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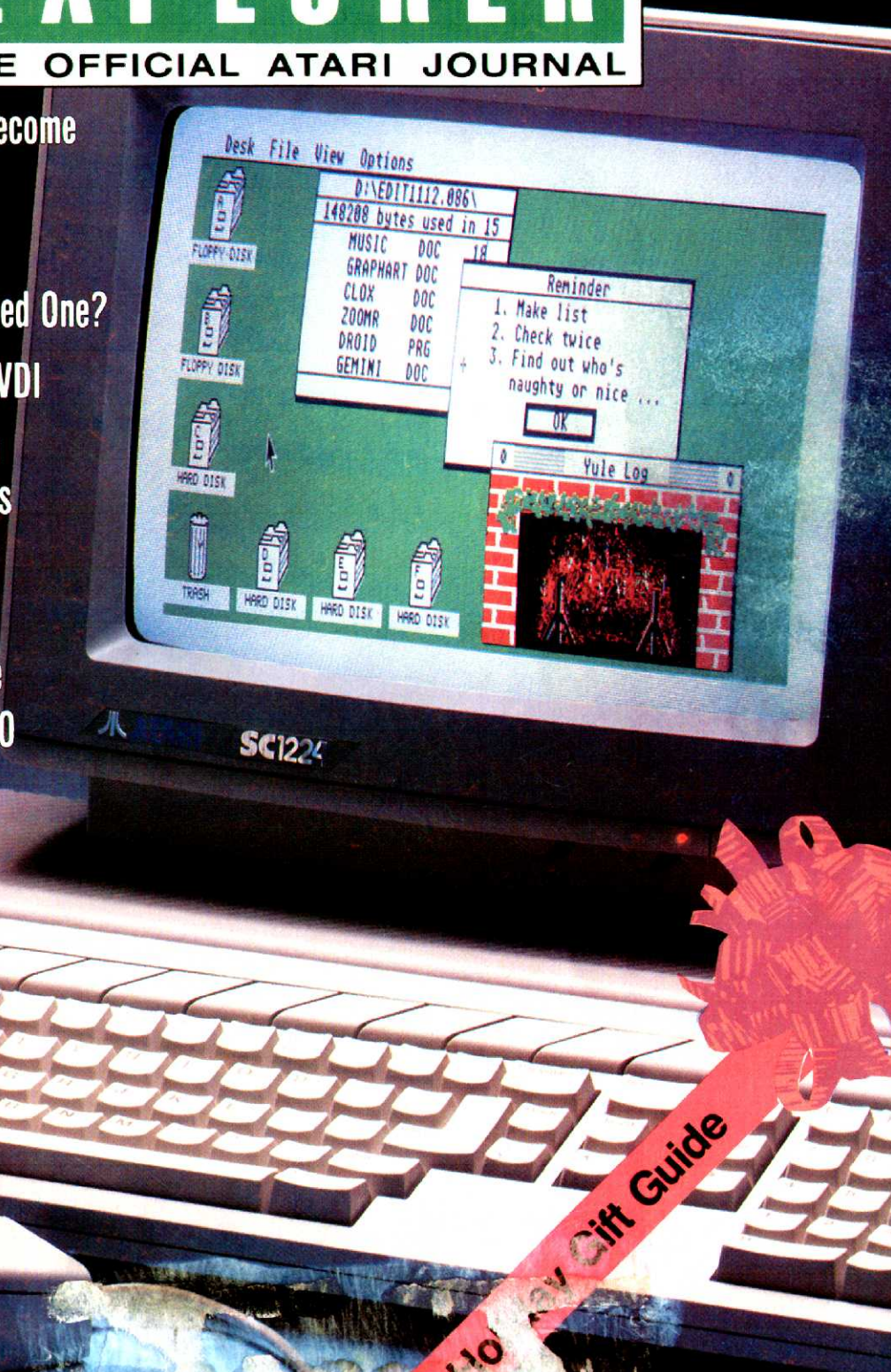
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Cover: Photograph by Jeff MacWright

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Thanks . . .
and another assignment



Editorial

By BETSY STAPLES

Thank you. Thank you for filling out the Reader Survey that appeared in our last issue. We appreciate your thoughtful responses, and you can expect to see the results of the Survey in an upcoming issue. You can also start looking for the ways in which we have begun to implement some of your suggestions.

Thank you, too, for all the positive comments you have made about the "new and improved" *Atari Explorer*. A very small sampling of your kudos appears in the Letters column in this issue; we were all gratified to learn that you like the new format and content, expect great things from our staff, and look forward to seeing *Atari Explorer* on a regular publication schedule.

We have great plans for *Explorer* and expect to offer you even greater "improvements" in upcoming issues—more pages, more color, more of the authors you respect.

But, to carry out these plans, we need your help. Before I tell you exactly what you can do, let me give you a short lesson in the economics of magazine publishing.

The Economics of Magazine Publishing

Magazine publishers make money on sales of the magazine itself—subscriptions and the single copies you buy on the newsstand—right? Wrong. The amount you pay for a magazine barely covers the actual cost of producing that copy—the articles, photographs, type-

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Naturally, it is to the magazine's advantage to keep those advertisers happy, and there are two basic ways a publisher can do this. The most obvious—and, often, the easiest—is to write what the advertisers want to see; to compliment a product in print regardless of its actual merit, simply because the manufacturer is an advertiser—or even a prospective advertiser.

The more difficult way is to win the loyalty of readers by publishing unbiased articles that help them avoid wasting their money on flaky hardware and buggy software. This approach is more difficult, because it is indirect. It relies on the reader to communicate his approval of the magazine to the advertiser.

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We don't want you to start selling ads for us—that's Pamela Stockham's job. But we do want you to realize that you are the best promotional tool we have. You can play an important role in the success of this magazine, because the more advertising we have, the more editorial we can print.

So if you want more unbiased reviews, more in-depth interviews with today's top software designers, more useful programs, and more educational tutorials, don't forget to say, "I read about your product in *Atari Explorer*." ■

News and Views

By DAVID H. AHL

If computers represent the engines driving the most important technological revolution in history, then software is the fuel. Therein lies a paradox: as software fuels this revolution, it also impedes it and threatens to explode it. Software has proliferated faster than computing experts' understanding of it; and society's increasing dependence on software has caused a wide array of intractable problems, not only in computing but also in law, economics, management, and education.

Recognizing this problem, Carnegie-Mellon University's new Software Engineering Institute (SEI) was established to mount a broad-based attack on the software crisis. Funded by the Department of Defense and supported by corporations, universities, and government agencies, the SEI will serve as a catalyst to a larger effort among these groups to 1) develop new tools and technologies for creating and modifying software and 2) accelerate the transition of these tools from development to practice.

Underlying the projects at the SEI is the so-called "software factory" concept, which is already in use in Japan in prototype form. A software factory is a continuously evolving software development environment in which software project managers standardize, measure, and analyze literally all the activities that are involved in building software projects—from the very basic design of what the software is intended to do, through integration, to components testing, deployment, evaluation, and even modification in the field. Only through this preservation of "corporate memory" can the software specialists exploit fully what they learn—for example, by reusing a section of code in particular, and the know-how acquired during the project in general.

SEI technical projects are intended to increase both management and technical control of large scale software engineering products and to provide the technology-intensive support for all aspects of software engineering. The SEI will also be establishing requirements and developing modules for a university-level software engineering curriculum, and working to find solutions for legal licensing and protection of software. Stay tuned.

Benchmarks

Nick Walker of *Personal Computer World*, Britain's largest microcomputing magazine, recently devised a new set

of six benchmark programs to replace the eight-year-old set of programs the magazine had been using. The six programs test the speed of: integer mathematics calculations, real mathematics, trigonometric and logarithmic functions, screen I/O with a text screen, screen I/O with a graphics screen, and disk I/O.

We think you'll be interested to see the benchmark timings for the Atari ST and several other popular computers (Table 1).

Atari Fair Goers

The folks who ran the Atari Fair in Southern California this past August collected some interesting statistics on the attendees. Of the 3207 paid admissions, 81% owned one or more Atari computers. Of Atari computer owners, 14% owned both an ST and 8-bit system, 57% owned only an 8-bit machine, and 29% owned only an ST. Of the Atari owners, 23% also owned another brand of computer. Of the non-Atari owners, 10% owned some other machine, and 9% did not own a computer.

John K. Tarpinian, president of the HACKS club in North Hollywood, wrote in his newsletter column, "Those statistics are very interesting. Most of the displays at the show were ST oriented, yet the majority of attendees were XL/XE owners. There is still a huge

XL/XE ownership out there. Do you manufacturers hear that?"

These figures are similar to those gathered in a survey of the membership of the Packerland user group in North-eastern Wisconsin. In this group, the ST is the computer most used by 30% of the members, the 8-bit family by 70%. Interestingly, the most-used programs are ones like *AtariWriter Plus* and *Print Shop* on the 8-bit machines and *Sundog*, *1st Word*, and *Degas* on the ST. Who says the only thing Atarians do is play games?

(Ed note: we would be pleased to hear from other clubs and show sponsors about your shows, attendees, concerns of owners, interesting new products, etc.)

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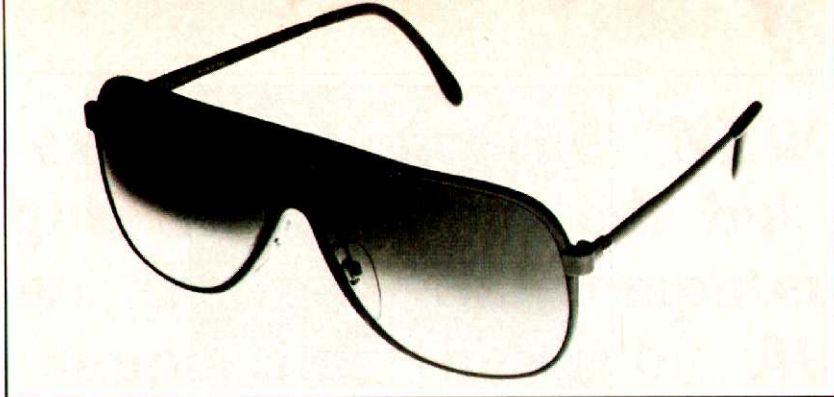
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They have a nice Atari ST Sig in action with a large list of public domain programs that can be downloaded. However, their specialty is a CB setup which allows you to page people on the system, join group talks, or have a private chat with another plinker. The commands are easy to remember, and the service is easy to use. Because People Link is relatively small, CB seems more personal than on some other systems.

You can contact People Link toll free by voice (800) 524-0100 or computer (800) 826-8855 to set up an account or request a free trial hour of service. (The numbers in Illinois are: (312) 870-5200 and (312) 822-9712. Access to the system is via your local Telenet or Tymnet number. ■

	Integer Math	Real Math	Trig Log	Text Screen	Graphics Screen	Disk I/O
Atari ST ST Basic	1.5	1.9	7.9	44.8	22.7	9.9
Atari ST Megamax C	0.16	1.1	7.9	39.6	7.7	7.1
Commodore Amiga Basic	1.7	2.7	6.7	150.3	25.0	32.7
IBM PC BasicA	6.2	8.2	47.0	100.0	49.0	17.2

Table 1. New PCW benchmark timings in seconds.



They look like sunglasses.

Vision Breakthrough

*When I put on the pair of glasses
what I saw I could not believe. Nor will you.*

By Joseph Sugarman

I am about to tell you a true story. If you believe me, you will be well rewarded. If you don't believe me, I will make it worth your while to change your mind. Let me explain.

Len is a friend of mine who has an eye for good products. One day he called excited about a pair of sunglasses he owned. "It's so incredible," he said, "when you first look through a pair, you won't believe it."

"What will I see?" I asked. "What could be so incredible?"

Len continued, "When you put on these glasses, your vision improves. Objects appear sharper, more defined. Everything takes on an enhanced 3-D effect. And it's not my imagination. I just want you to see for yourself."

When I received the sunglasses and put them on I couldn't believe my eyes. I kept taking them off and putting them on to see if indeed what I was seeing through the glasses was indeed actually sharper or if my imagination was playing tricks on me. But my vision improved. It was obvious. I kept putting on my cherished \$100 pair of high-tech sunglasses and comparing them. They didn't compare. I was very impressed. Everything appeared sharper, more defined and indeed had a greater three dimensional look to it. But what did this product do that made my vision so much better? I found out.

DEPRESSING COLOR

The sunglasses (called BluBlockers) filter out the ultraviolet and blue spectrum light waves from the sun. You've often heard the color blue used for expressions of bad moods such as "blue Monday" or "I have the blues." Apparently, the color blue, for centuries, has been considered a rather depressing color.

For eyesight, blue is not a good color too. There are several reasons. First, the blue rays have the shortest wavelength in the visible spectrum (red is the

longest). As a result, the color blue will focus slightly in front of the retina which is the "focussing screen" onto which light waves fall in your eye. By eliminating the blue from the sunglasses through a special filtration process, and only letting those rays through that indeed focus clearly on the retina, objects appear to be sharper and clearer.

The second reason is even more impressive. It is not good to have ultraviolet rays fall on our eyes. Recognized as bad for skin, uv light is worse for eyes and is believed to play a role in many of today's eye diseases. In addition, people with contact lenses are at greater risk because contacts tend to magnify the light at their edges thus increasing the sun's harmful effects.

Finally, by eliminating the blue and uv light during the day, your night vision improves. The purple pigment in your eye called Rhodopsin is affected by blue light and the eyes take hours to recover from the effects.

SUNGLASS DANGER

But what really surprised me was the danger in conventional sunglasses. Our pupils close in bright light to limit the light entering the eye and open wider at night—just like the aperture in an automatic camera. So when we put on sunglasses, although we reduce the amount of light that enters our eyes, our pupils open wider and we are actually allowing more of the blue and ultraviolet portions of the light spectrum into our eyes.

BluBlockers sunglasses are darker at the top to shield out overhead light. The lens used is the CR-39 which most eye doctors will tell you is one of the finest materials you can use for glasses and is manufactured under license.

The frames are some of the most comfortable I have ever worn. The moulded nose rest will fit any nose. The hinge causes the frames to rest comfortably on your face and can be adjusted for almost

any size face.

We also have a clip-on pair that weighs less than one ounce. Both come with a padded carrying case and an anti-scratch coating.

I urge you to order a pair and experience the improved vision. Then take your old sunglasses and compare them to the BluBlockers. See how much clearer and sharper objects appear with BluBlockers. And see if your night vision doesn't improve as a direct result. If you don't see a dramatic difference in your vision—one so noticeable that you can tell immediately, then send them back anytime within 30 days and I will send you a prompt and courteous refund.

DRAMATIC DIFFERENCE

But from what I've personally witnessed, once you use a pair, there will be no way you'll want to return it.

Astronomers from many famous universities wear BluBlockers to improve their night vision. Pilots golfers, skiers, athletes—anyone who spends a great deal of time in the sun have found the BluBlockers indispensable.

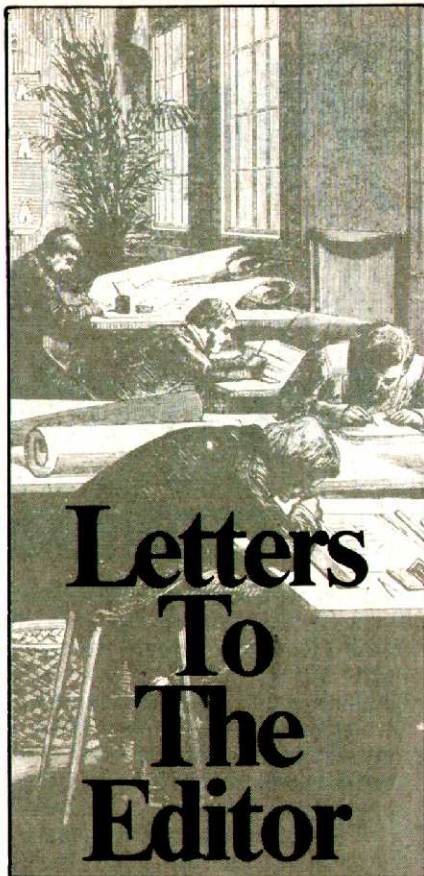
Our eyes are very important to us. Protect them and at the same time improve your vision with the most incredible breakthrough in sun glasses since they were first introduced. Order a pair or two at no obligation, today.

