
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 3040 DATA 68,3,169,130,157,69,3,169,25
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 3050 DATA 3,32,86,228,162,16,169,7,157
 ,66,3,169,252,157,68,3,7108
 3060 DATA 169,131,157,69,3,169,255,157
 ,72,3,169,0,157,73,3,32,4465
 3070 DATA 86,228,162,16,169,7,157,66,3
 ,169,251,157,68,3,169,132,8611
 3080 DATA 157,69,3,169,255,157,72,3,16
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 3090 DATA 162,16,169,7,157,66,3,169,25
 0,157,68,3,169,133,157,69,8495
 3100 DATA 3,169,255,157,196,84,191,85,
 72,3,169,0,157,73,3,32,4492
 3110 DATA 86,228,162,16,169,7,157,66,3
 ,169,249,157,68,3,169,134,8661
 3120 DATA 157,69,3,169,255,157,72,3,16
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 3130 DATA 162,16,169,7,157,66,3,169,24
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 3140 DATA 3,169,255,157,72,3,169,0,157
 ,73,3,32,86,228,162,16,5991
 3150 DATA 169,7,157,66,3,169,247,157,6
 8,3,169,136,157,69,3,169,7971
 3160 DATA 255,157,72,3,169,0,157,73,3,
 32,86,228,162,16,169,7,5491
 3170 DATA 157,66,3,169,246,157,68,3,16
 9,137,157,69,3,169,255,157,1004
 3180 DATA 72,3,169,0,157,73,3,32,86,22
 8,162,16,169,7,157,66,5999
 3190 DATA 3,169,245,157,68,3,169,138,1
 57,69,3,169,255,157,72,3,8344
 3200 DATA 169,0,157,73,3,32,86,228,162
 ,16,169,7,157,66,3,169,6040
 3210 DATA 244,157,68,3,169,139,157,69,
 3,169,255,157,72,3,169,0,7233
 3220 DATA 157,73,3,32,86,228,162,16,16
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 3230 DATA 68,3,169,140,157,69,3,169,25
 5,157,72,3,169,0,157,73,7356
 3240 DATA 3,32,86,228,162,16,169,7,157
 ,66,3,169,242,157,68,3,7168
 3250 DATA 169,141,157,69,3,169,255,157
 ,72,3,169,0,157,73,3,32,4675
 3260 DATA 86,228,162,16,192,85,23,86,1
 69,7,157,66,3,169,241,157,9313
 3270 DATA 68,3,169,142,157,69,3,169,25
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 3280 DATA 3,32,86,228,162,16,169,7,157
 ,66,3,169,240,157,68,3,7182
 3290 DATA 169,143,157,69,3,169,255,157
 ,72,3,169,0,157,73,3,32,4719
 3300 DATA 86,228,162,16,169,7,157,66,3
 ,169,196,157,68,3,169,2,6156
 3310 DATA 157,69,3,169,5,157,72,3,169,
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 3320 DATA 24,86,19,87,162,16,169,12,15
 7,66,3,32,86,228,32,76,4602
 3330 DATA 81,96,32,173,87,32,86,76,173
 ,132,2,201,0,240,3,76,6160
 3340 DATA 41,86,173,8,6,201,20,176,236
 ,32,223,87,173,7,6,141,7522
 3350 DATA 52,6,173,8,6,141,53,6,173,13
 2,2,201,0,240,249,32,8178
 3360 DATA 86,76,173,132,2,201,0,240,3,
 76,83,86,24,173,8,6,3463
 3370 DATA 201,20,176,235,173,7,6,205,5
 2,6,144,227,173,8,6,205,8235
 3380 DATA 53,6,144,219,32,223,87,173,7
 ,6,141,54,6,173,8,6,3282
 3390 DATA 141,55,6,165,88,133,180,165,
 89,133,181,165,182,133,178,165,3777
 3400 DATA 183,133,179,160,0,177,180,14
 5,178,200,192,200,208,247,24,165,5784
 3410 DATA 178,105,200,133,178,165,179,
 105,0,133,179,24,165,180,105,200,1930

3420 DATA 133,180,165,181,105,0,133,18
1,160,0,177,180,145,178,200,192,4032
3430 DATA 200,208,247,169,1,141,58,6,1
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3440 DATA 153,76,96,173,58,6,201,1,240
1,96,32,193,87,24,173,6931
3450 DATA 54,6,237,52,6,141,57,6,24,17
3,55,6,237,53,6,141,4550
3460 DATA 56,6,32,86,76,173,132,2,201,
0,240,3,76,246,86,173,9301
3470 DATA 8,6,201,20,176,236,24,173,57
6,201,255,240,12,24,109,9257
3480 DATA 20,87,15,88,7,6,24,201,19,14
4,3,76,246,86,24,173,6004
3490 DATA 56,6,201,255,240,12,24,109,8
6,24,201,19,144,3,76,3825
3500 DATA 246,86,32,223,87,32,85,77,16
5,203,133,180,165,204,133,181,3774
3510 DATA 165,182,133,178,165,183,133,
179,172,53,6,192,0,240,18,24,7898
3520 DATA 165,178,105,20,133,178,165,1
79,105,0,133,179,136,192,0,208,1096
3530 DATA 238,24,165,178,109,52,6,133,
178,165,179,105,0,133,179,174,798
3540 DATA 56,6,232,172,57,6,200,177,17
8,145,180,136,192,255,208,247,7931
3550 DATA 24,165,178,105,20,133,178,16
5,179,105,0,133,179,24,165,180,597
3560 DATA 105,20,133,180,165,181,105,0
1,133,181,202,224,255,240,3,76,3323
3570 DATA 115,87,173,132,2,201,0,240,2
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3580 DATA 160,0,169,248,145,203,200,16
9,249,145,203,200,169,250,145,203,9378
3590 DATA 96,32,153,76,160,0,169,187,1
45,203,200,169,188,145,203,200,6274
3600 DATA 169,189,145,203,200,169,186,
145,203,200,169,190,145,203,96,169,670

7
3610 DATA 0,141,8,210,169,3,141,15,210
1,69,50,141,0,210,169,170,743
3620 DATA 141,1,210,162,6,32,185,74,16
9,0,141,0,210,141,1,210,8301
3630 DATA 96,76,28,88,34,114,233,163,4
3,119,239,178,43,115,162,185,2004
3640 DATA 16,88,227,88,154,0,227,232,2
42,233,243,0,249,239,242,235,234
3650 DATA 165,88,133,203,165,89,133,20
4,24,165,203,105,165,133,203,165,4175
3660 DATA 204,105,0,133,204,160,0,185,
4,88,145,203,200,192,10,208,1779
3670 DATA 246,24,165,203,105,118,133,2
03,165,204,105,0,133,204,160,0,724
3680 DATA 185,14,88,145,203,200,192,14
2,208,246,162,240,32,185,74,32,2030
3690 DATA 185,74,96,173,4,6,201,0,208,
5,160,0,76,127,88,201,7450
3700 DATA 64,208,5,160,1,76,127,88,201
1,28,208,5,160,2,76,127,7606
3710 DATA 88,160,3,32,223,87,169,0,141
29,208,162,10,32,185,74,7403
3720 DATA 173,120,2,201,14,208,11,190,
196,2,232,138,153,196,2,76,9829
3730 DATA 202,88,201,13,208,11,190,196
2,202,138,153,196,2,76,202,1107
3740 DATA 88,201,7,208,12,24,185,196,2
1,105,16,153,196,2,76,202,8178
3750 DATA 88,201,11,208,9,24,185,196,2
233,15,153,196,2,173,132,9789
3760 DATA 2,201,0,240,3,76,135,88,32,2
23,87,173,132,2,201,0,7554
3770 DATA 240,249,169,3,141,29,208,96,
182,0,183,0,0,146,12,6,4101
3780 DATA 13,6,245,77,224,2,225,2,0,74
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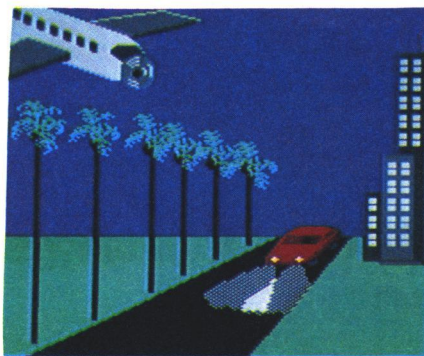
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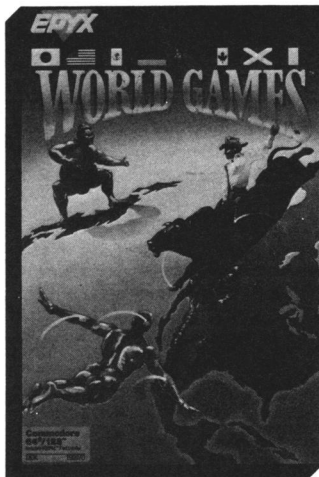
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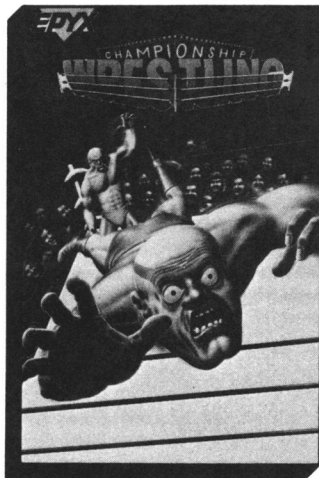
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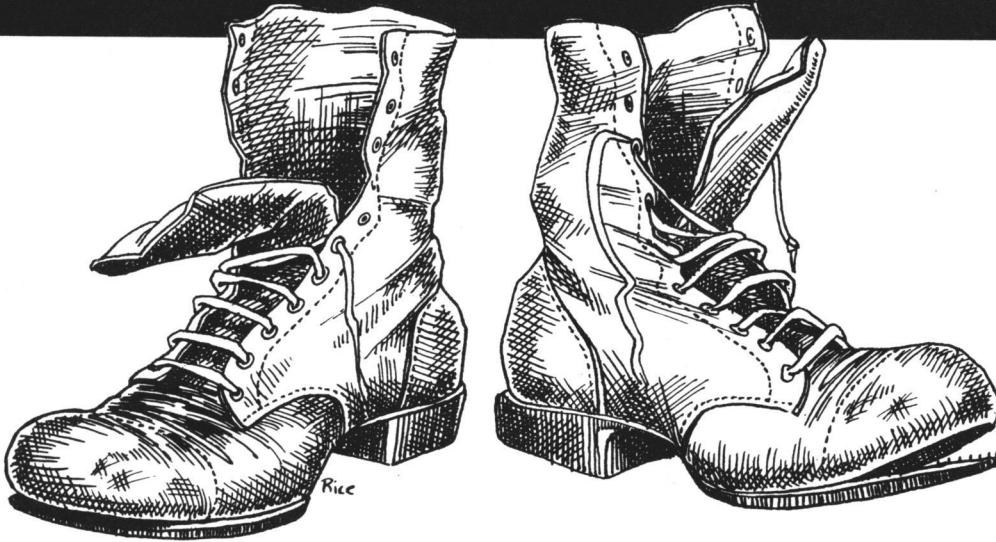
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Boot Camp

Reading the joystick and smoothing out player movement via vertical blanks.

by Karl E. Wieggers

In part 1 of our discussion of using player/missile graphics (PMG) in assembly language (issue 48, last month), we saw how to allocate memory for PMG, design player shapes and make them move around under program control. One limitation of our program: the player movement was somewhat jerky and erratic. Another was that we didn't yet have any way for a user to move a player around the screen via a joystick or other input device.

This lesson provides a solution to both problems. We'll write a vertical blank interrupt (VBI) routine to read the status of the joystick and move a player accordingly. Further, by making all player movement take place in the vertical blanking period, the unsightly flickers and jerks will disappear. And our evolving "Attack of the Suicidal Road-Racing Aliens" moves forward yet another notch in sophistication.

The assembly statements in the accompanying listing are designed to be merged with the listing from our last month's column, to make a complete example. Follow this procedure. First, boot up your assembler and retrieve last month's program. Then, delete Lines 2670-3120 and Lines 4160-4490 (with the now-defunct routines for moving the alien and car under program control). Finally, enter the statements from this month's listing with the line numbers shown, and store the whole thing as today's example. Run this composite program at address \$5000. We'll conclude the PMG discussion next month, by adding further to this composite listing.

I'm including a bonus BASIC program that incorporates a VBI routine to move a player via joystick, in case

you ever write another BASIC program. First, though, the requisite background material.

Vertical blank interrupts.

Video display devices like TV sets generate images on a screen with one or more electron guns. These guns paint a picture by scanning a large number of horizontal lines, one after the other. The normal Atari video display contains a vertical stack of 192 of these scan lines.

The scanning process begins in the upper left corner of the screen and concludes when the guns are aimed at the lower right corner. Then there's a short delay, while the guns point back at the upper left corner—to begin the entire scanning process again. This sequence of electron gun scanning to create a full screen display takes place sixty times per second.

During every $\frac{1}{60}$ second, while the electron beams are returning to the top of the screen, they're turned off. This very short period is called the "vertical blank interval." We don't notice the vertical blanking process, because our eyes and brain can't react to something that happens so quickly.

But a few milliseconds is a long time to the computer. Your Atari uses that slack time to perform some house-keeping chores, like updating the hardware registers from their shadow registers, as we discussed a couple months back.

The Atari designers thoughtfully provided the option for us to execute our own machine language program during the vertical blank interval. The act of getting the computer's attention is called a "vertical blank interrupt," or VBI, and the machine language routine we execute is called a "VBI routine."



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Lots of tasks lend themselves to processing in a VBI. Anything you'd like done at a regular interval is suitable. If sixty times per second is too frequent, use a counter so the task in question is only executed every so many vertical blank intervals. (If sixty times per second is too slow, you're out of luck.)

Consider our present goal: to read the deflection of a joystick and adjust the position of a player based on that deflection. If we move the player 1 pixel per vertical blank interval, it will take him about 3 seconds to move across the screen. You can get faster movement by shifting the player more than 1 pixel each time.

Not only that, but by performing all this movement while the TV is essentially off, there's no flicker while the player moves. This kind of "behind the scenes" movement is similar to the curtain's dropping between acts for a change of scenery in a stage play. When the curtain is raised again, the set might be totally different, yet we saw no activity associated with the change.

A VBI routine can use up to 3000 (or even more) machine cycles to execute—with no adverse effects. This is more than enough to solve our present problem. Let's summarize what our VBI is to accomplish:

- Move the car to the right 1 or more pixels (depending on the speed desired).

- Read a joystick plugged into port 1 and check for deflection to the right or left.

- Shift the alien (let's call him Bonzo) 1 pixel in the direction the joystick is deflected.

- Keep track of Bonzo's horizontal position and make sure he doesn't move outside our specified boundaries.

- Check the joystick for deflection up or down.

- Shift Bonzo 1 pixel (scan line) in the direction the joystick is deflected.

- Keep track of his vertical position and make sure he doesn't move out of bounds.

Of course, the joystick could be at a diagonal, in which case, movement in both horizontal and vertical directions is required. If the joystick is centered, Bonzo stays put.

Deciphering the joystick.

You've probably used the STICK function in Atari BASIC to determine which way a joystick is pushed. The usual procedure is to follow the joystick read operation with a series of IF statements, to perform some function based on the value returned by the STICK function. The decimal numbers returned by STICK certainly don't reveal any pattern, making it difficult to discern the relationship between deflection direction and the numeric decimal equivalent. However, if the numeric value of each joystick deflection direction is expressed in binary terms, a pattern emerges.

Figure 1 labels the nine stick deflection directions with their binary values. Notice that the center position, corresponding to no stick movement, returns a binary value of 1111. The "up" position has a value of 1110. The 0 in the least significant bit (bit 0) thus indicates that the stick is pressed upward. Upper-left and upper-right diagonal deflections also have a 0 in bit 0, as well as in other positions.

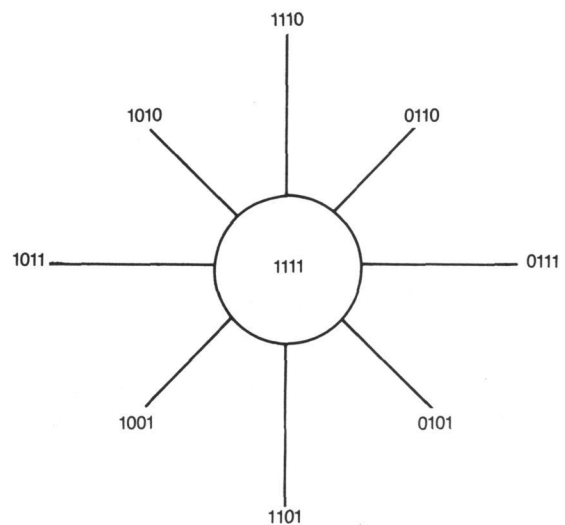


Figure 1. — Binary values of joystick.

Turning to downward stick movement, notice that all three such positions contain a 0 in bit 1. The three possible stick positions of left deflection each have a 0 in bit 2, while bit 3 is the magic 1, for right deflection. Let's see what to do with this precious information.

Consider how we can tell if the joystick is pushed to the right. First, we need to read joystick 0 by retrieving the value stored at address \$0278 (STICK0; joysticks 1-3 are read in \$0279-\$027B). Figure 1 says that right deflection results in bit 3 of this byte being set to 0. So we just need to see if the contents of STICK0 have bit 3 set (meaning the stick is not pushed to the right) or unset (meaning that it is).

The logical operator AND provides a convenient way to test for a specific bit pattern. The AND operation simply compares the bit patterns of 2 bytes. If the bits in corresponding positions of each byte are both set to 1, then the result will have a 1 in that same bit position. Otherwise, the result has a 0 in that bit position.

If we compare the value from STICK0 with a byte that has only bit 3 set, then the decimal value of the resulting byte will either be 0 (if bit 3 of STICK0 is 0) or 8 (if bit 3 of STICK0 is 1). In other words, if the result from the AND operation is 0, then the joystick is indeed pushed to the right. If the result is 8, then it isn't. Here are two examples:

Example 1.

| | | |
|--------------------|---|----------------------|
| Stick bit pattern | = | 00001110 (decimal 6) |
| AND bit pattern | = | 00001000 (decimal 8) |
| Result bit pattern | = | 00000000 (decimal 0) |

The stick is pushed to the upper right, and the result of the AND operation is 0.

Example 2.

| | | |
|--------------------|---|-----------------------|
| Stick bit pattern | = | 00001101 (decimal 13) |
| AND bit pattern | = | 00001000 (decimal 8) |
| Result bit pattern | = | 00001000 (decimal 8) |

The result of decimal 8 tells us that the stick was not pushed to the right. In fact, it was pushed down.