To order, credit card holders call toll free and ask for product by number shown below or send a check plus \$4 for delivery.

BluBlockers (0020 S) \$59.95
Clip-On Model (0022 S) \$34.95
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Welcome Back

Dear Editor:

It was with renewed interest that I read the latest issue of *Atari Explorer*. First, a quick riffle through the pages promised something unusual. Then, as I actually began reading, references to the new staff and philosophy quickened the interest. And finally, in light of that, the contents satisfied the expectation. Welcome back.

George G. Stepanenko
2606 47th St., S.E.
Calgary, AB T2B 1L8

Beanstalk Miscalculation?

Dear Editor:

Your first issue of the latest incarnation of Atari's official journal is nicely done. However, I must point out that the published solution of 199 days to Jack's Beanstalkin "Puzzles & Problems" is wrong. Note that the beanstalk grows by one-half its original height every day, starting with Day 1. It will be twice its original height on Day 2, three times on day 4—in general, $1 + D/2$ times its original height on Day D. Thus, it will be 100 times its original height on Day 198, not 199.

As an old owner of an 800 and a new owner of a 1040ST, I wish you and Atari great and enduring success.

James Wells
52 Mary's Lane
Centerport, NY 11721

In a sense, both answers are correct. If you count the day of planting, Day 0, as one of the days, then the entire process takes 199 days. If you count only the growing days, then, 198 is correct.

Here is a simple Basic program to solve the problem; note that it counts both the day of planting and the growing days. —DHA

LIST

```
10 D=1 : H=1 : 'Day 1, Height = 1
20 D=D+1 : 'Increase day counter
30 H=H+H/D : 'Let beanstalk grow
40 IF H<100 THEN 20 : '100 times orig?
50 PRINT "Height is" H "after" D "days."
Ok
run
Height is 100 after 199 days.
Ok
```

Dramatic Change

Dear Editor:

I have been an Atari user for several years, starting with an Atari 800 that cost near \$1000 with only 16K of memory. I ultimately upgraded it to 48K and added a disk drive. Then late in 1985, I made the switch to a 520ST. I have never regretted the day! I recently visited the person to whom I sold the 800, and it is still running fine.

I have read issues of your magazine for several years, but your latest changes are dramatic! Obviously, quality is your goal, and you are succeeding in that quest. I am looking forward to getting the future issues, and I'm sure the quality will continue to be high.

As the "official" voice for Atari, I look forward to your continued reporting of the latest advances and news of the company.

Steve Finzel
3750 Voice Rd.
Kingsley, MI 49649

NJ—Where Atari's Day Begins

Dear Editor:

Your Sept/Oct issue didn't have a subscription card, and I did not want to cut up the magazine to get the subscription application provided on page 75.

Good magazine. I'll keep buying it at the bookstore until I get a subscription application that doesn't require cutting up the magazine.

Good idea to be in New Jersey so you can get a head start on the rest of the country each day.

Doyle Davis
114 Long Bow
San Antonio, TX 78231

We appreciate your reluctance to deface your copy of Explorer and have taken care of the problem by including a "blow-in" card in this issue. If someone has already used the card in your copy, please be assured that we accept subscription orders on photocopied forms and on plain white (or your favorite pastel) paper as well. —EBS

**Astra is excited about the "NEW" Atari...
That's right, we are excited, but not just
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We are supporting the 8 bit Atari line
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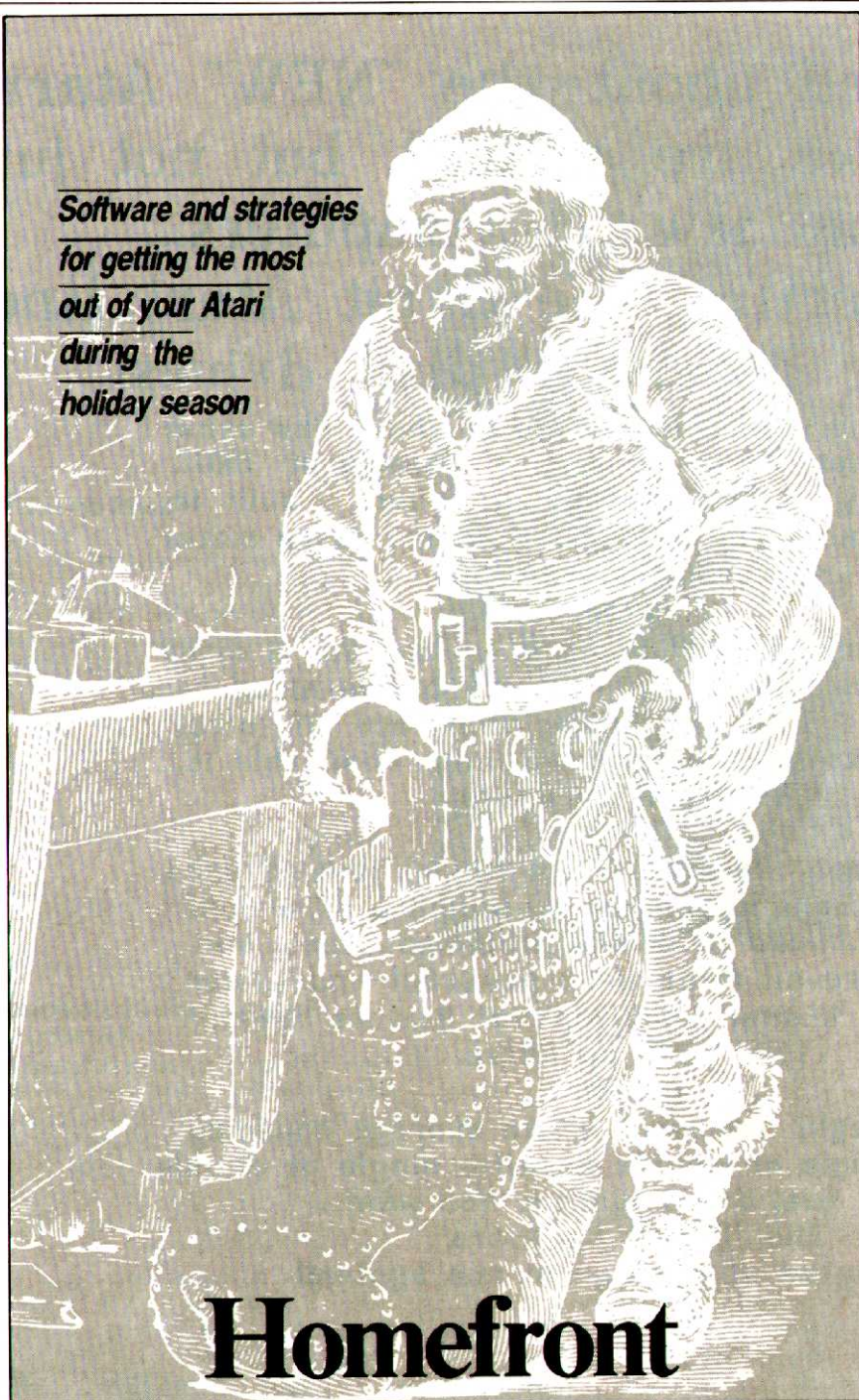
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	single drives	dual drives
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	The One by Astra Single or Double density Single or Double sided Direct drive motor Precision formatting Built-in printer interface.	Big D by Astra Single or Double density Single or Double sided Direct drive motor File and disk copies easier with two drives Put program in 1 data in 2
D O U B L E S I D E D		

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**Software and strategies
for getting the most
out of your Atari
during the
holiday season**



Homefront

By ROXANE FARMANFARMAIAN

The holidays are upon us with all the mixed blessings that they imply. The cheer is great—eggnog and roast turkey, missives from old friends, gathering round the fire with loved ones while Jack Frost rimes the windows. It's the planning, list making, gift buying, card mailing and the question of how to keep the children happy and out of your busy hair that sometimes besmirch the otherwise perfect bliss.

If this were 1886, or even ten years ago in 1976, your cares would be without recourse. But this is 1986. Today

you have an able-bodied and willing vacation valet already in the house, quietly standing by to streamline your chores and humor the kids. Lurking behind the facade of your Atari's screen is art studio, print shop, baby sitter and music box all wrapped into one. The trick is knowing how to make good use of this wonder under holiday pressure.

Getting Out the Greetings

The mails are already in a crush. Are you beginning to get that feeling of rising panic (or is it resignation, perhaps) that there's no way this year's cards will

reach their destinations before next year's season? If so, stop. Hook up that printer and power up that Atari; it's time to hunker down at the keyboard.

If your family likes to send newsy letters to friends and relatives summarizing all that has happened by year-end, you need nothing more than your trusty word processing program to speed you on your way. One real plus of doing it on the computer: everyone in the family can work on it at their leisure, yet it can still be a group effort.

Someone should be designated newsletter editor to proofread the masterpiece and make sure everyone participates by a certain deadline. Then each family member can contribute his or her two cents' worth when it's convenient by booting up the software and adding to the file.

If it seems expedient to create a number of different versions of the letter (one for relatives, one for colleagues, etc.), just modify the basic file and save each version under a different filename. Depending on how long your address list is, either print out the requisite number of letters directly, or print master copies to run off on a duplicating machine.

The word processor isn't the only kind of software you can use for mass correspondence. Some database management programs (*Zoomracks*, reviewed elsewhere in this issue, is a good example) provide sufficiently powerful text handling features to handle letter writing, and they offer the advantage of being able to manage your address list and archive versions as well.

For those who prefer sending cards, or newsletters festooned with decorations, your Atari can accommodate by turning chameleon-like into a printing press. Boot up *Print Shop*, *CardWare*, or *PrintMaster* and you'll find your home press not only easy to use but capable of turning out very professional-looking stationery.

At the core of each program is a library of predrawn pictures and borders (called "clip art") which you can mix and match with text, the latter in various fonts and sizes, to create personalized greetings. This is very gratifying to kids (and adults who, like me, weren't heavily endowed with the gift of free-hand artistry) because it allows for fast results with a certain degree of polish.

Opt for the card format, and the programs print out the paper in quadrants so that you can conveniently French-fold it into cards. *Print Shop* comes

packaged with brightly colored continuous form paper; packages of multi-hued printer paper are also available from Unison (publishers of *PrintMaster*) and Wizard Computer Accessories.

If it's embellishment to stationery that you're after, these programs can print out everything from festive borders to very official-looking letterhead. (Drawing programs, such as *Blazing Paddles* (reviewed elsewhere in this issue), will also work well as long as they are compatible with your printer). For some real snazz, hype the border decoration by printing it with a colored ribbon; then, after switching to a ribbon of contrasting color, feed the paper through the printer again to receive the text. (Unibrite Publishing offers colored ribbons for a whole slew of different printers as well as liquid colors for do-it-yourself ribbon inking; Rainbow Ribbons are also available from Princeton Office Supplies and other distributors).

Entertaining With Ease

Whether you are the parent in charge of caroling, or hosting the family banquet this year, the task involves, to one degree or another, inviting participants, welcoming them, and putting on some kind of hospitable display. The warmth that makes for success is not the computer's strong point; helping everything mesh smoothly, and perhaps even adding a touch of the sublime, is more your Atari's forte.

First, the invitations (or, if it's the caroling group, take-home notices of what, when, and where). If the list is large, a database of names and accompanying addresses can go a long way to keeping outgoing notes (or calls) and incoming responses straight.

PartyWare adds a nice twist to this idea by linking a database of up to 20 names with an invitation-making facility. You can make out invitations to three or four get-togethers simultaneously, and the program will automatically personalize the notes according to the event. This program is easy and fun to use; running it is an ideal project for the kids and a great way to get them involved in something important and useful within the overall holiday scheme of things. The program also prints out a phone list and address list, so you can have all relevant information about your prospective guests at hand.

Roxane Farmanfarman is technology editor of *Working Woman* magazine.

Painting competitions with themes and rules can keep a houseful of kids creatively engrossed for hours.

For those who don't have a printer, but whose friends have Atari (800 series or 130XEs), *PartyWare* has a unique feature that enables you to send them invitations on disk. They don't even need the *PartyWare* software to boot the disk and see the glittering message. And, since you determine what text to send, you can send them their season's greetings this way too.

It is in creating the warm welcome that the younger set, in collusion with the Atari, can really shine. Marvelous for initial impact is the welcome banner—its big letters printed out sideways on the computer printer. Both *PrintMaster* and *PartyWare* offer this facility, with the option to choose lettering in a number of different fonts and decorative pictures from their clip art galleries. Once printed, the banners can be even more impressive if you put the kids to work on them with magic markers and stickers.

Also fun is to make buttons that everyone in the family and all houseguests (or carol group members) can wear. Using *PrintMaster* and a separate button kit, you can create badges with funny designs, identifying initials, or whatever clicks.

Another way to offer welcome with a splash? First find a safe, sturdy spot for your Atari in the entrance hall, or where it can look out a window near your front door. Then challenge the creative ones in the family to paint a computer graphic that beckons and entices your guests into your home (try a welcome mat on-screen?). Using programs like *MicroPainter* and *Blazing Paddles*, artists of all ages can flourish the paintbrush without splattering the walls, and save their best efforts for later recall.

Using *DEGAS* on an ST, you can even compile a slide show of drawings that will run in an endless loop—a good way to ensure that everyone's masterpiece gets a fair viewing. Painting competitions with themes (grandmother's arrival, for example, or New Year's Eve) and rules (such as having to work with a partner, or limiting the painting to a maximum of three colors) can keep

a houseful of kids creatively engrossed for hours, and be the source of a great deal of shared family pleasure.

As with art, so with music. Those with the gift can compose multi-voiced musical arrangements using programs like *Music Studio* and *Music Construction Set* to herald the arrival of guests. Easiest for kids to use on their own is probably *Bank Street Musicwriter*, which has a super feature called "album" that automatically plays all the selections saved on a disk in one, smooth sequence. Don't limit this to livening up the entry hall; give it a whirl on after-dinner harmonies, too.

Bank Street Musicwriter, *ST Music Box*, and certain other music programs can even print out scores, a handy option when you are trying to get copies of music and lyrics to everyone in a caroling group. If you are the volunteer or ad hoc music director for the group, a music program can help you work out voicings (most can handle up to three voices, perfect for Soprano/Alto/Baritone chorales) and harmonic arrangement. Not only do they provide an immediate



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record of your work, but that record can be easily saved so you can get someone else's input, or simply mull it over at your leisure.

Nor is your Atari condemned to sit off-stage while the choir is on. Coupled with an inexpensive MIDI keyboard instrument (like the Casio CZ-101) and appropriate software, it can act as metronome, rehearsal pianist, and pit orchestra—never missing a note or fudging a harmony.

Give Great Gifts

Many of the programs that pour from hackers' disk drives can, with just a speck of imagination, be used to create a slew of fun, worthwhile gifts. Here are just a couple of suggestions:

If you own a VCR, you can start exercising some real tape control using a nifty program called *Video Title Editor*. This can lead to some pretty fabulous gifts. You can surprise your unsuspecting spouse or parents by adding introductory title screens to their tape collection. If some of their videos include movies taped from TV, you can spiff them up by replacing the commer-

Surprise your unsuspecting spouse or parents by adding introductory title screens to their tape collection.

cial (or noisy snow screens) with silent solid color screens. Because the program gives you the flexibility to record screens anywhere on the tape, you can add commentary and caption screens to home videos if you wish, describing vacations, family dos, etc. Or, for a novel stocking stuffer, steer your family into 1987 worry-free by using this program to help make a record of all your possessions for insurance purposes.