Boot Camp *continued*

So our assembly code to examine the joystick must test sequentially for deflection in the four primary directions, by appropriate AND operations.

Assembly listing.

Please turn your attention to the assembly listing. We have a few new equates defined in Lines 190-550. One is ATTRACT (\$4D). Storing any number in this location prevents the Atari's attract mode of screen color shifting from taking place, as it normally does nine minutes after the last key was pressed. This is a good idea in programs that don't involve keyboard input. I described the STICK0 location earlier. SETVBV and XITVBV are vectors to jump through (with a JSR instruction) when turning on a VBI (SETVBV) or exiting the VBI routine itself (XITVBV). Also, we're now placing some horizontal restrictions on Bonzo's movement, with two of my own variables, LEFT and RIGHT.

You can store the VBI routine anywhere in memory you like. Since we have player/missile graphics taking up the block from \$3000-\$37FF and the main program starts at \$5000, I stashed the VBI starting at \$4000. This is obviously not the most efficient use of RAM, but this program won't be large enough to cause a problem. If you really get tight for memory, remember the unused portion of the

dedicated PMG region. A VBI routine might well fit in that block.

The VBI code begins at Line 700. First, turn off attract mode (Lines 710-720). Lines 730-760 move the car 2 pixels to the right. Change the number of INC instructions, to make it move slower or faster. Lines 820-870 set up a 0 page address (PLYRSTRT), so we can move Bonzo vertically using indirect indexed addressing.

Lines 940-960 begin the joystick checking, by looking for deflection to the right. If not, as indicated by a non-zero result from the AND operation, go look for deflection to the left (Line 970). If the stick is pushed to the right, see if Bonzo is at our designated right boundary (Lines 980-990). If so, don't move him, but go check for upward deflection (Line 1000). If Bonzo's not at the outer limits, move him 1 pixel to the right (Lines 1010-1030) and head for the STICKUP routine (unconditional branch in Lines 1170-1180).

The procedure to handle stick deflection to the left (Lines 1190-1280) is equivalent to the STICKRIGHT routine. Notice that the AND instruction now has an operand of 4, to examine bit 2.

The STICKUP routine beginning at Line 1420 checks for stick deflection upward. If no, then look for downward

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deflection. If yes, check for Bonzo trying to escape off the top of our playing area. Leave the VBI if this is found to be the case, by going to the label VBIEXIT and jumping through the XITVBV vector (Line 1830).

Bonzo's vertical movement is handled by a procedure identical to the approach we used last month in the yo-yo example, so I won't elaborate on it here. Finally, the procedure for handling the case where the joystick is pressed in the downward direction (Lines 1640-1810) is just the converse of the up direction situation. Remember, moving a player image to a location higher in memory makes it move down on the TV screen.

Lines 2500-2530 set the horizontal boundaries for Bonzo's movement. Feel free to change these, if you like. Lines 2670-2680 set the stage for the vertical player movement we'll encounter when the VBI routine is executed.

Having all this VBI code is fine, but how do we activate it? Please see Lines 2980-3010. Load the 6502's Y-register with the low byte of the VBI starting address; load the X-register with the high byte; and load the accumulator with the decimal value 7. JSR through the SETVBV vector, and the VBI routine begins executing immediately. Line 3020 simply loops forever, or until you press RESET, whichever comes first.

There are actually two flavors of VBI routine, "deferred" and "immediate." The 7 in the accumulator in Line 3000 tells the operating system that we wish to use a deferred VBI. This makes sure our routine doesn't interfere with the system vertical blank procedures that must be performed. I always use the deferred VBI, and haven't had any problems yet.

Now you can move Bonzo around the screen with the joystick, at least until he bumps into one of our boundaries. The car continues to zip by at a regular pace. Notice that the animation of both car and Bonzo is perfectly smooth and flicker-free, thanks to the VBI.

It would be nice if something happened when Bonzo and the car shared the same space, wouldn't it? And, hey, maybe the game would be more fun if there were some walls for Bonzo to either hide behind or have to maneuver around. If you come back a mere thirty days from now, we'll add those features.

The crux of the matter is to check for collisions among players, and between players and playfield objects—then come up with something interesting to do about it. I'll also show you how you can change Bonzo's shape and color, depending on whether he's facing to the right, to the left, or dead ahead.

The BASIC bonus.

As advertised, the BASIC listing in this column is a sample program that contains a VBI to read joystick 1 and move player 0 accordingly. The VBI routine itself is found in the DATA statements in Lines 110-310. You can include this directly in your own programs, if you pay attention to the other POKes needed to make it all work correctly.

This program creates a player who resembles an orange hot-air balloon, using double-line resolution (hence the POKE 559,46 in Line 440). It might be interesting to study the comments in this BASIC listing, comparing its player/

missile functions with those we've been doing in assembly language. Any time you see this many POKE and DATA statements in a BASIC program, assembly is likely to be a viable alternative.

There's a small chance that your next BASIC program won't require an animated orange balloon. Here are what some of the values in the DATA statements mean, so you can change them for your own purposes.

Line 140 — the 200 is the right edge of the player area.


Line 180 — the 50 is the left edge.

Line 210 — the 14 is the top edge.

Line 230 — the 18 is the number of bytes in the player image plus 3.

Line 260 — the 100 is the bottom edge of the player area (remember, this is double-line resolution).

Line 270 — the 17 is the number of bytes in the player image plus 2.

See you next time, when we wrap up this three-volume player/missile graphics extravaganza. 

Listing 1. Assembly listing.

```
0100 ;Vertical Blank Interrupt Example
0110 ;
0120 ;by Karl E. Wiegas
0130 ;
0190 ATRACT = $4D
0220 STICK0 = $0278
0300 SETVBV = $E45C
0310 XITVBV = $E462
0540 LEFT = $063B
0550 RIGHT = $063C
0630 ;
0640 ;*****
0650 ;VERTICAL BLANK INTERRUPT ROUTINE
0660 ;*****
0670 ;
0680 ;    *= $4000
0690 ;
0700 VBI
0710     LDA #0           ;turn off
0720     STA ATRACT       ;attract mode
0730     INC XPOS0+1      ;move car 2
0740     INC XPOS0+1      ;pixels to the
0750     LDA XPOS0+1      ;right
0760     STA HPOS0+1
0820     CLC
0830     LDA #$04
0840     ADC #PMG/256
0850     STA PLRSTRT+1
0860     LDA YPOS0
0870     STA PLRSTRT
0940 STICKRIGHT
0950     LDA STICK0       ;stick reading
0960     AND #8           ;pointing right?
0970     BNE STICKLEFT    ;no,check left
0980     LDA XPOS0        ;yes,get X-pos
0990     CMP RIGHT       ;at right edge?
1000     BEQ STICKUP      ;yes,check for up
1010     INC XPOS0        ;no,
1020     LDA XPOS0        ;move one pixel
1030     STA HPOS0        ;to the right
1170     CLC             ;go check for
1180     BCC STICKUP      ;stick up
1190 STICKLEFT
1200     LDA STICK0       ;stick reading
1210     AND #4           ;pointing left?
1220     BNE STICKUP      ;no,check for up
1230     LDA XPOS0        ;yes
1240     CMP LEFT         ;at left edge?
```

Boot Camp *continued*

```

1250      BEQ STICKUP ;yes,check for up
1260      DEC XPOSP0 ;no, move him
1270      LDA XPOSP0 ;one pixel to
1280      STA HPOSP0 ;the left
1420 STICKUP
1430      LDA STICK0 ;stick reading
1440      AND #1 ;pointing up?
1450      BNE STICKDOWN ;no,check down
1460      LDA YPOSP0 ;yes
1470      CMP TOP ;at top edge?
1480      BEQ VBIEXIT ;yes, leave VBI
1490      STA PLYRSTRT ;no, use Y as
1500      INC NBYTES ;offset pointer
1510      LDY #1 ;to move alien
1520 LOOPUP
1530      LDA (PLYRSTRT),Y ;take a byte
1540      DEY ;shift to 1
1550      STA (PLYRSTRT),Y ;byte lower
1560      INY ;in RAM
1570      INY ;point to next
1580      CPY NBYTES ;done yet?
1590      BNE LOOPUP ;no, go again
1600      DEC YPOSP0 ;yes, set new
1610      DEC NBYTES ;Y-position
1620      CLC
1630      BCC VBIEXIT ;leave VBI
1640 STICKDOWN
1650      LDA STICK0 ;stick reading
1660      AND #2 ;pointing down?
1670      BNE VBIEXIT ;no, leave VBI
1680      LDA YPOSP0 ;yes
1690      CMP BOTTOM ;at bottom edge?
1700      BEQ VBIEXIT ;yes, leave VBI
1710      STA PLYRSTRT ;no, move alien
1720      LDY NBYTES ;down just like
1730      DEY ;we moved him
1740 LOOPDOWN ; up, a byte
1750      LDA (PLYRSTRT),Y ;at a time
1760      INY
1770      STA (PLYRSTRT),Y
1780      DEY
1790      DEY
1800      BPL LOOPDOWN
1810      INC YPOSP0 ;set new Y-pos
1820 VBIEXIT
1830      JMP HITVBV ;leave VBI
1840 ;
2500      LDA #191 ;right edge of
2510      STA RIGHT ;alien area.
2520      LDA #56 ;left edge of
2530      STA LEFT ;alien area.
2670      LDA ALIEN ;set up for
2680      STA NBYTES ;vertical motion
2950 ;
2960 ;turn on VBI routine
2970 ;
2980      LDY #VBI&255
2990      LDX #VBI/256
3000      LDA #7
3010      JSR SETVBV
3020 END JMP END ;loop forever

```

```

GN 130 DATA 2,41,8,208,16,165
HX 140 DATA 203,201,200,240,30,230
DJ 150 DATA 203,165,203,141,0,208
SN 160 DATA 24,144,20,173,120,2
AJ 170 DATA 41,4,208,13,165,203
HM 180 DATA 201,50,240,7,198,203
JC 190 DATA 165,203,141,0,208,173
TS 200 DATA 120,2,41,1,208,24
GC 210 DATA 165,204,201,14,240,46
OA 220 DATA 160,1,177,204,136,145
PN 230 DATA 204,200,200,192,18,208
TK 240 DATA 245,198,204,24,144,28
UC 250 DATA 173,120,2,41,2,208
BX 260 DATA 21,165,204,201,100,240
GY 270 DATA 15,160,17,177,204,200
LK 280 DATA 145,204,136,136,192,255
AI 290 DATA 208,245,230,204,76,98
DW 300 DATA 228,104,160,98,162,228
YM 310 DATA 169,7,76,92,228
OX 320 REM Change 3rd number in VBI to 10
      w byte of
RH 330 REM starting location for VBI rout
      ine in RAM
PQ 340 POKE PMBASE+130,10+128
QW 350 REM Change 5th number to
OT 360 REM corresponding high byte
QQ 370 POKE PMBASE+132,RAMTOP
ZU 380 REM Protect PMG area from accident
      al destruction
SD 390 POKE 106,RAMTOP
OA 400 REM Tell computer where to find pl
      ayer data
ML 410 POKE 54279,RAMTOP
UF 420 GRAPHIC5 3:REM Set up a graphics s
      creen
YX 430 POKE 704,56:REM Set player 0 color
      to orange
NY 440 POKE 559,46:REM Enable PMG
US 450 POKE 53277,3:REM Turn on players a
      nd missiles
RL 460 REM Clear out player 0 area
IQ 470 FOR I=PMBASE+512 TO PMBASE+640:POK
      E I,0:NEXT I
CT 480 REM Initialize player 0 X-position
LV 490 X=100:POKE 203,X:POKE 53248,X
DH 500 REM Initialize player 0 Y-position
DC 510 Y=50:POKE 204,Y:POKE 205,RAMTOP+2
RS 520 REM Read in player 0 bit image dat
      a
RQ 530 FOR I=1 TO 15:READ A:POKE PMBASE+5
      12+I+Y,A:NEXT I
MD 540 DATA 60,126,255,255,255
WM 550 DATA 255,189,129,66,66
SS 560 DATA 36,36,36,24,24
TA 570 REM Turn on VBI routine by machine
      language call
SC 580 A=USR(PMBASE+128)
IZ 590 REM Turn off VBI routine with this
YS 600 REM machine language call
MI 610 REM A=USR(PMBASE+243)
NZ 620 END

```

Listing 2.
BASIC listing.

```

NZ 10 REM ..... VBI Routine for reading
OZ 20 REM ..... joystick 0 and moving
UD 30 REM ..... player 0
XI 60 REM Reserve 3K of RAM for PMG
NN 70 RAMTOP=PEEK(106)-12
HW 80 PMBASE=RAMTOP*256
QL 90 REM Read VBI data values and POKE i
      nto safe place in RAM
CH 100 FOR I=0 TO 124:READ A:POKE PMBASE+
      128+I,A:NEXT I
IK 110 DATA 104,160,10,162,6,169
ID 120 DATA 7,76,92,228,173,120

```

The two-letter checksum code preceding the line numbers here is *not* a part of the BASIC program. For further information, see the *BASIC Editor II*, in issue 47.



How lucky
(and how smart)
do you feel? Have a go at

Fortune-Wheel

by Robert A. Beatty

You can feel the sweat beading on your forehead. The bright TV lights beaming down make you feel as though you're part of a poorly written detective novel. The air is so thick you have to make a conscious effort to suck each breath into your lungs.

And the pressure. The pressure of hundreds of eyes staring at the back of your head. You're the lucky one. You're the one who has the chance to walk out of the studio richer by over \$25,000.00. But that chance is fading with every passing second.

This answer seems more difficult than the ones before. Oh sure, half the audience has already guessed the answer, and the other half is probably closer to it than you'll ever get. Into your head pops the image of people sitting in their living rooms screaming the answer at you in vain (as you've done to others, before). Out of the five consonants and one vowel that you picked, only four of the ten letters appeared. Your head feels like it's spinning, when... BUZZZZZZZZ...

A sense of humiliation, along with a sense of relief, sweeps over you. The room feels ten degrees cooler. With the echo of the buzzer still ringing in your ears, the answer appears. Your eyes burn and you bite your lip, when you realize the answer is just as obvious as those you'd guessed from your living room. The \$25,000.00—and all the luxuries it would buy—are gone. History. You had your big chance. And you blew it.

It really is easier when it's not for real.

Welcome to **Fortune-Wheel**, a two-player game written in Atari BASIC, that gives you the chance to demonstrate your game-show savvy. While it's difficult to simulate all

the emotions you would feel when playing for the Big Money, this game will let you test your abilities under the pressure of the clock.

In **Fortune-Wheel**, you are presented with a number of dashes, representing the letters of a title, person, place, thing or phrase. The category is displayed below these dashes. In the first phase of the game, players begin their turn by pressing S (spin), B (buy vowel) or G (guess). If S is pressed, you'll see a series of numbers appear in the spin block and hear the clicking of the wheel. The number appearing in the spin block when the wheel stops is the dollar amount you'll be awarded each time your guessed letter appears in the answer.

To guess a letter, just press the desired key. The letter you choose will first be removed from the alphabet at the bottom of the screen, then, if correct, will appear in the answer. Your money will be displayed in the appropriate block. If you wish to buy a vowel, press B. Vowels cost \$250.00, and you must have at least this much credit. Be careful not to press a letter already selected, whether a consonant or vowel. If you do, your turn will end.

If you think you know the answer, press G. A cursor will appear below the dashes, and you can enter your guess. Punctuation is not used in any clues or answers. If you correctly guess the answer, the money you've won will be put into your account. Your account total will be displayed between rounds, or by pressing ? prior to spinning. If, during your spin, the words *FREE*, *TURN* or *BANK* appear, you'll either earn a free spin, lose your turn, or go bankrupt. The game's first phase consists of three rounds played in this manner.

In the second phase of play, the player who had the most money after the first phase will face the Big Board. Presented with a clue, you'll start by selecting five consonants.



Fortune-Wheel *continued*

then a single vowel. The correctly guessed letters will appear, and you'll have thirty seconds to guess the answer. If correct, an additional \$25,000.00 will be added to your account.


Entering Fortune-Wheel.

Type in Listing 1, using **BASIC Editor II** (issue 47), and save it under the filename FORDAT.BAS. This is the main body of **Fortune-Wheel**. You'll notice that there's no game data included in Listing 1. Listing 2 is DGEN.BAS, an editor which will enable you to enter your own data and categories. Once you've entered and saved a copy of both, run DGEN.BAS.

You'll first be prompted for a new filename. Enter FORDATA and press RETURN. The default categories will be displayed, and you'll be asked if you want to change them. Type N at this time. Now, you'll begin entering the clues from Listing 3. When you press RETURN, the screen will go blank for a moment, and you'll be prompted for the next clue. To change categories, press CTRL-C; to save or quit, press CTRL-S.

Once you've entered all the clues from Listing 3, save the data. After the save is complete, you'll be asked if you want to continue. Enter "FORDATA.DAT". Save the combined programs as FORTUNE.BAS. Keep this on the same disk as DGEN. Whenever you run **Fortune-Wheel**, you'll be asked if you want to play, edit or load a different data file. Pressing P will take you directly to the game. Pressing E will load DGEN, and pressing L will enter a new data file previously edited, overwriting the default data and categories for this session. Option L will not be displayed if there are no data files on the disk.

DGEN is made possible using the "dynamic keyboard" function of the Atari computer. The character luminance is POKEd to match the background luminance during the dynamic keyboard action, in order to maintain a smooth appearance.

Credit goes to Richard J. Kalagher, whose **Multicolor Screen Generator** (**ANALOG Computing**, issue 12) is the source of the colorful screen display. It really helps to whisk away those graphics 0 blues! 

Robert A. Beatty has made the U.S. Navy his career for nine years. He's now Nuclear Coordinator in Columbus, Ohio. Having bought his first Atari while in Okinawa, he's been programming in BASIC for three years. He can be reached on CompuServe, user #70317,3045.

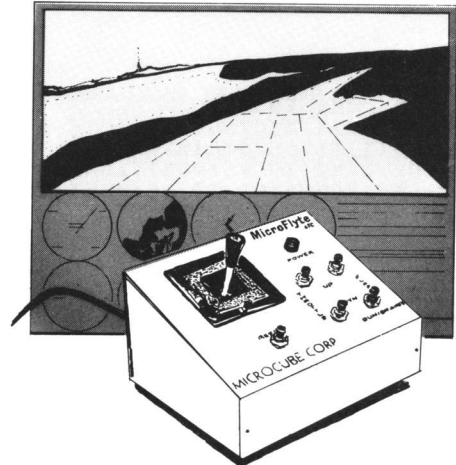
The two-letter checksum code preceding the line numbers here is *not* a part of the BASIC program. For further information, see the **BASIC Editor II**, in issue 47.