Video Title Editor also opens up the possibility of sending greeting cards on videotape. If you have a v-cam, you can make the whole thing professional indeed: choose one of the title screens for initial impact, then start wielding the camera until it's time to sign off with a final text screen.

If you prefer to give clothes rather than magnetic media during this festive season, try decorating your own line of designer T-shirts and other clothing with some help from any of the printing or graphics programs on the Atari's roster.

Have your children give you a hand printing out designs you have all created with *PrintMaster* or *Print Shop*, for example, onto transfer paper (you can also use special colored heat-transfer ribbons in your printer). Ribbons, paper, and coloring pens are all available from Unibrite International Publishing.

Once you have printed out the design, just iron it onto the clothing of choice and color it in; you'll be surprised at how professional it looks. Tea towels and pillowcases also qualify for decoration, as do sheets and shorts and . . . well, the list is bounded only by your (and your kids') imagination.

In fact, that is the computer moral for 1986: Your Atari is eager and capable and has the memory of an elephant. Delegate, and your mutual accomplishments will be limited only by the extent of your ingenuity. ■

More About the Products Mentioned

For 8-bit Systems:

Bank Street MusicWriter; \$14.95
Mindscape
3444 Dundee Rd.
Northbrook, IL 60022
(800) 221-9884

Music Construction Set; \$14.95
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171

Music Studio; \$39.95
Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
(415) 960-0410

Blazing Paddles; \$34.95
Baudville
1001 Medical Park Dr.
Grand Rapids, MI 49506
(616) 957-3036

CardWare; \$9.95
PartyWare; \$14.95
Hi-Tech Expressions, Inc.
2699 South Bayshore Dr., Ste. 1000A
Coconut Grove, FL 33133
(800) 848-9273

The Print Shop; \$44.95
Broderbund
17 Paul Dr.
San Rafael, CA 94903
(415) 479-1170

Video Title Editor; \$29.95
VideoWare
19777 West 12 Mile Rd., Ste. 180
Southfield, MI 48076
(313) 626-7208

For ST Systems:
ST Music Box; \$49.95
Xlent Software
P.O. Box 5228
Springfield, VA 22150
(703) 644-8881

Music Studio; \$59.95
Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
(415) 960-0410

PrintMaster; \$39.95
Unison World Inc.
2150 Shattuck Ave., Ste. 902
Berkeley, CA 94704
(415) 848-6666

DEGAS; \$39.95
Batteries Included
30 Mural St.
Richmond Hill, ON L4B 1B5
Canada
(416) 881-9941

For All Systems:
Colored printer ribbons
Princeton Office Supply
43-15 Quail Ridge Dr.
Plainsboro, NJ 08536
(609) 799-2515

Paper, ribbons, etc.
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P.O. Box 3056
Berkeley, CA 94703
(800) 331-1868

Paper, envelopes
Wizard Computer Accessories
2423 West Devonshire Ave.
Phoenix, AZ 85015
(602) 285-1355

WareWithAll; \$14.95
Hi-Tech Expressions, Inc.
2699 South Bayshore Dr., Ste. 1000A
Coconut Grove, FL 33133
(800) 848-9273

\$79.95

Zoomracks II: an integrated productivity tool thats fun to use.

Now with math, report formatting, improved mail merge,
Degas file displays, easier to learn.

Zoomracks is an integrated productivity tool based on a simple and familiar concept. You keep your information--names and addresses, invoices, correspondence, or whatever-- in cards in racks like those next to factory time clocks. It is easy to use, helps you structure your problems, and it can handle an exceptionally wide variety of applications.

Zoomracks lets you zoom back to see the first line of several cards, and several racks next to each other--compressed for display with its Smart Zoom feature.

2.	C:QNAMEs	4.	C:KEYHELP	0.	C:Disk
Mr. Joel Cairo	BE5-3341	SHF F5 Zom Pict r ll Tgg!		C: DICT	105472
Mr. Mils Archer	AL3-7845	-		C: DISTRIBU	7168
Mr. Rick Blaine	CA3-1871	Alt N-Next/Prior Menu		C:F1HELP	29696
Mr. Sam Dooley	Ca-1871	F10-Next Quickcard		C:GRADES	2048
Mr. Samul Spade	AL3-7845	F9-Prior Quickcard		C:IBM REGIS	14336
Mr. Sid Wise	LE5-1299	TAB-Next Fieldscroll		C:INVESTOR	8192

Here you get an overview of three racks. Pressing one key zooms you in on one rack; pressing another, zooms you in on one card. To go someplace on the screen or execute a command, just click the mouse.

Mr. Joel Cairo	BE5-3341
Mr. Mils Archer	AL3-7845
Mr. Rick Blaine	CA3-1871
Mr. Sam Dooley	Ca-1871
Mr. Samul Spade	AL3-7845
Mr. Sid Wise	LE5-1299

Mr. Sam Dooley	CA3-1871
Piano Player	Rick's Place
Downtown	
Casablanca Morocco	
Sam Dooley is the well known piano player at Rick's Place and is best known for his rendition of "As Time Goes By."	

What the reviewers said about Zoomracks (version I)

"Zoomracks, a \$79.95 wonder...from Quickview Systems"
- Newsweek

"The simplest thing in the world to use... very much recommended"
- Jerry Pournelle, Byte

"Truly innovative, ... flexible... extremely easy to use..."
- InfoWorld

"practical and even fun ... you can always visualize your data as you want --- from a broad overview of the whole database to a specific detail of a single field..."
- Art Leyenberger, Compute!

"99% of the database needs in home and small business computers do not require the power and programming features of DBASE III. In fact, by the time you learn DBASE III, you could have all your database needs filled by Zoomracks.

For those of us with two left thumbs...It is very hard to lose data with this well thought out system... less than \$100 and worth 10 times that amount"
- Don Terp, ST Business

You can be an anarchist...and this program will bring order to your chaos...It is useful enough to become a standard equivalent to Lotus 1-2-3 in the industry.
- Jim Bumpus, Atari ACE

"*****...the more I use Zoomracks, the more I like it, and the more I can see to do with it.... will be with us for a long time, finding a solid niche in both home and office."
- Richard Keller, ST Applications

Zoomracks has established a productivity standard in design, concept, originality, and functionality."
- Alan Glick, JBUG (Boston Computer Society)

Zoomracks is totally in a class of its own... I found it so useful I considered buying another ST for my office.
- John Leon, HASTE Elektronik Letter

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FLEXIBLE: Modify templates and report formats, copy between fields and racks, view multiple racks, zoom in on a rack or card.

EASY TO USE: No field sizes to specify, few frustrating error messages, visual inter- face, Doesn't require programming. Few con- cepts to learn: everything based on cards in racks. You can undo commands

EASY TO LEARN: on-line tutorial, on-line help, 180 page manual, use Commands or menu. Works with or without mouse.

FUN: For people who hate data bases. Point and zoom in on cards, racks. Toggle commands let you try and untry things.

*Uses are limited only by your
imagination: Ask some one who uses it.*

OFFICE: Mailing lists, Form letters, invoic- ing, agendas, projects, tickler files, payables, receivables, credit records, correspondence, schedules, appointments, office procedures, check registers, employee records.

EDUCATION: annotated bibliographies, lesson planning, test banks, dissertations, organize notes for class, books, anything you do with index cards.

HOME: Address and phone lists, insurance catalogue, credit card records, shopping lists, Christmas card records, videotape/records catalogue, recipe cards, checkbook.

SALES: prospect files, tickler file, call reports, mailing lists, sales order entry.

Coming soon: Zoomracks Starter Packs with templates and forms for the office, home, school, collectors etc. (\$19.95 each).

Available at your local ST retailer or mail this coupon to Quickview Systems, Dept. x, 146 Main St., Suite 404 Los Altos, CA 94022 California residents add 6.5% sales tax.

- Zoomracks II* \$119.95 (\$149.95 after 12/25)
- Zoomracks I \$79.95 (Upgraded)

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*Zoomracks II lets you save macros and create multiple print formats. Registered Zoomracks owners can up- grade to Zoomracks I (\$14.95) or Zoomracks II (\$79.95)

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Try This!

Combining the snarls out of logic puzzles

By EDWARD H. CARLSON

Surely you have run across Messrs. Brown, Green, Black, and White who have different first names, occupations, and tastes in something or other. Having been given a few clues about who goes with what, you are challenged to sort out the rest of this complex skein of relationships.

Although your mind is the fundamental tool for solving logic puzzles of this type, a computer can offer a powerful assist. In this article, we will discuss the several roles your Atari can play in

Figure 1. A typical logic puzzle. From the Dell Book of Logic Problems, 1984. Reprinted with permission of Dell Publishing, Inc.

Football Game Watchers

by Margaret Shoop

Four friends, including Mike, gathered at Mike's home on a Sunday afternoon to watch a football game on television between the Washington Warriors and the New York Braves. From the clues that follow, can you determine each fan's last name (one is Blake-ly) and occupation (one is a statistician)?

- Two of Mike's guests were Donna and the building contractor.
- Hugh, whose last name isn't Horner, is a loyal Braves fan.
- Donna isn't the dentist.
- Jenkins, an avid Warriors fan, went home before the game was over, following an apparently conclusive Braves touchdown late in the fourth quarter, which put the Braves in the lead.
- Jean and Anderson were both delighted to watch the Warriors win the game with a touchdown in the final seconds.
- The programmer was the last person to go home.
- Horner isn't the building contractor.

helping you comb the snarls out of logic puzzles and present a program that puts some of these techniques into practice.

Two Hemispheres Solve a Puzzle

Figure 1 shows a typical logic puzzle, reproduced here by permission of Dell Puzzle Publications, Inc. When a wetware computer (read: "human being") works on such a puzzle, he tends to start by constructing tables like the ones shown in Figure 2.

These tables are used to keep track of the relationships that turn up as the

clues are examined. As positive relationships (Donna is the programmer) are established, the appropriate cells in the tables can be marked with dots or equal signs. Negative relationships (Mark is not the statistician) can be marked with X's.

Since determining positive relationships and facts is the object of logic puzzle-solving, authors of such puzzles are notoriously stingy with these. Much more often, clues are phrased in such a way that only negative correlations are revealed at first.

Figure 2. A set of solution tables for Football Game Watchers.

	Anderson	Blakely	Horner	Jenkins	bldg. cont.	dentist	program.	statis.
Mike								
Donna								
Hugh								
Jean								
bldg. cont.								
dentist								
program.								
statis.								

Logic Puzzler

ATARI KEY

- Any Atari 8-Bit Home Computer
- Atari Basic

```

10 GOTO 1200
20 REM ----- MAIN LOOP -----
30 OPEN #1,4,0,"K:"
40 PRINT CHR$(125);K$="0"
50 PRINT :PRINT " USE UPPER CASE ONLY":PRINT
60 PRINT " LOGIC PUZZLE SOLVER":PRINT
70 PRINT " 1 ENTER CATEGORIES"
80 PRINT " 2 DISPLAY & CORRECT ITEMS"
90 PRINT " 3 ENTER RELATIONSHIPS"
100 PRINT " Q QUIT"
110 GET #1,K:K$=CHR$(K)
120 IF K$="Q" THEN 160
130 Y=VAL(K$)
140 ON Y GOSUB 170,1040,360
150 GOTO 40
160 END
170 REM --- ENTER CATEGORIES & ITEMS
180 FLAG=1
190 PRINT :PRINT " ITEMS: ";LW;" OR LESS CHARACTERS"
200 PRINT :PRINT " NUMBER OF CATEGORIES"
210 INPUT NC:FOR I=1 TO NC:LW=C$(I)=" ":NEXT I
220 PRINT :PRINT " NO. OF ITEMS IN EACH"
230 INPUT NN:NI=NN*NC
240 FOR J=1 TO NN*NC:LW=LW STEP NC:LW=N$(J,J+NC*LW)=C$
:NEXT J
250 FOR I=1 TO NC:BC=(I-1)*LW+1:PRINT
260 PRINT " CATEGORY NAME"
    
```

(continued)

Clue 1, for example, reads "Two of Mike's guests were Donna and the building contractor." This sentence hides at least two negative relationships: 1) Mike is not the building contractor, and 2) Donna is not the building contractor. So two X's go into the "professions" table.

As negative relationships accumulate, certain positive relationships can be proved by elimination. If, for example, you have recorded that Mike is not the building contractor, dentist, or programmer, then, by elimination, he must be the statistician, and you can enter another relationship into the table—one not provided directly by the clues. (By the way, the "facts" I give here concerning the Football Game Watchers puzzle are for illustration only. They are unlikely to be correct, or even consistent!)

After a bit, the tables suggest so many hidden relationships that they snowball. Eventually, every person is connected to all the proper attributes, and the puzzle is solved.

Silicon and Software Lend a Hand

Now let's trot along the path the program follows as it helps us solve a logic puzzle. As it stands, the program acts as a sort of solver's amanuensis, keeping track of the facts you enter in an orderly fashion and displaying them in a coherent way. The first thing it asks you to do is enter the number of categories that exist in the puzzle you are attempting to solve, and the number of items in each.

Football Game Watchers is a three-category puzzle (first names, last names, professions), with four items in each category. So you enter the names of the categories and the names of the items. In the present example, Category 1 might be called First Names and contain the items Mike, Donna, Jean, and Hugh; Category 2 might be Professions and contain the items Statistician, Dentist, Building Contractor, and Programmer.

After that, you can start entering facts and relationships gleaned from the clues. These are entered as expressions of the form $A = B$, for positive relationships, and $A ! B$, for negative ones (the exclamation point stands for "is not"). The clue "Two of Mike's guests were Donna and the building contractor," for example, would result in two fact entries of the latter form, thus:

MIKE ! BLDG
DONNA ! BLDG

```

270 INPUT CC$
280 C$(BC,BC+LW)=CC$:BI=(I-1)*NN*LW+1
290 FOR J=1 TO NN
300 PRINT " ITEM NAME":INPUT CC$
310 AI=BI+J*LW-LW
320 N$(AI,AI+LW)=CC$
330 NEXT J:NEXT I:GOSUB 1040
340 NT=0:FOR I=1 TO NC:NT=NT+I:NEXT I
350 RETURN
360 REM --- ENTER RELATIONSHIPS ---
370 PRINT :PRINT " Input relationships in this form:"
PRINT
380 PRINT "      X=Y      where = means IS"
390 PRINT "    or X!Y      where ! means ISN'T "
400 PRINT "    or X?Y      where ? means ERASE THIS
      RELATIONSHIP"
410 PRINT "    or X@Y      where @ means DISPLAY
      THIS TABLE"
420 PRINT
430 PRINT "      X and Y are ITEM NAMES":PRINT
440 PRINT " Enter DONE when you are done entering rela
tionships:"
450 PRINT :CC$=""
460 INPUT CC$:IF CC$="DONE" THEN RETURN
470 NR=NR+1:ER=0:GOSUB 510
480 IF ER=0 THEN GOSUB 810:GOSUB 960
490 IF ER<>0 THEN NR=NR-1
500 GOTO 450
510 REM --- PARSE THE SENTENCE ---
520 L=LEN(CC$)
530 FOR I=1 TO L
540 K$=CC$(I)
550 IF K$="=" OR K$="!" OR K$="?" OR K$="@" THEN V$=K$
:GOTO 580
560 NEXT I
570 PRINT "INCORRECT GRAMMAR IN THE SENTENCE":NR=NR-1
RETURN
580 X$(1,LW)=E$(1,LW)
590 X$(1,LW)=CC$(1,I-1):S1=I+1
600 IF CC$(S1,S1)=" " THEN S1=S1+1:GOTO 600
610 Y$(1,LW)=E$(1,LW)
620 Y$(1,LW)=CC$(S1,L)
630 GOSUB 640:RETURN
640 REM --- IDENTIFY THE ITEMS ---
650 XC=0:YC=0
660 FOR I=1 TO NI*LW STEP LW
670 IF X$=N$(I,I+LW-1) THEN XC=I
680 IF Y$=N$(I,I+LW-1) THEN YC=I
690 NEXT I
700 IF XC=0 THEN PRINT " ITEM NOT FOUND: ";X$:ER=1:RET
URN
710 IF YC=0 THEN PRINT " ITEM NOT FOUND: ";Y$:ER=1:RET
URN
720 XC=(XC+LW-1)/LW:YC=(YC+LW-1)/LW
730 IF XC>YC THEN 760
740 X=XC:XC=YC:YC=X
750 CC$=X$:X$=Y$:Y$=CC$
760 IX=INT(XC/NN-0.1)+1:JX=XC-NN*(IX-1)
770 IY=INT(YC/NN-0.1)+1:JY=YC-NN*(IY-1)
780 IF IX=IY THEN PRINT " ITEMS ARE IN THE SAME CATEGO
RY: ";X$:Y$:ER=1
790 REM PRINT XC, YC, IX, IY, JX, JY
800 RETURN
810 REM --- UPDATE THE TABLE ---
820 TB=((IX-2)*(IX-1)/2+IY-1)*NN*NN+(JX-1)*NN+JY:REM :
PRINT " TB ";TB
830 IF V$="!" THEN GOSUB 870

```

(continued)

If you find you have entered a relationship incorrectly, you can erase it by entering an expression of the form A ? B. Thus, you could erase the relationship established above by typing:

```
DONNA ? BLDG
```

Finally, by entering an expression of the form A & B, you can display the table of relations for any two items of different categories.