Listing 1.
BASIC listing.

```
EH 0 REM *****
PI 1 REM *          FORTUNE-WHEEL          *
SZ 2 REM *
YE 3 REM *      A game show simulation      *
TB 4 REM *
LT 5 REM *          by                      *
```

```
TD 6 REM *
RC 7 REM *          Robert Beatty          *
AS 8 REM *          [70317,3045]          *
EQ 9 REM *****
UF 10 GRAPHICS 0:POKE 710,0:POKE 752,1:PO
KE 16,64:POKE 53774,64:GOSUB 29000
QD 100 REM SET UP SCREEN
XP 110 POSITION K10,K1:?" Fortune-Wheel
DK 120 POSITION K4,K6:?"Player 1 Spi
n Player 2"
EC 121 POSITION K4,K7:?"
VA 122 POSITION K4,K8:?"|$ |
FZ 123 POSITION K4,K9:?"
PA 125 FOR N=K1 TO K2:TPM(N)=K0:PM(N)=K0:
F(N)=K0:NEXT N
FG 130 PLR=K2
YI 200 REM GET NEW WORD
YT 202 ROUND=ROUND+K1:POSITION K6,22:?" A$
QK 205 IF ROUND>K3 THEN POSITION K10,K3:?"
Tie Breaker!":GOTO 215
ZG 210 POSITION 15,K3:?"Round ";ROUND
JU 215 FOR N=K1 TO 26:U(N)=K0:NEXT N
KY 220 GOSUB GDAT
YC 400 REM BEGIN TURN
JX 405 PLR=K3-PLR:FOR N=K1 TO PLR:GOSUB B
EEP:NEXT N
DI 410 GOSUB MD:POSITION K5,K10:?" "
POSITION 27,K10:?" "
DX 412 IF F(K1)>K0 THEN POSITION K6,K10:?"
FREE"
DF 414 IF F(K2)>K0 THEN POSITION 28,K10:?"
FREE"
KC 420 POSITION K3,K18:?"Player ";PLR;"
Spin, Buy vowel or Guess?"
XD 425 POKE 764,255
NO 430 OPEN #K1,K4,K0,"K:":GET #K1,A:CLOS
E #K1
HA 440 IF A=71 THEN GOSUB GUESS:GOTO 400
WP 445 IF A=66 AND PM(PLR)>249 AND VG(K5
THEN V=K1:GOSUB CLL:POSITION K9,K18:?"
Player ";PLR;"Select Vowel":GOTO 620
FI 450 IF A=63 THEN GOSUB TMD:GOSUB DEL:G
OTO 410
RU 455 IF A<>83 THEN GOSUB BUZZ:GOTO 430
ZP 460 GOSUB CLL
MY 500 REM SPIN
AR 510 Z=K1:N=INT(RND(K0)*20)+K10
IN 520 FOR I=K1 TO N:POKE 53279,K0
XQ 530 Z=Z+K4:IF Z>93 THEN Z=K1
ID 540 MNY$=5P$(Z,Z+K3):POSITION 17,K8:?"
MNY$
JK 550 FOR D=K1 TO (I*K2):NEXT D
GH 560 NEXT I
KU 565 IF MNY$<>"FREE" THEN 570
FL 567 F(PLR)=F(PLR)+K1:GOSUB CLL:POSITIO
N K6,K18:?"Player ";PLR;" wins a FREE
spin!":GOSUB DEL:GOTO 410
OI 570 IF MNY$<>"TURN" THEN 575
FU 572 GOSUB CLL:POSITION K8,K18:?"Playe
r ";PLR;" loses a turn!":GOSUB AW:GOSU
B DEL:GOTO 776
KF 575 IF MNY$<>"BANK" THEN 590
SN 577 PM(PLR)=K0:GOSUB CLL:POSITION K8,K
18:?"Player ";PLR;" goes bankrupt!":G
OSUB AW:GOSUB DEL:GOSUB MD:GOTO 776
CZ 590 MNY=VAL(MNY$(K2,K4))
ZD 600 REM GET LETTER
NF 610 GOSUB CLL:POSITION K8,K18:?"Playe
r ";PLR;"Select Letter"
XD 615 POKE 764,255
NO 620 OPEN #K1,K4,K0,"K:":GET #K1,A:CLOS
E #K1
SQ 625 IF V=K0 AND (A=65 OR A=69 OR A=73
OR A=79 OR A=85) THEN GOSUB BUZZ:GOTO
620
```

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```

PI 627 IF V=K1 AND A<>65 AND A<>69 AND A<
>73 AND A<>79 AND A<>85 THEN GOSUB BUZ
Z:GOTO 620
JW 630 IF A<65 OR A>90 THEN GOSUB BUZZ:GO
TO 620
PF 640 IF U(A-64)=K1 THEN FOR N=K1 TO K3:
GOSUB BUZZ:NEXT N:V=K0:GOTO 400
AC 645 GOSUB CLL
NQ 650 U(A-64)=K1
DF 660 POSITION K6+(A-65),22:? " "
DX 700 REM IDENTIFY LETTER
ES 710 Z=K0
CN 720 FOR I=K1 TO W
QN 730 IF A<>ASC(W$(I)) THEN 770
MI 740 MW$(I,I)=CHR$(A)
LB 750 FOR N=K1 TO K5:POSITION (X-K1)+I,K
12:? "":FOR D=K1 TO K5:NEXT D:POSITIO
N (X-K1)+I,K12:? " ":NEXT N
ZG 760 POSITION (X-K1)+I,K12:? CHR$(A):Z=
Z+K1:GOSUB BEEP
GL 770 NEXT I
PI 772 IF V<K0 THEN V=K0:PM(PLR)=PM(PLR)-
250:VG=VG+K1:IF Z THEN 785
FH 774 IF Z THEN 780
PW 775 GOSUB BUZZ:GOSUB MD
ZQ 776 IF F(PLR)<K0 THEN GOSUB FSPIN
NZ 777 GOTO 400
XQ 780 PM(PLR)=PM(PLR)+(MNY*Z)
OZ 785 GOSUB MD
VL 790 GOSUB VCHK:GOTO 410
BB 1000 REM WINNER!
NT 1004 TPM(PLR)=TPM(PLR)+PM(PLR):PM(K1)=
K0:PM(K2)=K0
SM 1005 GOSUB CLL:POSITION K8,K18:? "Play
er ";PLR;" wins the round!":FOR N=K1 T
O K3:GOSUB BEEP:NEXT N:GOSUB TMD
OJ 1008 FOR N=K1 TO K5:GOSUB BEEP:NEXT N:
GOSUB DEL
XB 1009 POSITION K9,K5:? "
"
XO 1010 IF ROUND(K3 THEN 200
ZW 1014 PLR=(TPM(K1)>TPM(K2))+TPM(K2)>TP
M(K1))*K2
TI 1018 IF PLR=K0 THEN PLR=K2:GOTO 200
BI 1020 GOSUB CLL:POSITION K4,K18:? "Play
er ";PLR;" moves to the BIG board"
NM 1030 FOR N=K1 TO K5:GOSUB BEEP:NEXT N:
GOSUB DEL
HI 2000 REM THE BIG BOARD
KQ 2005 ? "A":POSITION 11,K1:? " Fortune
-Wheel "
ZM 2010 POSITION K10,K3:? " The $25,000 B
oard ":POSITION 15,K7:? "Player ";PLR
VJ 2015 GOSUB GDAT
JE 2080 FOR N=K1 TO K3:GOSUB BEEP:NEXT N
HN 2085 POSITION K4,K18:? "Player ";PLR;"
, Enter five consonants"
WJ 2090 FOR I=K1 TO K5
HN 2095 POKE 764,255
FV 2100 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
KL 2105 IF A<65 OR A>90 THEN 2100
XC 2110 IF A=65 OR A=69 OR A=73 OR A=79 O
R A=85 THEN 2100
IC 2115 POSITION K8+(I*K3),20:? CHR$(A)
IW 2120 C(I)=A
PW 2125 NEXT I:FOR N=K1 TO K3:GOSUB BEEP:
NEXT N
DC 2130 GOSUB CLL:POSITION K6,K18:? "Play
er ";PLR;" enter one vowel"
GX 2135 POKE 764,255
GH 2140 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
PJ 2145 IF A<65 OR A>90 THEN 2140
SB 2150 IF A<>65 AND A<>69 AND A<>73 AND
A<>79 AND A<>85 THEN 2140
RN 2155 POSITION 26,20:? CHR$(A)
JB 2160 C(K6)=A
SL 2165 FOR I=K1 TO W

```



Fortune-Wheel *continued*

```

YW 2170 FOR N=K1 TO K6
UR 2175 IF C(N)<>ASC(W$ (I)) THEN 2195
QG 2180 MW$ (I,I)=CHR$(C(N))
ZO 2185 FOR Z=K1 TO K5:POSITION (X-K1)+I,
K12:?"":FOR D=K1 TO K5:NEXT D:POSITI
ON (X-K1)+I,K12:?" ":NEXT Z
ZD 2190 POSITION (X-K1)+I,K12:?" CHR$(C(N)
):GOSUB BEEP
IQ 2195 NEXT N
EU 2200 NEXT I
NU 2205 REM GUESS ANSWER II
IN 2210 FOR N=K1 TO K3:GOSUB BEEP:NEXT N
GH 2215 GOSUB CLL:POSITION K10,K18:?"Pla
yer " ;PLR;" :Your guess?"
CY 2220 OPEN #K1,K4,K0,"K":Z=K0
WU 2225 POSITION X-K1,13:?" " ;:POKE 764,
255
RK 2230 FOR I=K1 TO W
OR 2235 FOR D=K1 TO K5:NEXT D:Z=Z+0.1
DO 2240 IF Z=INT(Z) THEN SOUND K0,K10,K10
,K10:SOUND K0,K0,K0:POSITION K18,K9
:?" 31-Z;" "
SY 2245 POSITION (X+I)-K1,13:?"":IF Z>3
1 THEN CLOSE #K1:GOTO 2295
CA 2250 IF PEEK(764)=255 THEN 2235
YM 2255 GET #K1,A:IF (A<65 OR A>90) AND A
<>126 AND A<>32 THEN GOSUB BUZZ:GOTO 2
255
WM 2260 IF A<>126 THEN 2275
WH 2265 IF I>K1 THEN POSITION X-K1+I,13:?"
CHR$(126);CHR$(254):I=I-K1
CT 2270 POKE 764,255:GOTO 2235

```

```

YX 2275 G$(I)=CHR$(A):POSITION X-K1+I,13:
?" G$(I);
CI 2280 POKE 764,255:NEXT I:CLOSE #K1
JK 2285 POKE 752,K1
UM 2290 IF G$=W$ THEN 2305
QL 2295 POSITION X,13:?" W$
HL 2300 FOR S=150 TO 250:SOUND K0,5,K10,K
10:SOUND K1,5+K2,K10,K10:NEXT S:SOUND
K0,K0,K0,K0:SOUND K1,K0,K0,K0
IM 2302 GOSUB DEL:GOTO 2335
YG 2305 FOR N=K1 TO K5
RT 2310 FOR S=50 TO 150 STEP K5
FX 2315 SOUND K0,5,K10,K10:POKE 712,5
DQ 2320 NEXT S:NEXT N
LU 2325 SOUND K0,K0,K0,L0:POKE 712,K0
AD 2330 TPM(PLR)=TPM(PLR)+25000
FJ 2335 ? "K":POSITION K10,K2:?" Fortun
e-Wheel "
CH 2340 POSITION K10,K3:?" Player Summa
ry "
SY 2345 POSITION K4,K6:?"Player 1":POSIT
ION 26,K6:?"Player 2"
FC 2350 POSITION K4,K7:?" " " :POSIT
ION 26,K7:?" " " " :POSIT
ZG 2355 POSITION K4,K8:?" |$ " :POSIT
ION 26,K8:?" |$ " "
DR 2360 POSITION K4,K9:?" " " :POSIT
ION 26,K9:?" " " "
NH 2365 POSITION K6,K8:?" TPM(K1):POSITION
28,K8:?" TPM(K2)
SL 2370 POSITION K4,K12:?" (Sorry, dollar
s are simulated)"

```

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Other shows planned, no date set yet.

NEW YORK CITY
ST. LOUIS, MISSOURI
BOSTON, MASSACHUSETTS
CHICAGO, ILLINOIS

```

EX 2375 POSITION K10,K18:? "Play again? (
Y/N)"
GX 2380 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
DX 2385 IF A=89 THEN ROUND=K0:PLR=K0:? "K
":GOTO 110
AS 2390 IF A<>78 THEN 2380
FI 2395 GRAPHICS 0:END
VM 3000 FOR I=K0 TO K1:POSITION K0,K12+I:
? "
";NEXT I:RETURN
YX 3005 POSITION K2,K18:? "
";RETURN
DF 3010 FOR S=K1 TO K10:SOUND K0,25,K10,K
10:NEXT S:SOUND K0,K0,K0:RETURN
FG 3015 FOR S=K1 TO 15:SOUND K0,40,K12,K1
0:NEXT S:SOUND K0,K0,K0:RETURN
ZN 3020 FOR S=K1 TO 250:NEXT S:RETURN
XX 3025 GOSUB CLL:POSITION K5,K18:? "Do y
ou want to use FREE spin?"
GD 3030 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
LS 3035 IF A=89 THEN F(PLR)=F(PLR)-K1:PLR
=K3-PLR:GOTO 3045
UB 3040 IF A<>78 THEN 3030
BH 3045 RETURN
HG 3050 POSITION K6,K8:? " ":POSITION
28,K8:? " ":POSITION K6,K8:? PM(K
1):POSITION 28,K8:? PM(K2):RETURN
KJ 3055 POSITION K6,K8:? " ":POSITION
28,K8:? " ":POSITION K6,K8:? TPM(
K1):POSITION 28,K8:? TPM(K2)
IU 3060 POSITION K5,K10:? "Total":POSITIO
N 27,K10:? "Total":RETURN
YS 3065 FOR S=150 TO 250 STEP K2:SOUND K0
,S,K10,K10:SOUND K1,S+K2,K10,K10:NEXT
S:SOUND K0,K0,K0,SOUND K1,K0,K0,K0
BV 3067 RETURN
RM 3070 Z=K0:FOR I=K1 TO W
RF 3075 AA=ASC(MW$(I)):A=ASC(W$(I))
MM 3080 IF AA=45 AND A<>65 AND A<>69 AND
A<>73 AND A<>79 AND A<>85 THEN Z=K1
GJ 3085 NEXT I
WL 3090 IF Z THEN RETURN
TU 3095 POP :GOSUB CLL
QS 3100 POSITION K4,K18:? "Only vowels 1e
ft, Time to guess";
OB 3105 FOR N=K1 TO K5:GOSUB BEEP:NEXT N:
GOSUB DEL
DW 3110 GOSUB GUESS
NJ 3115 PLR=PLR+K1:IF PLR>K2 THEN PLR=K1
DZ 3120 GOSUB GUESS
MI 3125 GOSUB CL:POSITION X,K12:? W$
NI 3130 GOSUB CLL:POSITION K12,K18:? "Bot
h players lose!"
KS 3135 FOR N=K1 TO K3:GOSUB BUZZ:NEXT N:
GOSUB DEL:GOTO 200
UQ 3140 REM GUESS ANSWER
GP 3145 GOSUB CLL:POSITION K10,K18:? "Pla
yer ";PLR;":Your guess?"
GK 3150 POKE 764,255
YP 3155 OPEN #K1,K4,K0,"K:"
OP 3160 POKE 752,K0:POSITION X-K1,13:? "
";
SM 3165 FOR I=K1 TO W
FP 3170 GET #K1,A:IF (A<65 OR A>90) AND A
<>126 AND A<>32 THEN 3170
UL 3175 IF A<>126 THEN 3190
BZ 3180 IF I>K1 THEN ? CHR$(126);:I=I-K1
TF 3185 GOTO 3170
YI 3190 G$(I)=CHR$(A):POSITION X-K1+I,13:
? G$(I);
GO 3195 NEXT I
QF 3200 GET #1,A:IF A=126 THEN FOR N=I TO
K2 STEP -K1:? CHR$(126);:NEXT N:GOTO
3160
NO 3205 IF A<>155 THEN 3200
KQ 3210 CLOSE #K1:POKE 752,K1

```

```

QD 3215 IF G$=W$ THEN POP :GOTO 1000
TF 3220 GOSUB CLL:POSITION K12,K18:? "WR
ONG ANSWER"
ZF 3225 FOR N=K1 TO K5:GOSUB BUZZ:NEXT N:
GOSUB CLL
WZ 3230 POSITION X+W,13:FOR I=K0 TO W:? C
HR$(126);:NEXT I:RETURN
YU 3250 N=INT(RND(K0)*DA):VG=K0
CY 3255 RESTORE 10000+N
TV 3260 READ DZ$,W$:DZ=VAL(DZ$(K2,K2))
SZ 3265 IF DU(N)=K1 THEN N=(N+K1)*(N<DA-K
1):GOTO 3255
WH 3270 DU(N)=K1
UT 3275 DUP=DUP+K1:IF DUP+K1=DA THEN FOR
N=K0 TO DA-K1:DU(N)=K0:NEXT N:DUP=K0
CT 3280 W=LEN(W$)
QU 3285 MW$=" ":FOR I=K1 TO W:A=ASC(W$(I)
)
JW 3290 IF A<65 OR A>90 THEN MW$(I)=CHR$(
A):GOTO 3300
TG 3295 MW$(I)="-"
EX 3300 NEXT I
VT 3305 X=19-INT(W/K2)
HW 3315 GOSUB CL:POSITION X,K12:? MW$
UI 3320 POSITION 16,15:? D$(DZ*K8+K1,(DZ+
K1)*K8)
BH 3325 RETURN
AI 29000 REM INITIALIZE
QB 29010 DIM A$(26),W$(36),MW$(36),G$(36)
,SP$(96),D$(40),MNY$(4),DZ$(2),W(36),U
(26),PM(2),TPM(2),F(2),C(6)
DI 29020 K0=0:K1=1:K2=2:K3=3:K4=4:K5=5:K6
=6:K7=7:K8=8:K9=9:K10=10:K12=12:K18=18
RX 29030 ROUND=K0:GUESS=3140:CL=3000:CLL=
3005:BEEP=3010:BUZZ=3015:DEL=3020:F5PI
N=3025:DUP=K0
ZD 29040 MD=3050:TMD=3055:AW=3065:VCHK=30
70:GUESS=3140:GDAT=3250
XH 29050 A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
SM 29060 SP$="$800$ 50$600$150$650TURN$40
0$900$100$700$250FREE$950$550$300$750$
500TURN$850$450$200$350$999BANK"
ON 29100 REM LOAD DATA FILE
ZE 29105 ? :? "Fortune-Wheel by Rober
t Beatty"
XE 29110 N=K0:A=K0:POKE 65,K0
FT 29115 TRAP 29135
IP 29120 OPEN #K1,K6,K0,"D:*.DAT"
WQ 29125 INPUT #K1,W$
TQ 29130 IF LEN(W$)<17 THEN 29145
XW 29135 MW$(N*K8+K1,N*K8+K8)=W$(K3,K10)
XS 29140 N=N+K1:GOTO 29125
ZA 29145 CLOSE #K1:TRAP 40000:GOTO 29165
WE 29150 ? "Unexpected disk error - ";PEE
K(135):? "Press any key to continue":P
OKE 764,255
OW 29155 IF PEEK(764)=255 THEN 29155
ID 29160 RUN
MA 29165 ? :? " Select: ☐ Play game"
JH 29170 ? " ☐ Edit new data"
SA 29175 IF N THEN ? " ☐ Load new
data"
DN 29178 OPEN #K1,K4,K0,"K":GET #K1,A:CL
OSE #K1
SD 29180 IF A=80 THEN 29900
MX 29185 IF A=69 THEN RUN "D:DGEN.BAS"
PV 29190 IF N AND A=76 THEN 29200
MX 29195 GOTO 29178
DW 29200 ? "++ Clue files available..."
SF 29205 ? :? "
ES 29210 FOR A=K0 TO N-K1
IW 29215 ? " |";A+K1;";MW$(A*K
8+K1,A*K8+K8);";" |"
CY 29220 NEXT A
WV 29225 ? "
PI 29230 ? "++ Select which Clue file to
load:"
BQ 29240 OPEN #K1,K4,K0,"K":GET #K1,A:CL

```



Fortune-Wheel *continued*