The computer can understand a relationship in whichever order it is given: MIKE = PROGRAMMER means the same thing as PROGRAMMER = MIKE. When entered, each relationship passes through a parser to unravel its meaning and check its grammar and vocabulary; it then flows on to the table-update section which checks that the logic of the relationship is consistent with previously entered relationships. If you said that MIKE ! BLDG and then tried to say that MIKE = BLDG, an error message would inform you of the inconsistent logic and you could try again.

Unfortunately...

By now you have noticed the program's arrogant little deception. As written, it does not actually solve the puzzle—it just helps you to do so. Your brain is still required to perform the deductive process of looking at the clues, singly and in combination, and distilling facts from them in a form that can be entered into the tables.

Even as an amanuensis, the program could be improved somewhat. Limited conclusion-drawing capability could be added, for example, so that if the program knows that Mark is not the dentist, and not the contractor, and not the programmer, then he *must* be the statistician. Extra display features might be added to enable the user to ask the program to display all facts associated with a particular item. Many extensions of this kind are possible.

Moreover, logic puzzle authors sometimes use tricks that cross up the application of this program to certain puzzles. One of these is multiple assignments (suppose the football watchers puzzle allowed more than one person to be a programmer). In the process of writing extensions, why not see if you can generalize the program to include most puzzle variants in common use. For sample puzzles, check out the *Dell Book of Logic Problems*, Rosalind Moore and Mary Ann Kennedy, Eds., Dell Publishing, Inc., NY, 1984. ■

```

840 IF V$="" THEN GOSUB 900
850 IF V$="?" THEN GOSUB 930
860 RETURN
870 REM --- ENTER "NOT" IN THE TABLE
880 IF A$(TB,TB)="" THEN 950
890 A$(TB,TB)="!":RETURN
900 REM --- ENTER "IS" IN THE TABLE -
910 IF A$(TB,TB)="!" THEN 950
920 A$(TB,TB)="" :RETURN
930 REM --- ERASE ENTRY FROM TABLE --
940 A$(TB,TB)="" :RETURN
950 PRINT " LOGIC ERROR IN ";CC$:RETURN
960 REM --- DISPLAY THE TABLE -----
970 K=0:TB=((IX-2)*(IX-1)/2+IY-1)*NN*NN:Q=(IX-1)*NN*LNW
:S=(IY-1)*NN*LNW
980 FOR I=1 TO NN:PRINT " ";
990 FOR J=1 TO NN:K=K+1:PRINT A$(TB+K,TB+K);" ";:NEXT
J
1000 R=Q+(I-1)*LNW+1:PRINT " ";N$(R,R+LNW-1):PRINT :NEXT
I
1010 FOR I=1 TO NN
1020 Q=S+(I-1)*LNW+1:PRINT E$(1,I*2);N$(Q,Q+LNW-1):NEXT
I
1030 RETURN
1040 REM --- DISPLAY AND CORRECT ITEM
1050 PRINT CHR$(125):PRINT
1060 FOR I=1 TO NC:Q=(I-1)*LNW:PRINT C$(Q+1,Q+10);:NEXT
I:PRINT :PRINT
1070 FOR I=1 TO NN
1080 FOR J=1 TO NC:Q=((J-1)*NN+(I-1))*LNW+1:PRINT N$(Q,
Q+LNW-1);:NEXT J
1090 PRINT :NEXT I
1100 PRINT :PRINT " IS THIS CORRECT <Y/N>"
1110 GET #1,K:K$=CHR$(K):IF K$="Y" THEN 1220
1120 IF K$<>"N" THEN 1110
1130 PRINT " INPUT wrongname"
1140 INPUT CC$:L=LEN(CC$)
1150 FOR U=0 TO NC-1:Q=U*LNW+1:IF CC$=C$(Q,Q+L-1) THEN
1170
1160 NEXT U:GOTO 1180
1170 GOSUB 1210:C$(Q,Q+LNW-1)=E$(1,LW-1):C$(Q,Q+LNW-1)=C
C$:GOTO 1040
1180 FOR V=0 TO NI-1:Q=V*LNW+1:IF CC$=N$(Q,Q+L-1) THEN
1200
1190 NEXT V:GOTO 1220
1200 GOSUB 1210:N$(Q,Q+LNW-1)=E$(1,LW-1):N$(Q,Q+LNW-1)=C
C$:GOTO 1040
1210 PRINT " INPUT rightname":INPUT CC$:RETURN
1220 GOSUB 1230:RETURN
1230 REM --- PAUSE UNTIL SPACE BAR ---
1240 POSITION 0,23:PRINT " PRESS SPACE BAR TO CONTINUE
";
1250 GET #1,X
1260 POSITION 1,23:PRINT "
";
1270 RETURN
1280 REM ---INITIALIZATION -----
1290 PRINT " WAIT"
1300 LW=10:FLAG=0
1310 DIM K$(1),E$(10)
1320 E$=" : : : : : : : : : "
1330 DIM C$(71),N$(500),A$(1200)
1340 FOR I=1 TO 1200 STEP 10:A$(I,I+9)=E$:NEXT I
1350 DIM CC$(25)
1360 DIM X$(10),V$(1),Y$(10)
1370 E$=""
1380 BOTO 20

```




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Bridging the gap between traditional graphics packages and CADD (Computer-Assisted Design and Drafting) is, in an inordinately flexible and powerful software tool with applications ranging from business graphics to commercial design, mechanical drawing, and architecture.

At the simplest level, *The Graphic Artist* is a multicolor, high-resolution drawing environment giving full access to the capacious GEM arsenal of graphic and text handling tools. A dizzying

array of commands is implemented for drawing lines, frames and boxes, circles and arcs in various styles; filling areas with color and patterns; outputting and formatting text with a wide variety of attributes; and image editing.

When you work with *The Graphic Artist*, the display screen becomes a window onto a virtual drawing surface—a coordinate plane measured in generic "units." A reference grid can be superimposed on the work area or made transparent at will, and can be scaled to

measure fractions or multiples of units.

Units in the work area (and the large "virtual space" it subtends) bear no direct relation to units in the physical world. The unit space can be scaled and constrained, however, to create work areas ("world coordinate spaces") that relate closely to their physical analogs in scale and size. For example, when doing page layout with *The Graphic Artist*, it is possible to constrain the drawing surface to correspond to and 8 1/2" X 11" page with grid markings at even inches.

At the other extreme, the bounds of the drawing surface can be extended to cover 10⁵⁰ units square, forming a virtual sheet that, scaled one unit to the inch, would cover thousands of square miles.

What permits this enormous flexibility and capacity? *The Graphic Artist* stores graphic elements not as raster bitmaps tied to the resolution of the display or other output device, but as sets of abstract unit coordinates and commands (graphics "objects") that are translated to the display or other output device at whatever resolution it supports.

Based around the GEM NDC (Normalized Device Coordinate) system, this "object-oriented" approach to image handling increases the amount of information a drawing can contain to staggering proportions. In Figure 1, for example, a simple floor plan is displayed; Figure 2 shows a zoomed-in view of the same scene, revealing a tea service; while Figure 3 shows an even deeper zoom, revealing details of the engraving on a piece of silver.

Besides providing almost limitless creative freedom within a single, two-dimensional plane, *The Graphic Artist* permits a drawing to consist of up to 256 such planes, arranged as transparent layers that can be rendered visible or invisible at will. This overlay capability makes possible a whole variety of applications, from the creation of multilayer structural diagrams to correlated transparencies for overhead projection.

To further facilitate the creation of complex drawings, *The Graphic Artist* lets you save individual graphic objects or groups of objects to disk for incorporation into later work. It is thus possible to create extensive libraries of components that can be conveniently assembled into finished drawings with minimum creative overhead.

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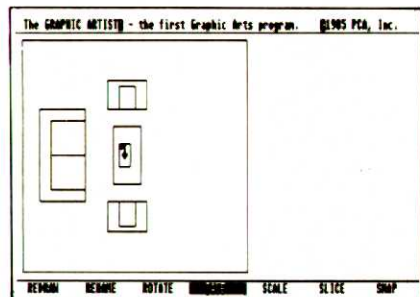


Figure 1.

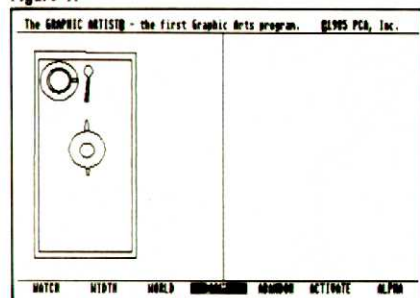


Figure 2.

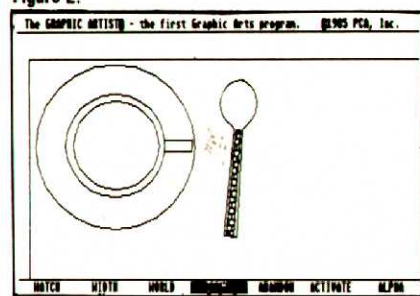


Figure 3.

By **NICHOLAS E. JAINSCHIGG**

The Spreadsheet

The Graphic Artist uses a unique spreadsheet system for organizing the elements of a design. As you draw, sequences of data and commands describing the objects you create are entered automatically into cells of a 500 X 500 spreadsheet.

By modifying and adding to these data with various commands, high-level relationships and dependencies can be established among the various objects portrayed. For example, it is possible to render the scale of one object dependent on that of another, or to make the form of an object reflect the values produced by a series of equations. In effect, the spreadsheet becomes a kind of dynamic "program," defining the appearance of your drawing according to conditions and procedures you devise. It is also a form of annotation that documents the structure of a drawing even when the eye is no longer able to resolve its elements.

As with a conventional spreadsheet, cells, columns, and ranges of cells can be moved around, copied, saved to and loaded from disk with great freedom. This permits the easy construction and use of templates that perform generic graphic tasks. For example, it is a fairly simple matter to design a template that will draw a histogram when values are plugged into a range of cells. Far more sophisticated applications come quickly to mind; for example, it should be possible to design mechanical drawing templates that will diagram parts automatically, based on numeric specifications. The mind boggles.

Business Graphics and Beyond

In addition to this battery of CAD functions, *The Graphic Artist* includes a full array of business graphics and text processing commands. Line, bar, pie, and exploded pie charts can be created directly from raw data, as in a standard business graphics package. Unlike standard business packages, however, charts created with *The Graphic Artist* can then be enhanced visually using the CAD functions and saved as objects for incorporation into works of larger scope—reports, presentation slides, whatever.

In addition to the wide range of text sizing and attribute functions afforded by GEM, *The Graphic Artist* incorpo-

The Graphic Artist provides almost limitless creative freedom within a simple two-dimensional plane.

rates limited facilities for handling text in ways a "desktop publisher" might find useful. Text can, for example, be justified, centered, proportionally spaced, "run in" to constrained spaces or across groups of linked spaces, and made to conform to margins. Eight fonts are provided on disk; these can be modified, or other fonts created using an ancillary Font Editor program. Also available is Fontpak-I, a two-disk collection of four additional fonts.

The Graphic Artist supports a wide variety of output devices, including the Hewlett-Packard Laserjet series, HP and HP-compatible plotters, and Epson-compatible printers. Two utilities are included to facilitate designing drivers for other brands of output device, but the manual warns that this is not a task for the technologically inept.

We did not have the opportunity to test *The Graphic Artist* with a laser printer (the recommended output device), but we can report that the quality of output on an Epson-compatible SMM804 dot matrix printer was more than acceptable—completely appropriate for reproducing all but the most formal or excruciatingly detailed drawings.

Progressive Computer Applications reports that some 520ST users have had difficulties printing with *The Graphic Artist*. This problem, they say, has been corrected in the recently released version 1.51, which PCA will send you in exchange for your 1.5 disk and a \$5.00 handling charge.

Documentation and Use

Although any program as complex and powerful as *The Graphic Artist* is going to require a considerable commitment of time to learn, the enclosed documentation assists the new user in proceeding quite a way towards mastery. The 364-page manual is clear and well-written, and presupposes very, very little knowledge of CAD, graphics, or even basic ST operations. Detailed instructions are given for making backups, configuring the program to run on your system, and getting started. A

lengthy tutorial with copious examples leads you through each feature of the program. Power users and fast learners will appreciate the concise, quick reference guides to commands and functions and the complete index to the manual as a whole.

Even with this assistance, learning to use *The Graphic Artist* is a fairly daunting project. Commands (and there are literally dozens of them) are executed mostly via one- or two-keystroke combinations (the mouse is used only as a drawing tool)—confusing until you get the command vocabulary partially memorized.

Even when you have memorized and fully understand the command structures, working with *The Graphic Artist* is a fairly slow and deliberate process in the early stages. A certain amount of planning is required to compose drawings using the geometric primitives supplied. In fact, you end up yearning for the "sketchpad" freedom of raster-based programs like *DEGAS*, even though the object-oriented approach to composition taken by *The Graphic Artist* offers infinitely greater power and ultimate flexibility.

Aside from wishing that the user interface of the program might conform more closely to the GEM standard, there are a few distinct bugs in the present release. Most noticeable of these is a tendency not to restore the graphic defaults of the system on exit, which causes the GEM desktop to reappear in whatever palette colors, line styles, etc. your *Graphic Artist* work led you to select. By and large, however, we found the program fairly stable in operation.

At \$199, *The Graphic Artist* is clearly not a tool for the weekend doodler. However, it is both affordable and powerful enough to be considered seriously for a wide range of professional applications. Businesspeople, artists, draftspeople, engineers, architects, and others seeking an inexpensive entrée into computer-aided design will find all they could hope for in this remarkable package. ■

Atari

The Year's Best 8-Bit Games

Some dazzling
entertainment disks
for the XL/XE

By ARNIE KATZ, BILL KUNKEL and JOYCE WORLEY

A year ago, certain "industry analysts" and other know-it-alls were prepared to close the books on the Atari 8-bit computers. The ST, loaded with advanced features, they predicted, would soon put the older systems on the shelf.

Well, twelve months have passed, and Atari enthusiasts remain dedicated to the older machines. The 8-bit Atari series has survived in a turbulent marketplace for one simple reason: their owners love them.

Software publishers, however, were a little slow to realize that the audience was still there, so they didn't release quite as many new entertainment programs as ardent gamers would have liked. Still, the XE and compatibles remain a superior medium for presenting leisure software.

Here, then, is the *creme de la creme* of this year's entertainment titles for the Atari XL/XE. We hope you will find some of your favorite games on our list and, perhaps, be inspired by it to try some new ones.