```

05E #K1
GB 29245 A=A-49
PK 29250 IF A<K0 OR A>N-K1 THEN 29240
QX 29255 W$=""
WW 29260 W$(K1,K2)="D:";W$(K3)=MW$(A*K8+K
1,A*K8+K8)
GL 29265 FOR I=K1 TO LEN(W$):IF W$(I,I)="
" OR W$(I,I)="" THEN W$(I)=".DAT":I=
LEN(W$)
HK 29270 NEXT I
EE 29275 ? :? " Loading ";W$:? :? " P
lease standby."
ZU 29280 FOR I=K1 TO 100:NEXT I
GN 29285 ? CHR$(125):POKE 709,K0
HU 29290 POSITION K2,K4:?"ENTER ";CHR$(3
4);W$;CHR$(34):? :? :? "POKE 842,12:CO
NT"
JF 29295 POSITION K2,K2:POKE 842,13:STOP
SN 29900 DA=500:REM # OF DATA STATEMENTS
SD 29910 DIM DU(DA)
TL 29920 D$="TITLE PLACE PERSON THIN
G PHRASE ":REM DATA CATEGORIES
WI 29999 REM GR.0 COLOR SUBROUTINE
HY 30000 ? CHR$(125):POKE 709,K10
TK 30002 POSITION 11,K3:?" Fortune-Whee
l":POSITION K12,K5:?"by ROBERT BEAT
TY":POSITION K12,K7:?"70317,3045"
TZ 30003 POSITION K12,11:?"Initializing.
..
AW 30004 FOR N=K0 TO DA-K1:DU(N)=K0:NEXT
N
NS 30005 RESTORE 30170:FOR N=K0 TO 99:REA
D X:POKE 1664+N,X:NEXT N
JZ 30010 CT=1712:LT=CT+24
ZY 30015 X=USR(1693)
EI 30020 POKE 512,128:POKE 513,K6
NB 30030 D$=PEEK(560)+256*PEEK(561)
QC 30040 FOR N=D$+K6 TO D$+28:POKE N,130:
NEXT N
QX 30050 POKE D$+K3,194:POKE 54286,192
CY 30060 ? "K":POKE 710,PEEK(CT):POKE 709
,PEEK(LT)
EB 30070 RETURN
WN 30170 DATA 72,138,72,174,156,6,189,176
,6,141
QV 30180 DATA 10,212,141,24,208,189,200,6
,141,23
YY 30190 DATA 208,238,156,6,104,170,104,6
,4,6,104
SW 30200 DATA 169,7,160,168,162,6,32,92,2
,28,96
IX 30210 DATA 169,1,141,156,6,76,98,228,1
,12,114
NH 30220 DATA 116,118,120,122,124,124,124
,124,122,122
XD 30230 DATA 124,124,120,120,118,118,116
,116,114,114
YW 30240 DATA 112,112,14,14,14,14,14,14,0
,0
TH 30250 DATA 0,0,0,0,0,0,14,14,14,14
QI 30260 DATA 14,14,14,14,14,14,0,0,0,0

```

Listing 2.
BASIC listing.

```

SY 1000 GRAPHICS 0:POKE 710,0:POKE 752,1:
POKE 16,64:POKE 53774,64
QU 1010 CHANGE=3000:SAVDAT=4000:FMGT=5000
:LINO=10000
GP 1020 K1=1:K2=2:K3=3:K4=4:K5=5:K6=6:K7=
7:K8=8:K9=9:K10=10
IZ 1030 ? "↓ *****"
GV 1040 ? " *
*
AA 1050 ? " * FORTUNE-WHEEL
*

```

```

HB 1060 ? " *
*
WY 1070 ? " * DATA GENERATOR
*
HH 1080 ? " *
*
JV 1090 ? " * by
*
GL 1100 ? " *
*
TU 1110 ? " * Robert Beatty
*
GR 1120 ? " *
*
UY 1130 ? " *****
****
CT 1150 DIM W$(36),D$(40),DZ$(K2),DF$(64)
,F$(18),TF$(14),TD$(K8)
QN 1160 D$="TITLE PLACE PERSON THING
PHRASE "
GC 1170 GOSUB FMGT:GOSUB CHANGE
RQ 2000 ? CHR$(125):POKE 709,K10:POKE 75
2,K0:?" Ctrl C:New Category Ctrl S:S
ave/Quit";
DE 2010 POSITION 11,K2:?"Data statement
#";LINO-9999
RM 2020 POSITION 11,K4:?"Category is ";D
$(DZ*K8+K1,(DZ+K1)*K8)
IX 2030 POSITION K4,K6:?"Input data: 36
Characters Max."
AR 2040 POSITION K2,K9:?" :
↑";
XS 2050 OPEN #K1,K4,K0,"K:"
OX 2060 W$="":FOR I=K1 TO 36
BP 2070 GET #K1,A:IF A>64 AND A<91 OR A=3
2 THEN W$(I,I)=CHR$(A):GOTO 2130
TM 2080 IF A=K3 THEN CLOSE #K1:GOSUB CHAN
GE:GOTO 2000
AO 2090 IF A=19 THEN CLOSE #K1:GOSUB SAVD
AT:GOTO 2000
UU 2100 IF A=126 AND I>K1 THEN ? CHR$(126
);:I=I-K1:GOTO 2070
VM 2110 IF A=155 THEN POP :GOTO 2170
QV 2120 GOTO 2070
QC 2130 POSITION K2+I,K9:?" CHR$(A);:NEXT
I
NY 2140 GET #K1,A
ZL 2150 IF A=126 THEN FOR N=I TO K2 STEP
-K1:?" CHR$(126);:NEXT N:GOTO 2060
PG 2160 IF A<>155 THEN 2140
UJ 2170 CLOSE #K1:POKE 709,K0:POSITION K2
,14:?" LINO";" DATA K";DZ;"";W$
GU 2180 ? "POKE 842,12:CONT";:POSITION K2
,12:POKE 842,13:STOP
KE 2190 LINO=LINO+K1:GOTO 2000
BR 3000 REM CHANGE CATEGORY
UE 3010 IF LINO>10000 THEN 3210
CB 3020 ? CHR$(125);"Current categories a
re:"
MD 3030 ? :FOR I=K0 TO K4:?" I+K1;" ";D$(I
*K8+K1,I*K8+K8):NEXT I
HD 3040 ? :?"Do you want to rename categ
ories (Y/N)"
GJ 3050 OPEN #K1,K4,K0,"K:";GET #K1,A:CLO
SE #K1
VE 3060 IF A<>89 THEN 3210
HU 3070 POKE 752,K0
QN 3080 ? "Input new category names (8 ch
ar max)"
YF 3090 OPEN #K1,K4,K0,"K:"
FI 3100 FOR N=K0 TO K4:?" ? N+K1;" ";
UB 3110 TD$="":FOR I=K1 TO K8
RO 3120 GET #K1,A:IF A=155 THEN I=K8:GOTO
3170
NI 3130 IF A>64 AND A<91 OR A=32 THEN TD$
(I,I)=CHR$(A):?" CHR$(A);:GOTO 3160
HK 3140 IF A=126 AND I>K1 THEN ? CHR$(126
);:I=I-K1
PP 3150 GOTO 3120

```



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We can't list it all... call if you don't see it!

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Fortune-Wheel *continued*