Action-Adventures

The most popular type of game for the Atari is the action-adventure. Six titles in this category made this year's list.

Alternate Reality: The City (Intelli-Creations; \$39.95) is the most ambitious effort. This fully-animated *tour de force* immerses you in a role-playing science fantasy embellished with breathtaking audiovisual effects.

The City is the first installment in a planned science-fantasy trilogy. In the opening episode, an alien spacecraft snatches you from Earth and transports you as a captive to a weird metropolis on an unknown planet.

You awaken in a room with a single portal. This distinctly otherworldly doorway leads out into *The City*. Passing through the exit generates your characteristics (strength, intelligence, wisdom, charisma, constitution, dexterity, and hit points) and begins the real adventure.

The interface of *Alternate Reality: The City* uses a combination of text and

illustration to create the world and its monsters and treasures. It is the extraordinary quality of the graphics, especially, which elevates the game to classic status. The sun rises and sets to mark the passage of the days and nights, and rain falls from overcast skies.

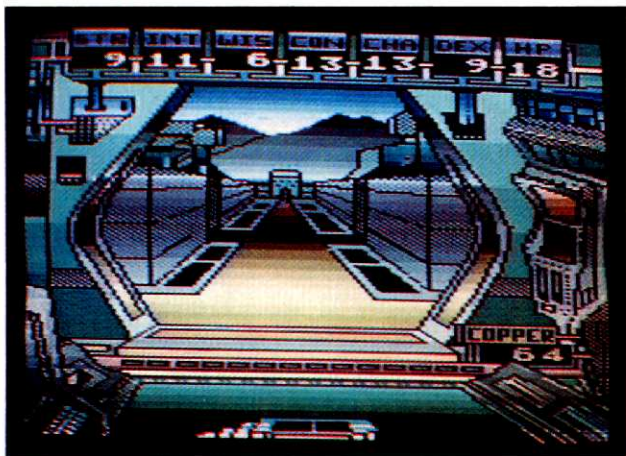
The promised sequels will expand and elaborate the world introduced in *Alternate Reality: The City*. But Atari-ans who love computer adventures will want to begin an odyssey in this strange land as soon as possible.

In praising the newcomer, there is no slight intended to the all-time champ: Lord British's *Ultima* series. *Ultima IV* (Origin; \$60.00) is the newest and splashiest installment in a series that gets better with each chapter.

The always-controversial designer has made some improvements in graphics and overall programming, but the unorthodox theme of *Ultima IV* is its most distinguishing characteristic. You roam wilderness, town, and darkest dungeons in search of nothing less than spiritual oneness. Monsters and treasures abound, but your true goal is the self-perfection of becoming an Avatar.

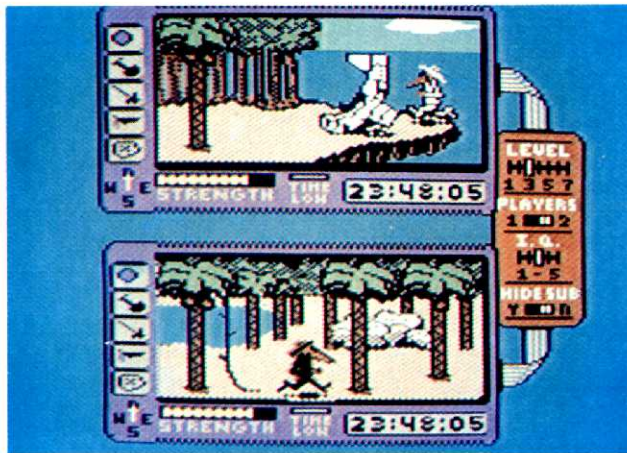
The main strength of *Wizard's*

Alternate Reality: The City

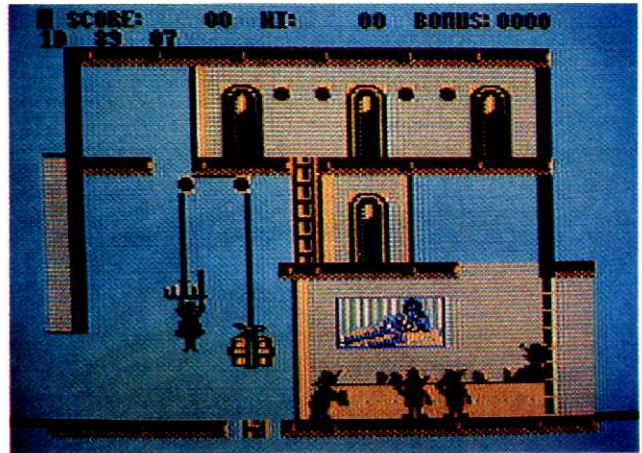


Ultima IV





Spy vs. Spy: The Island Caper



Zorro

Crown (Strategic Simulations; \$39.95), a role-playing adventure, lies in the loving attention to detail provided by the designer.

Characters, divided into the standard fantasy classes (sorcerer, priest, fighter, ranger, and thief) are individualized using a six-factor generating system. There are 26 weapons, 7 kinds of armor, 22 spells, 8 prayers (or Karma), and 30 skill areas which cover everything from a character's competence in combat to his ability to haggle effectively.

The game offers two combat systems. The computer can handle an encounter almost instantly in an abstract manner, or you can take full control of each adventurer in a more detailed rendition of the fight.

Wizard's Crown also boasts excellent terrain graphics and a moderately simple play system. Computer adventurers who glory in the intricacy of traditional role-playing contests should enjoy this game.

A somewhat less cerebral romp is *Spy vs. Spy II: The Island Caper* (First Star; \$29.95). Mike Reidel's sequel to his original hit is based on the famed Prohias strip in *Mad* magazine. *Spy II*, like

the earlier disk, employs a split-screen display and an on-screen "trapulator," which allows the secret agent to set deadly snares at the press of a joystick button.

Spy II takes place on a desert island, where the two cartoon antagonists have been stranded. Somewhere on the volcanic isle are pieces of a secret missile which they must retrieve. The two spies electrocute, barbecue, blow up, and otherwise make life miserable for one another while digging up the island in search of the lost weapon.

Spy II combines amusing graphics with more than enough action and strategy to satisfy even "serious" game players. Reidel has created one of the year's most enjoyable offerings.

Zorro (IntelliCreations; \$29.95) and *Goonies* (IntelliCreations; \$29.95) combine elements of the graphic adventure with the action-strategy play-mechanic introduced several years ago in *Bruce Lee*.

Zorro casts you as the famous masked adventurer who righted wrongs in old California with his trusty sword. This joystick-controlled contest sends the Fox on a 20-screen quest to free a

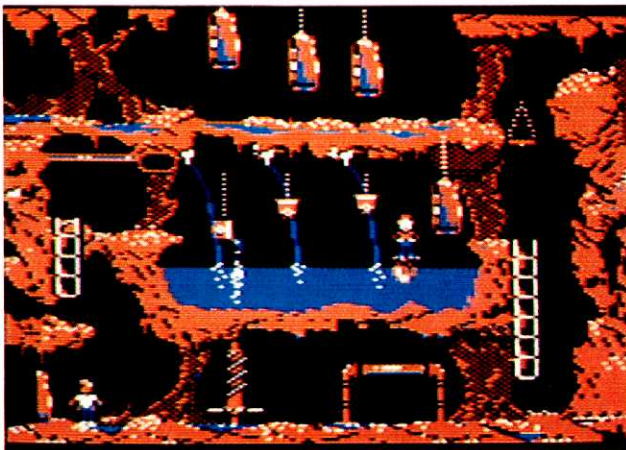
young lady held prisoner by the evil Commandante.

As *Zorro* moves from screen to screen, the rotund Sgt. Garcia and his band of armed incompetents tepidly pursue the black-garbed swordsman. To rescue the damsel and win the game, you must solve a succession of visual puzzles involving on-screen objects like ropes and trampolines to scamper about the adobe structures.

Goonies, based on the dreadful Steven Spielberg kids' adventure flick, uses a play-mechanic similar to that used in *Zorro*, but adds an interesting twist: You control not one, but two, surrogates. There are eight rounds, and you must get both characters to safety before advancing.

The game follows the plot of the film faithfully. It begins at the Fratelli house, where the boys must use a printing press to churn out counterfeit money to distract Mamma Fratelli while they make their getaway. It ends with the discovery of an ancient pirate galleon, complete with lost treasure, in a hidden underground cove. Along the way, there are mysterious caves, a giant octopus—which was cut from the film

Goonies



Antitam





U.S.A.A.F.



Lords Of Conquest



World Karate Championship



Hardball

prior to release—and other dangers. This is one time when a game has outdone the movie on which its license is based.

Military Simulations

Military simulations are also strongly represented on this year's list. Strategic Simulations deserves much of the credit for this. The publisher has continued to support the Atari 8-bit systems zealously, so the best in computer war gaming is available for the XL/XE.

Chuck Kroegel has produced a pair of Civil War titles which boast excellent detail, a realistic feel, and serviceable visual displays of the battlefields. In *Battle of Antietam* (\$49.95) you can restage this legendary conflict between Lee's Army of Northern Virginia and McClellan's Army of the Potomac on September 17, 1862, the single bloodiest day of the American Civil War. *Gettysburg: The Turning Point* (\$59.95) is an excellent treatment of an engagement which has always held special fascination for wargamers. The date is July 1, 1863 and Meade faces off against Lee in a small Pennsylvania farming town to re-enact the most significant battle of the War Between the States.

Kroegel's creations are not hard to play, but they don't gloss over any of the pivotal factors, either. Combat is decided down to the last soldier, and a new control scheme makes it less than certain that a field commander will actually implement your orders in time to do any good. This Civil War doubleheader is an armchair general's dream.

World War II mavens will enjoy *Panzer Grenadier* (\$39.95) and *U.S.A.A.F.* (\$59.95) (both from Strategic Simulations). The former puts you in command of a regiment of German elite armored infantry on the Eastern Front, while the latter deals with the daylight bombing of Nazi-occupied Europe by the United States Army Air Force.

Panzer Grenadier by Roger Damon is especially suitable for novice wargamers. It conveys the essence of armored combat, but its streamlined routine-of-play keeps things moving briskly. In *U.S.A.A.F.*, you can direct either the U.S. planes or the German ground defenses and Luftwaffe.

A more recent conflict is the subject of *Nam* (Strategic Simulations; \$39.95), Roger Damon's design is the first serious attempt to tackle that ill-starred campaign for the Atari. Six operations (Suoi Cat, Ap Bau Bang, Ia Drang, Tuy Hoa, Ben Het, and Hue) are simulated with you in command of combined forces from the U.S., South

Vietnam, and South Korea against the computer-controlled Viet Cong and North Vietnamese Army.

Lords of Conquest (Electronic Arts; \$33.00) combines strategic military operations with diplomatic interaction in the tradition of Risk and Diplomacy. *Lords of Conquest* involves the acquisition and exploitation of territory in an attempt to gain world dominance.

Unlike previous attempts to produce a computer game in which diplomacy plays a major role, *Lords of Conquest* offers a great solitaire version. It also offers something which no non-electronic boardgame of this type could possibly match: a choice of 19 playfields and a module that can generate custom-designed ones.

Sports Simulations

Sports simulations aren't nearly as plentiful for the XL/XE computers as for some other systems. Neither Gamestar nor the Avalon Hill Game Company has translated its 1986 titles for the Atari, so some of the year's top sports contests have yet to appear in this format.

The Racing Destruction Set (Electronic Arts; \$15.00) by Rick Koenig and Connie Goldman would make this list no matter how much competition it had. To play, you select one of the nine stock machines, including everything from a Can-Am racer to two motorcycles (city and dirt) and a lunar rover, and customize it by modifying the motor, tires, armor, and weaponry.

The completed vehicles can race on any of the 50 prepared courses included on the disk or on customized courses designed by you. Once you define the track conditions and choose "racing" or "destruction," it's time to roll.

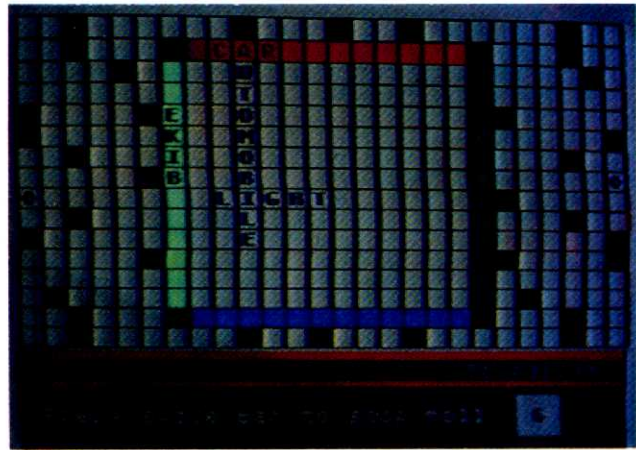
The program presents the track in three-quarters perspective. *Racing Destruction Set* utilizes a split screen so that the lead car isn't slowed down by a trailing competitor as in scrolling race simulations.

World Karate Championship (Epyx; \$39.95) is quite similar to Karate Champ, the Data East coin-op. You use the 17 possible joystick configurations to produce a range of martial arts moves which includes punches, kicks, spins, and leaps. This one-on-one battle can be enjoyed head-to-head or against the computer. Attractive intermission sequences, excellent graphics, and an on-screen *sensei* to make the calls make *World Karate Championship* almost as much fun to watch as it is to play.

Fight Night (Accolade; \$29.95) blends humor and ring action in a mix that resembles wrestling as well as box-



Super Boulderdash



Crosscheck

ing. In the "Championship Finals," your joystick-guided pugilist battles five progressively more skillful foes.

The second part of the game is the Boxer Construction Set, which allows you to assemble a fighter by selecting legs, trunk, body, head, and gloves from menus of components. The boxer then goes to the gym where you establish a training regimen.

The graphics are easily the best thing about *Fight Night*. They are cute rather than realistic—a good indication of a program that isn't meant too seriously. Highly skilled joystick jockeys may find that *Fight Night* becomes a little too easy after a few tournaments, but it certainly delivers a good measure of fistic excitement.

Hardball (Accolade; \$29.95) excels in its high-res depiction of the pitcher-batter confrontation. It employs a behind-the-pitcher perspective which anyone who watches the National Pastime on TV will recognize instantly. The animation is amazingly realistic, right down to the umpire's call of each ball and strike.

In truth, the rest of the game doesn't quite live up to this promising beginning. But the immediacy of the hitter-hurler rivalry makes this a 1986 winner.

Action Games

Action and action-strategy contests have always been a mainstay of the

Atari 8-bit computing. This year's best is *Super Boulderdash* (Electronic Arts; \$15.00). The disk presents a reprise of the First Star classic by Chris Gray and Peter Liepa along with 16 completely new playscreens to test wits and reflexes.

You use your joystick to maneuver "Rockford" through a series of action puzzles filled with boulders, fireflies, growing amoebas, jewels, and lots of dirt. Rockford's burrows makes boulders fall and shift the position of other items, too, constantly recasting the maze as play proceeds.

Like most other classic strategy games, *Boulderdash* is based on a relatively small number of elements. It is the way they are combined that creates the fun and challenge. The genius of designers Liepa and Gray makes *Boulderdash* an unflinching riveting entertainment experience.

Koronis Rift (Epyx; \$39.95) will remind many of Lucasfilms' earlier *Rescue on Fractalus*. In it, you pilot a scavenger craft across a planet that once served as the proving ground for the super weaponry of an advanced but long-departed alien race. The bank of scanner-monitors across the top of the screen and icon-based instrumentation at the bottom make it easy to direct the retrieval of all the valuable loot lying around for the picking.

Conflict arises from the fact that the

alien race left "guardian saucers" behind to watch over their devices. You must collect the planet's technology without succumbing to its automated protectors.

The final two entries on this year's Best list are *Crosscheck* (IntelliCreations; \$29.95) and *Fooblitzky* (Infocom; \$39.95). *Crosscheck* is a clever word game aimed at crossword puzzle fans. The object of this family-social recreation is to build a chain of words from the center of the board to your "home base." After you roll on-screen dice to determine the length of the secret word, the computer provides a clue and asks you to guess it. Up to four individuals or two teams can play. IntelliCreations promises more data disks to augment the *Crosscheck* package.

Fooblitzky is an off-beat title perfect for an evening of family fun. Fooblitzky is the name of the city in which the game takes place, a whimsical metropolis full of stores and hidden objects. Two to four contestants roam the streets of the city and visit shops to learn the identity and location of the four objects they must collect to win the scavenger hunt.

There you have it, the best 8-bit games of 1986. And only a fool would bet against the Atari XE and compatibles continuing to prosper long enough to enable us to return with a list of as many or more outstanding programs at this time next year. ■

Where to Find the Winners

Accolade
20833 Stevens Creek Blvd.
Cupertino, CA 95014
(408) 446-5757

Electronic Arts
2755 Campus Dr.
San Mateo, CA 94403
(800) 245-4525
(415) 571-7171

Epyx
600 Galveston Dr.
Redwood City, CA 94063
(415) 366-0606

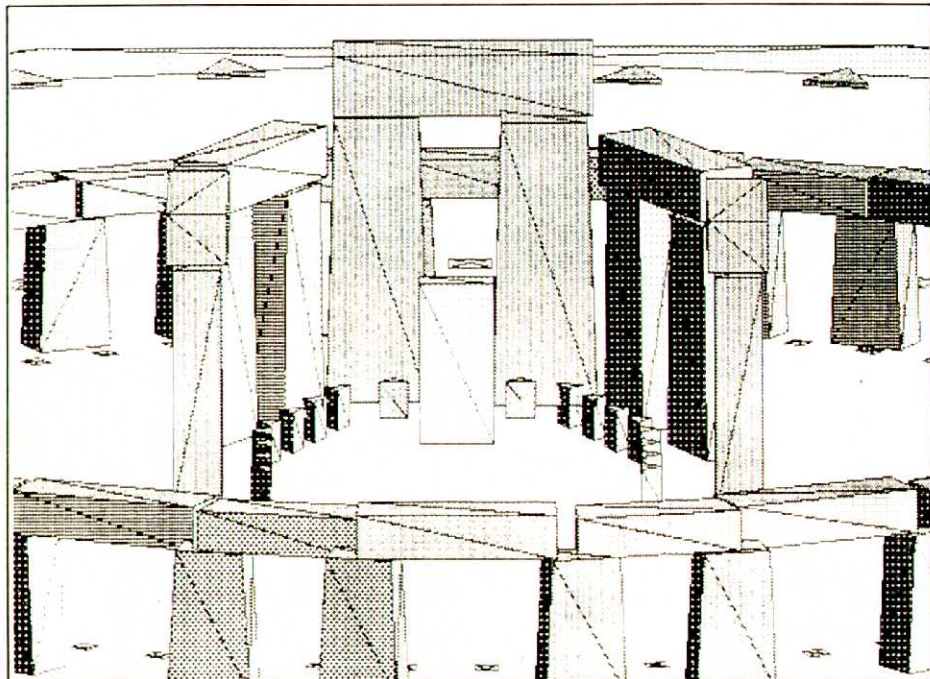
First Star Software
18 E. 41st St.
New York, NY 10017
(212) 532-4666

Infocom
125 Cambridge Park Dr.
Cambridge, MA 02140
(800) 262-6868
(617) 492-6000

IntelliCreations (Datasoft)
19808 Nordhoff Pl.
Chatsworth, CA 91311
(818) 886-5922

Origin Systems
340 Harvey Rd.
Manchester, NH 03103
(603) 644-3360

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



CAD-3D

*A new dimension
in computer-assisted design
for the Atari ST*

Computer-assisted design is now an indispensable element of our technology. Running on computers and workstations costing hundreds of thousands of dollars, CAD software speeds the process of industrial, electronic, and architectural design, and minimizes costly mistakes. By initially creating a part, circuit, or building within the confines of a computer dataset, designers can analyze and troubleshoot an item before committing time and money to a physical prototype.

Until recently the closest most people ever got to CAD was a TV commercial for Chrysler or a PBS special. With the advent of the microcomputer, however, interested folks have been able to give themselves a real taste of the computer revolution, including computer-assisted design. But CAD on an 8-bit machine is a very limited experience. It requires

System and Price: Atari ST (TOS in ROM); \$49.95
Summary: Combines ease of use with the capability for sophisticated 3-D modeling
Manufacturer:
 Antic Software
 524 Second St.
 San Francisco, CA 94107
 (415) 957-0886

tedious numeric entry of coordinates and often rewards intense effort with disappointing results—poor resolution, slow speed, and restricted capabilities.

The 16-bit Atari ST series has brought a new level of microcomputer sophistication into the consumer market at an extremely competitive price. The extensive hardware capabilities of this machine are now complemented by Tom Hudson's *CAD-3D*, a CAD program from Antic Software that combines ease of use with the capability for

truly sophisticated three-dimensional modeling.

CAD-3D runs in both monochrome and medium-res color modes. Because of the memory requirements of both program and constructed datasets, it requires either a 520ST with TOS in ROM or a 1040ST. The program is unprotected, so you can make archival back-ups.

Using the conventions of the GEM interface, *CAD-3D* allows you to create three-dimensional objects, then manipulate them on-screen. GEM windows, sliders, and pull-down menus simplify the process dramatically, as does a set of very powerful tools that impressively anticipate your needs. But among the most significant breakthroughs in the package is mouse-based entry of data coordinates. *CAD-3D* does not require you to make dimensional calculations on your own, nor does it accept lists of numerical coordinates.

Rather, the program allows you to point and click the mouse to draw the object you want. It will lay down a cube, sphere, wedge, or torus automatically and allow you to stretch, scale, and manipulate it with remarkable ease.

How It Works

The default *CAD-3D* desktop splits the screen into four windows. These break down into four views, which are two-dimensional representations of the three-dimensional "universe" available to you. The first is the "camera," which represents your selectable point of view toward any object. The others default to top, right, and frontal planes, which can be toggled to bottom, left, and back. The camera window makes no changes in the object itself, but rather changes your view of that object.

Using sliders in the camera window, you can rotate the camera horizontally and vertically, as well as zoom in and out to varying levels of magnification. Another option available from the camera window is "perspective," which automatically foreshortens the view of an object to the degree you specify. This option is especially useful in making objects seem massive.

Manipulation of an object in any win-

By JOHN J. ANDERSON

dow other than the camera window makes "actual" changes in the object. You can rotate and scale an object horizontally or vertically in whichever plane you select, as well as move it around within that plane. You can duplicate objects, then select and drag them to new locations.

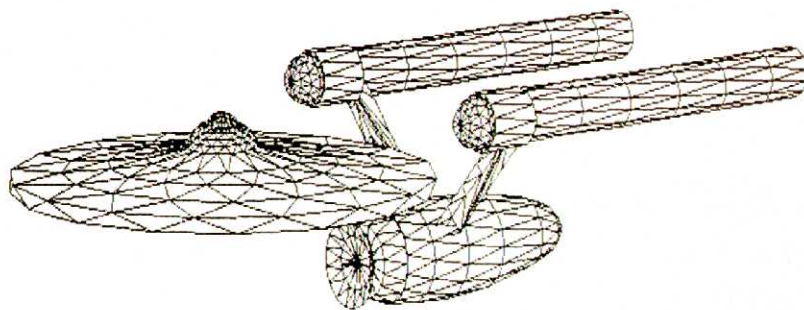
CAD-3D is object-oriented, which means that each object is discrete, requiring its own object name. Using a clever set of pull-down menu choices, manipulation of multiple or single objects is clarified and made as nearly intuitive as possible.

In addition to pre-stored geometric shapes, two very powerful shape-generation tools simplify the design process. The first, called *EXTRUDE*, allows you to define a shape in two dimensions using the mouse, then to pull that shape out in a third dimension to whatever length you like. *EXTRUDE* works in a manner somewhat analogous to a jigsaw. If you wanted a three-dimensional letter "e," for example, you would simply draw the letter conventionally in the *EXTRUDE* window, set its thickness to your liking, then select *DO EXTRUDE*. And there would be your three-dimensional letter. *EXTRUDE* creates cubes, girders, and wedges with ease.

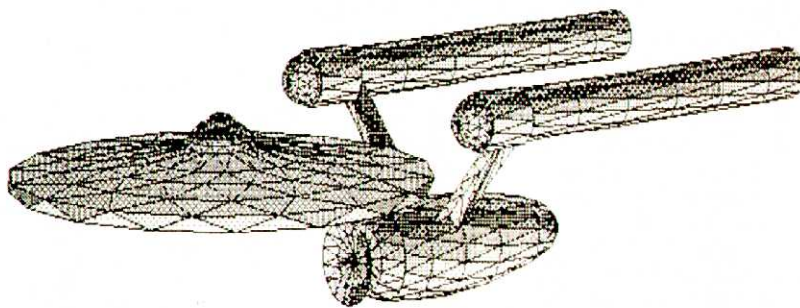
SPIN is an even more powerful tool than *EXTRUDE*. It works very similarly, but rather than working like a jigsaw, it works like a lathe, providing you with a symmetrical "turned" object. It is the tool to use for creating bowls, goblets, fuselages, rings, and the like.

Once you have a set of multiple objects placed three-dimensionally, you can *JOIN* them. They can be joined additively, which is like glueing them together, or subtractively, which allows you to "cut" one shape out of another. A third *JOIN* function, called *STAMP*, joins the silhouette of one object to another across the faces of both that meet, rather like a rubber stamp. This feature allows you to "print" or "emboss" the face of a defined object.

Four depictions are available for defined objects: *WIREFRAME*, which depicts every line of the object as if it were modeled from wire; *HIDDEN*, which plots the object with hidden lines suppressed for a more realistic view; *SOLID*, which shades planes to create the effect of a sculptured object; and *OUTLINE*,



Wireframe depiction: hidden lines suppressed



Starship Enterprise: Outlined solid object

which superimposes a *HIDDEN* plot over a *SOLID* plot. Another menu selection allows you to toggle between depictions of all lines or edge lines only.

On a monochrome screen, *CAD-3D* provides high-resolution plotting and sophisticated grey-scale shading. On a color screen, line plots are chunkier, but shading occurs in 14 shades of one color or seven shades of two colors. Colors are selectable from pull-down menus.

More Features

Three "spotlights" are available to illuminate depictions of solid objects, and their positions and brightness are user-selectable. There is also an "ambient" light setting, which provides a selectable brightness of diffuse light from all directions.

CAD-3D data can be saved in several ways. *SAVE ALL* saves all the three-dimensional objects in *RAM* to disk along with all current light settings. *SAVE GROUP* saves only selected objects to memory, without lighting data. You can use this method to develop a library of "primitives," which you can then use to create sophisticated shapes. Individual camera "superviews" can also be saved as screen dumps, and *CAD-3D* allows you to save them in *DEGAS*, *Neochrome*, or *C.O.L.R.* format.

A separate animation module on the program disk enables you to join object superviews into a chained animation.

Alternatively, you can chain *Neochrome* screens using another module included on the program disk. (*DEGAS* screens can be chained using a program that comes with *DEGAS*.)

A number of impressive 3-D constructs are supplied as demos on the *CAD-3D* disk. These include a representation of the ancient monoliths of Stonehenge, and viewed in backlit shades of blue, they are very impressive indeed. Gary Yost of Antic provided me with another disk full of images, including a set of chess pieces that are magnificently rendered. More *CAD-3D* datasets are available for download on the AtariSig of CompuServe, with new ones appearing regularly. Most reflect the growing skill of program creator Tom Hudson who deserves a salute for his programming and plotting prowess.

CAD-3D takes a bit of commitment to use, and even more to use effectively. Be prepared to sit with documentation in hand, engaging in many an exploration. But in contrast to any inexpensive CAD program I have seen to date, this one is truly worth the effort. The results are masterful. *CAD-3D* is without parallel in the the world of low cost micro-computer-assisted design.

Wish List

That having been said, I am loathe to nitpick, so let's call what follows a wish list:

3-D glasses will make objects float out in front of the monitor screen.

CAD-3D can be maddeningly slow, especially when JOINing multiple objects. In fairness, a slew of complex calculations takes place during this time, but there are times when you might actually fear that your computer has locked up, despite the reassuring window update-status headers.

The manual tries hard to be friendly but thorough and falls far short of the effort it attempts to document.

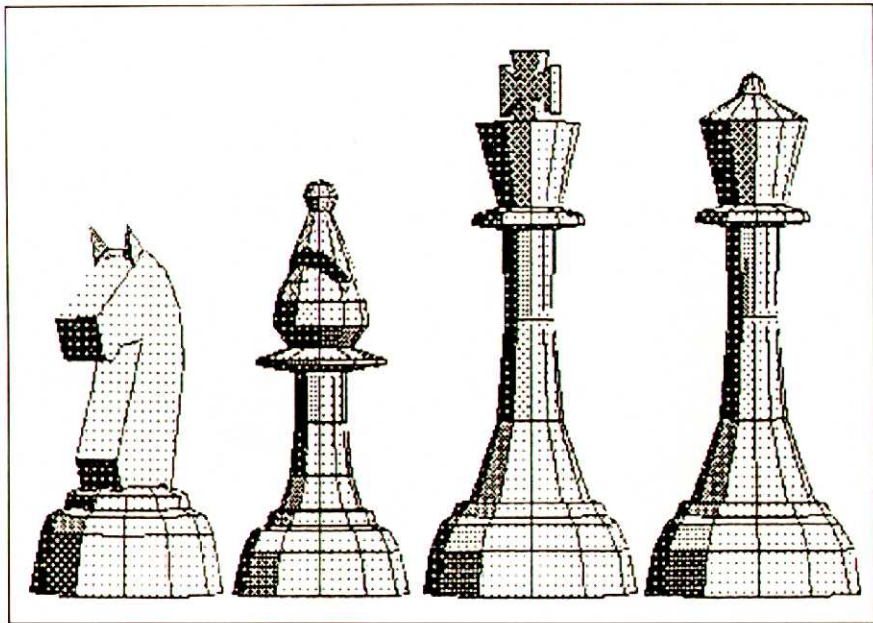
Mouse control is less than precise. When manipulating objects, the mouse feels a little clunky. When clicking between windows, some clicks "take" and others don't—very discomfiting.

SPIN and EXTRUDE are superb tools, but if there were more tools, the capabilities of the program could be boosted substantially. Unfortunately, it is not exactly a pleasure to design forms with these tools. Even in grid mode, where points are supposedly restricted to discrete coordinates, it is all too easy to miss the mark. There are no cut and paste, mirror, or ruler tools to expedite design.

Another constraint is that you must always draw in a clockwise manner. It would be wonderful if the program included 2-D input as well as output capability; you could then move a *DEGAS* file into a top plane, for example, and super-extrude or super-spin from there.

Although manual input of coordinates is a task I wouldn't wish on a computer-literate canine, it should probably be considered a limitation that the program does not provide for any kind of input other than that pointed-and-clicked by the mouse. Actual numerical input or some sort of "stick figure" drawing mode would add new levels of sophistication to an already sophisticated product.

The animation modes are quite limited. Logically, the animation module slows in direct proportion to the complexity of the objects it depicts. As a result, all but the simplest renderings are slowed to a crawl. By loading *Neochrome* images into a RAMdisk,



you can achieve impressive animation effects, but of course, the number of frames you can use is then limited to the size of the disk cache. With a tolerably quick hard disk drive, however, the animation capabilities of the program are significantly increased.

When building animation files, there is no logging, step-through, or back-track capability, nor is there extensive error-checking; you don't know what you have until it is "in the can," and you exit *CAD-3D* to have a look at it, or until you have already errored out.