```

FL 3160 NEXT I
NP 3170 D$(N*K8+K1,N*K8+K8)=TD$:NEXT N
LJ 3180 CLOSE #K1:POKE 752,K1
LR 3190 ? :? "Are these correct?";
LJ 3200 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1:IF A=78 THEN 3000
IJ 3210 ? CHR$(125);"Which category do yo
u wish to use?"
ME 3220 ? :FOR I=K0 TO K4: I+K1;" ";D$(I
*K8+K1,I*K8+K8):NEXT I
GH 3230 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
QC 3240 IF A<49 OR A>53 THEN 3230
MH 3250 DZ=A-49:RETURN
XB 4000 REM SAVE DATA ROUTINE
LO 4010 ? "Saving clues to ";F$
JH 4020 ? :? "Continue or Quit?";
GE 4030 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
WE 4040 IF A=81 THEN 4170
UA 4050 IF A<>67 THEN 4030
YK 4060 TRAP 6000: ? CHR$(125):POKE 709,K0
:ERR=4060
YV 4070 POSITION K2,K4: ? "29900 DA=";LINO
-10000;"REM OF DATA STATEMENTS"
GI 4080 ? "29920 D$=";CHR$(34);D$;CHR$(34
);"REM DATA CATEGORIES"
LL 4090 ? "POKE 842,12:CONT":POSITION K2,
K2:POKE 842,13:STOP
PJ 4100 LIST F$,10000,29999
OD 4110 TRAP 40000
TK 4120 POSITION K2,K10: ? "12": ? "15": ? "
POKE 842,12:CONT":POSITION K2,K8:POKE
842,13:STOP
YC 4130 ? CHR$(125):POKE 709,10: ? "Conti
ue entering clues? (Y/N)";
GJ 4140 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
CQ 4150 IF A=89 THEN RETURN
WV 4160 IF A<>78 THEN 4140
QA 4170 ? :? "Loading FORTUNE-WHEEL"
CI 4180 RUN "D:FORTUNE.BAS"
XD 5000 REM FILE MANAGEMENT ROUTINE
GJ 5010 M=K0:A=K0
SO 5020 TRAP 6000:ERR=5020
WK 5030 OPEN #K1,K6,K0,"D:*.DAT"
KN 5040 INPUT #K1,F$:IF LEN(F$)<17 THEN 5
080
XH 5050 D$(N*K8+K1,N*K8+K8)=F$(K3,K10)
WP 5060 M=N+K1:IF N=10 THEN 5080
RF 5070 GOTO 5040
AV 5080 CLOSE #K1
PA 5090 TRAP 40000
DV 5100 IF N<K1 THEN 5200
BS 5110 ? CHR$(125);: ? "Fortune-Wheel clu
e files available:"
FH 5120 ? :? "
HU 5130 FOR A=K0 TO N-K1
ZY 5140 ? " |";A+K1;" ";D$(A*K8+K
1,A*K8+K8);" |"
CA 5150 NEXT A
WN 5160 ? "
GY 5170 ? :? "Press ☐ to append or ☐ for
new file:"
GW 5180 OPEN #K1,K4,K0,"K":GET #K1,A:CLO
SE #K1
TQ 5190 A=A-49:IF A<>24 THEN 5230
VG 5200 POKE 702,64
KC 5210 ? :? "Enter a name for the new fi
le": ? "Use a max of eight letters:";:I
NPUT TF$:IF TF$="" THEN 5210
MI 5220 F$="D:";F$(K3)=TF$:F$(LEN(F$)+K1)
="."DAT":GOTO 5390
FZ 5230 IF A<K0 OR A>N-K1 THEN 5180
HM 5240 F$="D:";F$(K3)=D$(A*8+1,A*8+8)
IA 5250 FOR I=K1 TO LEN(F$):IF F$(I,I)=""
" OR F$(I,I)="" THEN F$(I,I)=""."DAT":I=L
EN(F$)
FP 5260 NEXT I

```

```

ZD 5270 TRAP 6000:ERR=5270
KX 5280 ? :? "Loading ";F$: ? :? "Please s
tandby...":FOR I=1 TO 500:NEXT I
PN 5290 POKE 709,K0: ? CHR$(125):POSITION
K2,K4: ? "ENTER ";CHR$(34);F$;CHR$(34):
? :? :? "POKE 842,12:CONT"
VP 5300 POSITION K2,K2:POKE 842,13:STOP
XV 5310 ? CHR$(125):POKE 709,K10
KI 5320 GOSUB 29900
BM 5330 ? :? "Number of clues - ";DA
JW 5340 LINO=10000+DA
ZZ 5350 FOR I=1 TO 250:NEXT I
BK 5390 RETURN
YO 6000 REM ERROR-LAND
NZ 6010 TRAP 40000: ? CHR$(125):POKE 709,1
0
IE 6020 IF PEEK(195)=138 THEN ? :? "Check
disk drive,";CLOSE #1:GOTO 6070
VC 6030 IF PEEK(195)<>165 THEN 6060
PE 6040 ? :? "Try another name for the ne
w file": ? "Use a max of eight letters:
";:INPUT TF$
PC 6050 F$="D:";F$(3)=TF$:F$(LEN(F$)+1)=""
.DAT":GOTO 6070
JT 6060 ? :? "Unexpected error - ";PEEK(1
95)
GM 6070 ? :? "Press any key to continue":
POKE 764,255
EG 6080 IF PEEK(764)=255 THEN 6080
LC 6090 ? CHR$(125):POKE 764,255:GOTO ERR
CZ 30000 RETURN

```

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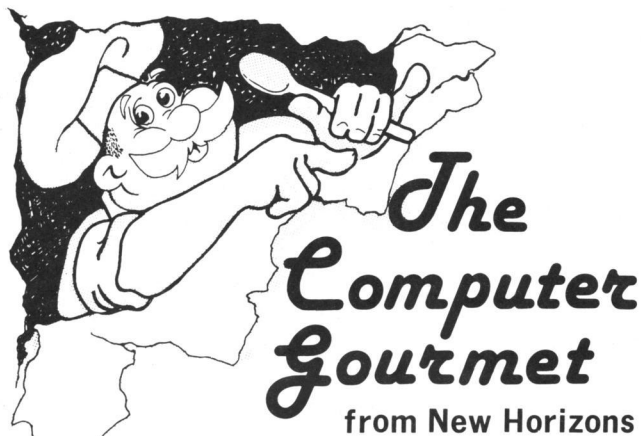
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PHRASE

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ONLY THE GOOD DIE YOUNG
IT TAKES TWO TO TANGO
SHOOTING FISH IN A BARREL
DONT LET THE BED BUGS BITE
SPEAK NOW OR FOREVER HOLD YOUR PEACE
FLATTERY WILL GET YOU NOWHERE
BLACK SHEEP OF THE FAMILY
TEMPORARILY OUT OF SERVICE
REAL MEN DONT EAT QUICHE
THAT TAKES THE CAKE
MORE THAN ONE WAY TO SKIN A CAT
LEAVE NOTHING TO CHANCE
THE BUCK STOPS HERE
KEEP YOUR EYES PEELED
LAUGH ALL THE WAY TO THE BANK
THERES NO PLACE LIKE HOME
A FOOL AND HIS MONEY ARE SOON PARTED
WASTE NOT WANT NOT
ONLY HER HAIRDRESSER KNOWS FOR SURE
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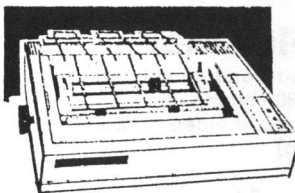
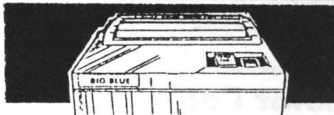
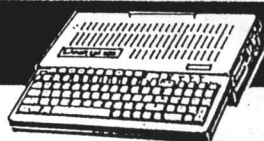
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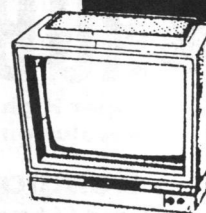
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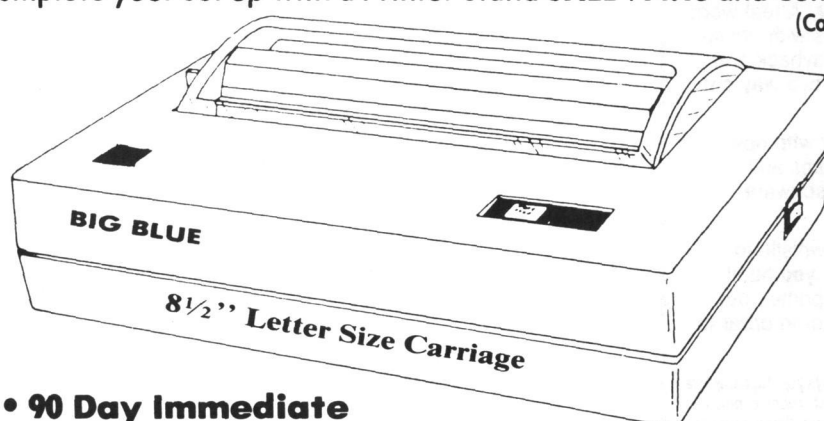
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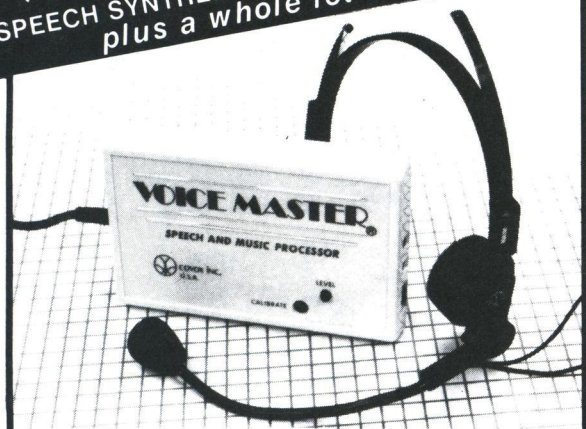
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