While there is a merge feature, which allows new objects to be loaded without clearing those in memory, there is no macro or primitive support to help the design process along. It would certainly be nice if you could load your own set of primitives just as you can load those that Tom has made available as default cubes, spheres, wedges, and tori.

Now that the "if-onlys" have been addressed, let me reiterate that *CAD-3D* is a capable, powerful, and impressive program. Even an ST can do only so much.

The Future of CAD-3D

The problem is that when you stumble on a program as good as *CAD-3D*, you find yourself thinking, "well, if only it could do this," and "gee, if only it could do that." We can only hope that

RAM constraints will soon crumble, disk-packing techniques will soon improve, the blitter chip will soon advance the state of ST graphics, and new revs of the software will eventually appear.

I asked Gary Yost what was ahead for *CAD-3D*. He told me that he plans to release a module next year that will present three-dimensional models in "stereo"—that is, with 3-D glasses to make objects float out in front of the monitor screen. Before you groan, note that we are *not* talking about red/blue or even polarized lenses, but high speed liquid crystal shutter lenses, oscillating electronically at 1/60 of a second.

This technology was pioneered by Sharp in Japan, and I have experienced how impressive it is in rendering 3-D NTSC video. The glasses sync with screen refresh for the ST, which alternates between left and right eye views. Gary assures me that a prototype is up and running and providing some fantastic images.

The next step after that? Interface to a three-dimensional plotter, of course. Start with a cube of wax rather than a sheet of paper, and watch it whittle your flights of fancy into three-dimensional sculptures.

We'll be keeping an eye—make that both eyes—on the talented Tom Hudson. [See the interview with Tom Hudson elsewhere in this issue.—Ed.] ■

What Next?

After the new wears off, many personal computers wind up gathering dust in a closet. Don't let your Atari be one of them.

Why did you originally buy an Atari computer? To do word processing? To compose music? To manage your business? To play games? Chances are, whatever your initial reason for buying an Atari, you've discovered that it has many additional capabilities and potential applications.

The flip side of the coin is that you've probably experienced some frustration as well. Maybe your word processing package won't do subscripts or underlining. Perhaps your database won't sort on as many fields as you need. Or, it could be that when you write a program, your whole system acts user-hostile.

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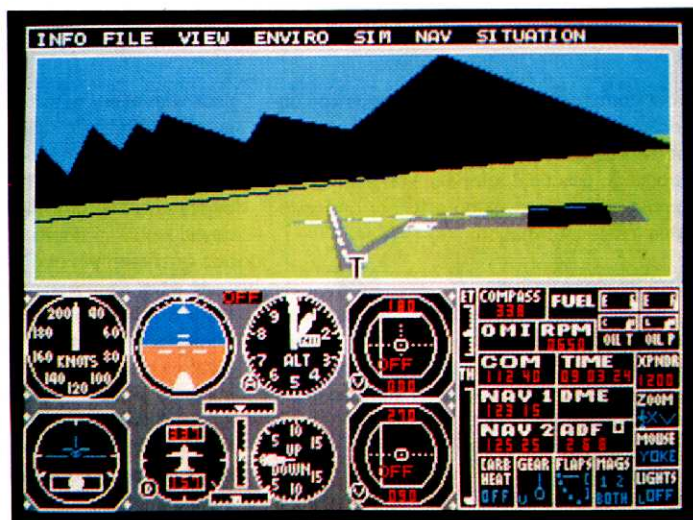
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Flight Simulator II

ST graphics and speed add amazing realism to Sublogic's latest simulation



graphical locations supported, and you can land and take off from any of them.

The World Around You

Perhaps the most striking thing about the *Flight Simulator II* package is the graphics. As you look out the windows of your plane, what you see is not a flat picture but a complex, three-dimensional representation of the area you are flying over, including the manmade landmarks (buildings, roads, bridges) that would aid your navigation from the cockpit of a real plane. For example, I have visited San Francisco and had no trouble at all identifying the Oakland Bay Bridge, Alcatraz, and of course, the Golden Gate Bridge. (If you want to have some fun, try flying the Learjet under the bridge.)

While the graphics that depict the scenery are well-done and quite detailed, what makes the flight simulator seem real is the speed with which the program updates the display. The faster the new images are drawn, the better the illusion of motion and flight, and it is here that the power of the 68000 becomes evident, for the ST version of *Flight Simulator II* offers a faster frame change rate than any of the previous versions. It completely redraws each scene up to ten times per second—eight times faster than earlier versions for other machines—and produces much more detailed images.

It's just possible, you know, that an Atari ST and *Flight Simulator II* from Sublogic could be one of the most sensible and economical purchases you will ever make. If you doubt it, just compare the cost of a Gates Learjet, the training to fly it, and the fuel to keep it in the air with the cost of a complete flight simulator system from Atari and Sublogic—talk about "power without the price."

Having used earlier versions of *Flight Simulator II* for other machines, I was quite eager to see just how much power the superior color graphics and high speed data processing of the ST had added to one of my favorite entertainment packages.

But I'm getting ahead of myself; I should explain that *Flight Simulator II* is a program that simulates the flying of an aircraft. You are the pilot, and depending on your skill and knowledge, you can fly as smoothly as an experienced pilot—or crash like a dodo bird. The advantage of taking your training in front of the computer is that after a crash, all you have to do to restore body and property is reboot your aircraft.

The program offers a very realistic approach to flying an aircraft, including an authentic control panel, smooth and accurate response from the plane, real world physics, and excellent graphics.

Getting Started

Flight Simulator runs on any ST with at least one disk drive, 512K or

System and Price: Atari ST; \$49.95

Summary: A great new version of a best-seller.

Manufacturer:

Sublogic
713 Edgebrook Dr.
Champaign, IL 61820
(800) 637-4983
(217) 359-8482

RAM, and a color monitor (Sublogic promises that a subsequent version will work with monochrome systems).

The program loads quickly, and if it detects no input from you, automatically runs a demo. I recommend that you watch the demo at least once, because it gives you a good idea of what is in store when you take the controls.

You have choice of aircraft: a Cessna Turbo Skyland RG II or a Gates Learjet 25g, and every aspect of your flight, from environmental factors (seasons, weather, wind, etc.) to the geographical area over which you fly, is user-configurable.

For example, the default is the Oakland Bay/San Francisco area, but New York City/Boston, Los Angeles, Seattle, and Chicago are all built into the scenery on the disk. In fact, there are 120 different airports within the geo-

Other Improvements

Of course, there is more to this latest and greatest release than speed and beauty. The game itself has been improved. You can now, for example, zoom in to magnify an area that you want to view in greater detail. You can also use the Spot and Track modes to see your plane as it would appear from a spotter plane flying alongside. And, along with a map window, you can have two different view windows open at the same time.

Perhaps the best and most entertaining new feature is the multi-player option, which allows two or more players to fly together. If, for example, you and I were playing in this mode, we would each fly our own plane but be able to see and interact with the other aircraft as it zoomed by. (I suppose we could even have a mid-air collision if we weren't careful.)

By LOUIS R. WALLACE

You can use the multi-player mode either via modem over the telephone lines or with a null modem cable (which allows faster data transfers, up to 9600 baud). The manual says that it is possible to link more than two computers by using a host program and some sort of cable networking system, and I predict that it will not be long before we see squadrons of ST-controlled aircraft whose pilots may be sitting side-by-side, across town, or even across the country.

Nor will multi-player capability be limited to the ST in the future, so you may soon be able to fly in formation with users of other computers.

Finally, even with all the new features, *Flight Simulator II* for the ST is even easier to use than earlier versions. The mouse is the perfect controller, the windowing environment improves the flow of information, and your plane is more responsive than ever.

But let's not forget the most important consideration of all—the game is lots of fun to play . . . and guaranteed to save you gobs of money. ■

More Basic Computer Games

The sequel to the best-selling book, Basic Computer Games, can be yours for just \$5.00.

Basic Computer Games by David Ahl was the first computer book to have ever sold 1 million copies. Its sequel, *More Basic Computer Games*, first released in 1979, contains 84 additional games, many of them even more creative and interesting than those in the original volume.

In *More Basic Computer Games*, you'll be able to evade a man-eating rabbit, crack a safe, tame a wild horse, become a millionaire, race your Ferrari, joust with a knight, trek across the desert on your camel, and navigate in deep space. You'll find gambling games, logic games, word games, fantasy games, and psychological games.

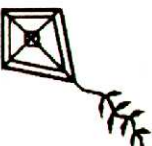
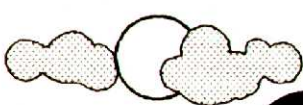
Perhaps the most famous game in the volume is Hunt the Wumpus by Gregory Yob. In it, you roam around a 3-D dodecahedron hunting a Wumpus with your bow and crooked arrows that can travel up to five caves away. You must contend with bottomless pits, supercats that lift you from one location to

another, and, of course, the horrible man-eating Wumpus himself. Moreover, the book is the only place that contains Yob's sequel, Wumpus II, with six additional types of caves and a cave editor so you can construct your own labyrinth.

In the book, you'll also find Bobstones, the game played in *Watership Down*, the original game of Dodge 'Em, the first Basic version of Eliza, and Edward de Bono's sensational L Game.

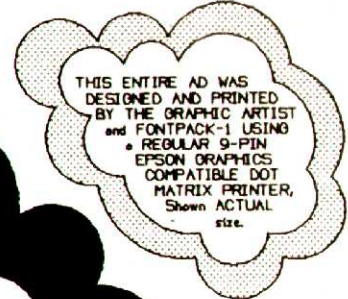
You'll find *More Basic Computer Games* in your local bookstore for \$7.95, but we have a small quantity with the older cover that we're selling for just \$5.00 postpaid. Payment in advance please; no credit cards, no CODs, no orders to be billed. (Price to Canada is \$6.00 in U.S. funds.)

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Atari 800

The Year's Best ST Games

For a machine that only recently celebrated its first birthday, the Atari ST has an unusually well-endowed library of entertainment software.

The obvious explanation for this is that game designers could not resist the challenge of incorporating the superb music and graphics of the ST in their favorite programs—old and new. And incorporate they did, setting standards that make game-loving owners of other machines drool.

Certainly there are some weak spots. One genre not even represented on this list is the arcade game. Although arcade games in general seem to be waning in popularity, I predict that the graphic superiority of the ST will soon inspire a mini-renaissance that will be welcomed by joystick jockeys around the world.

Nor are many war or traditional combat games available for the ST. Again, I think that time will remedy this deficiency as the three leaders in the computer war gaming community—Strategic Simulations, Strategic Studies Group, and Avalon Hill Game Company—begin to translate their classics and create new ones for this sophisticated system.

Most of the games currently available for the ST, including six of the 20 covered here, are action adventures. This is not surprising when you consider the ability of the machine to draw magnificent pictures and keep track of intricate plots. The combination is a natural one. But now, let's have a look at my Top 20 games for the ST.

Space Simulations

Sundog (FTL Games; \$40), written by Bruce Webster and Wayne Holder, is a great place to start. Graphically, it is the best adventure game I have seen. But it is far more than just another pretty face: this game will demand vast

amounts of your time and intellectual energy.

Your mission is to locate cryogenics (frozen people) and take them to Jondd. It is a mission you inherited along with your spaceship, *Sundog*. Unfortunately, the task is complicated by the somewhat dilapidated condition of the ship. To earn the cash you need to purchase the items required to get you to Jondd, you must visit many star systems and trade shrewdly.

Pirates, who will steal whatever you have onboard, are another hazard, but three-dimensional ship-to-ship combat makes confrontations almost enjoyable and always challenging. Zoom graphics also enhance game play, as does the ability to save your game on a blank disk so you can pick up where you left off the next time you play.

In short, I think you will find in *Sundog* almost everything you could wish for in a space game.

Written by William G. M. Leslie III, *Universe II* (Omnitrend; \$70) is a game that demands total immersion. It is so complex and realistic that, for example, the crew (all of whom have names and personalities) must be paid and fed or they will jump ship at the first opportunity.

You start out as a free trader, but your status soon changes as you accumulate wealth and become a miner or a pirate. You must select your crew, train them, and choose a ship that is suited to

Outstanding graphics, speed, and sound attract

game designers to Atari's "new" computer

the vocation you have selected. It would not do, for example, to choose a slow, spacious ship if your objective is to outrun other ships so you can pirate their cargo.

Pull down menus make the game easy to play, but certainly not easy to master. Complexity is the overwhelming attraction in *Universe II*.

Star Fleet I (Electronic Arts; \$50) pits the Galactic Alliance ship Republic against the forces of the evil Krellans and Zaldrans. You are on a conquer-or-destroy mission, or rather missions. You start out with short, relatively simple missions and progress to longer, more challenging ones. Star bases, located throughout your universe allow you to make repairs and replenish your supply of torpedos.

The game is loosely based on the old Star Trek games, but with several important additions, including a 100-page manual—which gives a good indication of the complexity and sophistication of the package.

Star Fleet I lacks the variety of challenges found in the previous two simulations, and the graphics won't astound you. But it is a tribute to the computer that you hardly notice these limitations.

Adventures

Authors Rod Smith, Joe Vierra, and William Mataga have done a masterful job making *Breakers* (Broderbund; \$45) a game that understands almost everything you tell it and identifies clearly those things it does not understand—a feature that makes this game

By RICK TEVERBAUGH

much more pleasant to play than many other text adventures.

And speaking of "pleasant," the Breakers for whom the game is named are not. But to complete your mission, you must not only interact with them to obtain information but persuade them to help you with the task.

A good sense of timing and patience are virtues that will serve you well in *Breakers*. For example, at one point in the game, you must feign death. It isn't necessary to hold your breath while waiting for the next input command, but you must pick the proper moment to leave the casket.

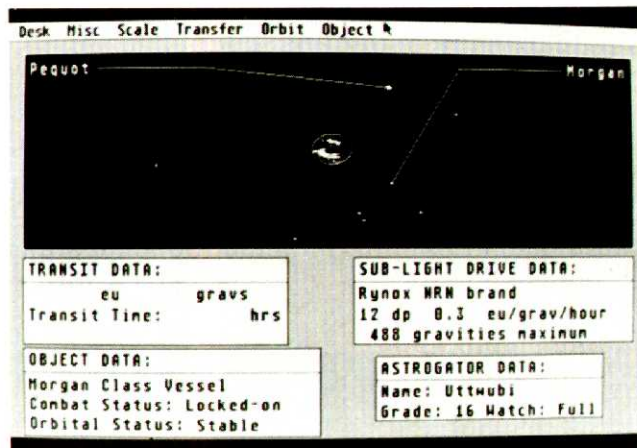
The writing of the text is informative and colorful.

Leather Goddesses of Phobos (Info-com: \$40) by Steve Meretzky has received a great deal of notoriety because of its sexy nature. In actual play, it has much more going for it than mere titillation.

As the game begins, you are kidnapped from a bar in Sandusky, Ohio, and taken to Phobos, a moon of Mars, by the lovely, but deadly Leather Goddesses. Enslavement of Earth is their goal, and they want to use you for sexual experimentation as they prepare for the invasion. You frolic around the solar system with your friend Tiffany (or Trent, if you are a male) looking for the things you need to make an Anti-Leather Goddesses Machine. Three levels of play, tame, suggestive, and lewd, correspond to movie ratings G, R, and X.

While this naughty epic certainly lives up to its image, it is the sparkling sense of humor that will keep you entertained once the novelty of its risqué presentation has worn off. The parser is quite knowledgeable, and you will probably have no trouble getting the program to understand what you want it to do. It might be more difficult for you to believe you want to do it.

As you play *Hitchhiker's Guide to*



Universe II

the Galaxy, you first learn that your house is about to fall under the bulldozer's blade and then that the entire planet Earth is moments from total destruction. From there everything gets crazy.

The game, written by Douglas Adams and Steve Meretzky, is patterned on the insanity of the books, but adds some new twists and turns. If you have read the book, you won't have a great advantage, and if you haven't, you won't be lost.

More than a sense of humor is needed to enjoy this outing; you must forget all (or most) of your preconceptions about life. It isn't easy to tear yourself away from this game once you get involved in it, and when you do, it is what you formerly perceived as Reality that seems bizarre and difficult to comprehend.

Borrowed Time (Activision: \$40) places you in the role of a private investigator. You are at work in your rather austere office when the phone rings and captures your attention. A voice says, "Sam, you're a dead man." You notice that the lettering on the door says your name is Sam, and suddenly your next

assignment becomes a matter of life and death—yours.

There are 20 suspects, all of whom have the motive and the opportunity to get you out of the way. You will need to stay alive long enough to find out which one wants you dead.

The game will hold your interest with well-written text and some outstanding graphics, and while it isn't likely that you will solve the mystery quickly, it is certain that you will enjoy every minute of the investigation.

In *Brataccas* (Mindscape: \$50) you are unjustly accused of a crime. But this is no ordinary charge.

The police blotter reads "genetic fraud." You have been set up by covert forces working within the government. Their base of operations is the asteroid Brataccas and that is where you must go to collect evidence to prove your innocence.

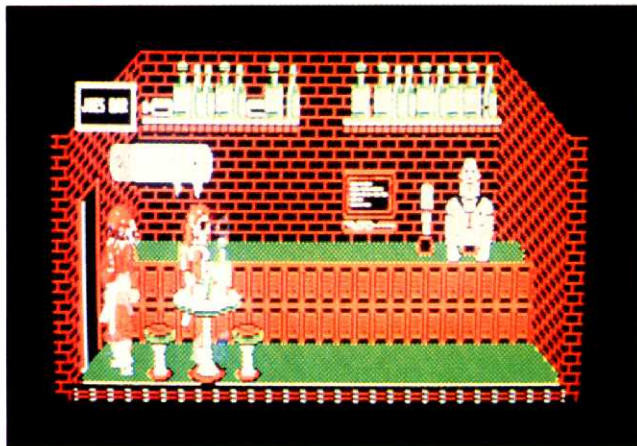
There is a great deal of fighting to satisfy your craving for action, but there are also puzzles to solve and characters with whom you must interact. It is during these communications that the game takes on a different look from

Star Fleet I



Borrowed Time





Brataccas

traditional adventures; the things your character says and the things that are said to him are represented in comic strip balloons that float over the heads of the characters.

Hacker II (Activision; \$50) is a sequel to the original *Hacker* by Steve Cartwright. Unlike many sequels, however, *Hacker II* is better than its progenitor.

The plot is simple: The CIA wants your help in breaking into a Russian maximum security complex to steal the Doomsday Papers. Robots patrol the halls and computers run cameras that keep the security control center in touch with all activity throughout the complex. It takes some planning and an understanding of video technology to pass this test.

Graphically, the game is a cut above average, and the animation is smooth. Though more limited geographically than the original, *Hacker II* offers greater challenge and greater satisfaction in completing the assignment.

Compared with the problems experienced by monarchs in other adventures, your troubles as King Graham of Da-

ventry in *Kings Quest II* (Sierra; \$50) seem small: You need a queen and an heir (tradition requires you to acquire them in that order).

Unfortunately, however, author Roberta Williams has caused you to fall in love with a vision reflected in a mirror. She is being held hostage by a jealous crone, and you must find the three keys that unlock the enchanted land in which she is being held.

As you proceed in your quest, you collect various items for which you are rewarded with points. Along the way, you must also interact with other characters, who, like the inhabitants of the real world, move about within the game setting: just because the dwarf is at home in his tree and throws you out on your first visit doesn't mean that you should avoid the place ever after.

This mobility adds realism and variety to the game, as do the animation and graphics, which are among the best I have seen in an adventure.

Phantasia (Strategic Simulations; \$40) is the king of multiple-character adventures. Written by Winston Douglas Wood, the game requires you to at-

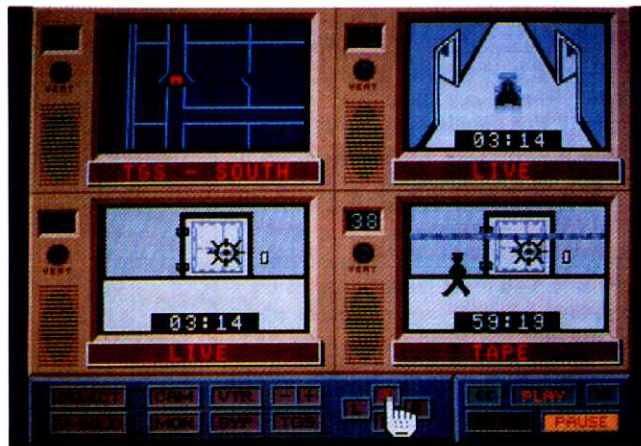
tack the Black Knights and defeat the evil sorcerer Nikademus.

Gathering the band of adventurers who will help you achieve this goal is almost as enjoyable as the quest itself. The characters come from 16 different races and fall into one of six classes; each is rated for five different attributes.

Brute strength and courage, as experienced adventurers know, won't accomplish everything; a well-timed spell can often accomplish more than a well-placed sword thrust. You need a well-rounded team of fellow questors.

Graphically, the game takes advantage of the speed and color of the ST to such an extent that you almost forget you're playing a game. Let's hope the ST version of *Phantasia II* will be released soon.

Rogue (Epyx; \$40) by Michael Toy and Glen Wichman is my favorite action adventure. Your goal is a magic amulet, and as you progress through the tale, you receive promotions in rank. Monsters defeated and strange areas explored earn points. A zoom feature reveals detail of your immediate sur-



Hacker II

Kings Quest II



Phantasia





Rogue



Time Bandit

roundings when necessary.

The game is so much fun to play that you will certainly be dismayed when you come to a premature end, but the closing sequence will salve your disappointment. I'll not spoil the surprise, but it is a real treat for the eyes.

Imagine an adventure so complex that it requires 3000 screens. In *Time Bandit* (Michtron; \$40) you must search for Great Artifacts in 16 different lands, each of which is set in a different time period—from the distant past to the uncertain future. And if that does not constitute sufficient evidence of complexity and challenge, let me just say that you begin play with 14 lives.

Some levels require mapping; others merely quick thinking and clever problem solving. A couple are text adventures, so there really is something for everyone.

Another outstanding feature is the two-player mode. Two can play either in cooperation or in competition. The top six scores are saved to the disk.

Animation is fluid, and it is safe to say that the look of the game is as good as the play—which is excellent.

War Games

For realism in a submarine simulation, it would be hard to top *Gato* (Spectrum Holobyte; \$40). As commander of this World War II sub, you are instructed to seek out enemy ships and destroy as many as possible before returning safely to port. To avoid wasting too much time in eventless patrolling, you can enter new coordinates and move immediately to another location. What this useful feature lacks in realism, it more than makes up for in sanity maintenance as it saves you from boredom.

You must plan your movements carefully, because submarines don't exactly turn on a dime, and you must keep an eye on your oxygen and battery power supplies.

From old war movies, you will recognize the ping sound that means the enemy has found you, and you will have to take evasive action immediately. Fortunately, if you fail, the game is unrealistic enough to allow you to reboot and try again.

I said that it would be hard to beat *Gato*—but not impossible. *Silent Ser-*

vice (Microprose; \$40) by Sid Meier does it for me. *Silent Service* gets me into the mood of the game better, but I prefer the sound effects in *Gato*.

Another advantage of *Silent Service* is the ability to customize the game to your ability with 12 scenarios, seven reality levels, and four skill levels.

The time period and setting are the same: World War II, Pacific Theater. The problem of boredom during patrols is solved by having time pass more quickly when you are on patrol; once you locate the enemy, the pace of the game slows down and a battle ensues. Commands are easy to learn and quickly executed.

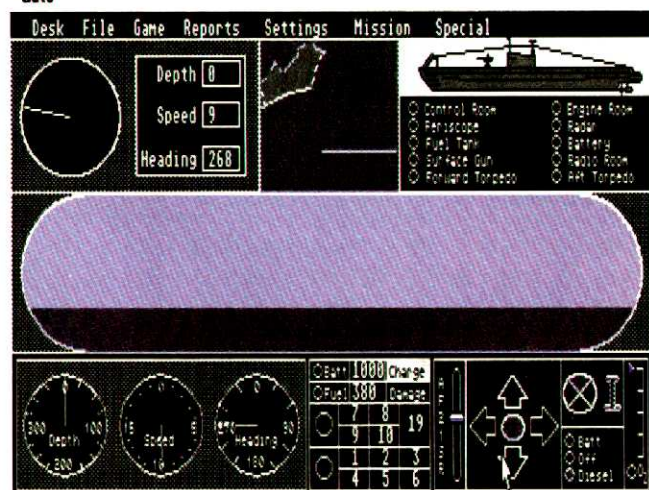
All things considered, I think *Silent Service* is the best war simulation yet released for the ST.

Strategy Games

It would not be entirely accurate to call *Word For Word* (Bay View Software; \$40) a Scrabble game for the computer, but that's exactly what you will be reminded of when you first boot it up.

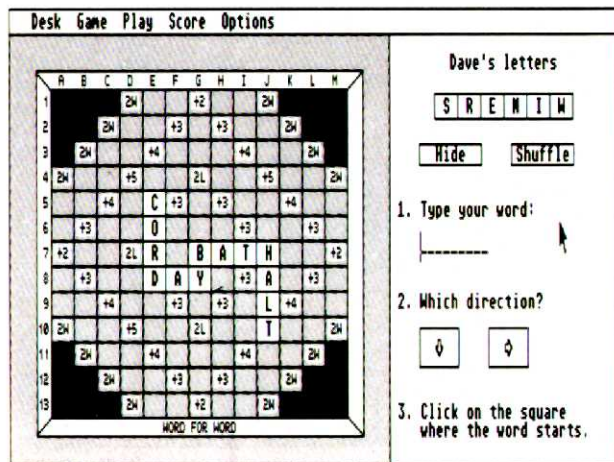
Among the differences between the

Gato



Silent Service





Word For Word

computer version and the board version are the presence of a computer foe, which can take the part of up to three other players, and a utility that lets you design your own boards and save them to disk, which is really nothing more than changing the location of the bonus squares.

The computer is a tough opponent for even experienced Scrabble players, and those who succeed in defeating it will feel a well-deserved sense of satisfaction.

Bridge 4.0 (Artworx; \$30) is for true bridge aficionados only. The game provides top-notch computer players for you to compete against, and you can replay a hand if you want to try for a different result. There is no tutorial or bidding help available.

The loading of *Bridge 4.0* is the most complex I have seen in a game. It in-

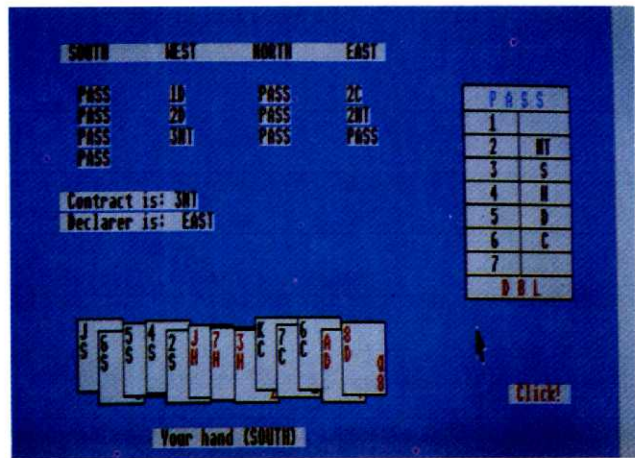
volves the language disk, and requires more effort than most of us are used to putting forth for a game, but bridge enthusiasts will find it well worth the trouble.

Like *Word For Word*, *Bridge 4.0* plays a challenging game and rewards those who beat it with a great feeling of satisfaction.

Sports Games

Winter Games (Epyx; \$40) is another clear winner. Sports animation is difficult to do well; almost everyone has seen what athletes look like while competing, so to make their actions believable on the computer screen is much more challenging than, say, simulating the destruction of an alien in deep space.

The programmers at Free Radical Software, designers of the package, have risen to the challenge and created a



Bridge 4.0

game that is not only realistic but fun to play.

The best events are ski jumping and the biathlon. As you participate in the ski jumping event, you can almost feel the bite of the wind on your face as you fly through the air. You use the joystick to control the animated form on the screen to maximize the distance and style points for the jump. Biathlon requires a combination of good skiing and sharp shooting; time elapsed and points scored determine the champion.

At the end of the game there is a medal ceremony, complete with the playing of the winner's national anthem.

Mean 18 (Accolade; \$50) by Rex Bradford and George Karalias is the best game I've seen for the ST in any category. The game feels like golf and looks like golf. You must pick the right

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Winter Games

club, select the right amount of power to put into your swing, and then time your swing just right to avoid a hook or a slice. All the traditional hazards are there to make the game interesting.

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Mean 18 includes every element of real golf except the exercise. An out-

standing effort.

Leader Board (Access; \$40) is the best *looking* sports game on the market. It is also somewhat easier than *Mean 18*, which may increase its appeal to novice players. The disk includes five courses of varying difficulty.

You must learn to judge the roll of the green and the effect of the wind. Timing is important, as are selecting the right strength for your swing and keeping the ball on a straight path.

There is lots of water around, so be-



Mean 18

ginners should wear their boots.

Honorable Mention

I know that I committed myself choosing the 20 top games of 1986, but as I study the entertainment marketplace, I wish I could push it to 25. Instead, I will award Honorable Mention to: *Hole-In-One Golf* and *Strip Poker* (Artworx; \$30 and \$40), *Major Motion* (Michtron; \$40), *Temple of Apsahai Trilogy* (Epyx; \$35), and *The Pawn* (Firebird; \$45). ■

CLOCK CALENDAR

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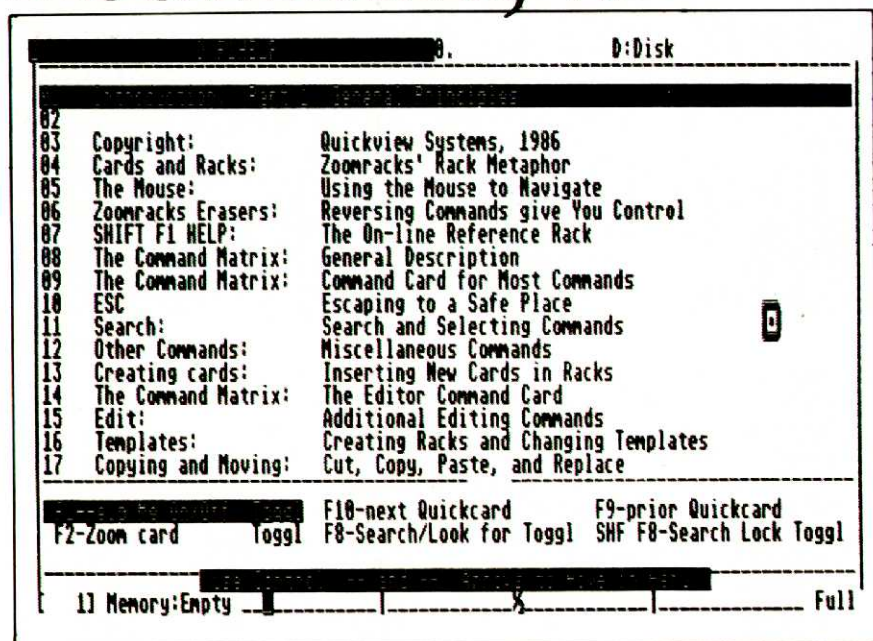
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Zoomracks, v.2



A powerful text-oriented data-handler based on an unusual "metaphor"

According to Webster, a *metaphor* is "a figure of speech in which a word or phrase literally denoting one kind of object or idea is used in place of another to suggest a likeness or analogy between them." Nowadays, computer scientists have adopted the word in reference to the current fashion of designing user interfaces to correspond, in function and appearance, to real-world objects. Thus GEM employs an "office" or "desktop" metaphor—with disks portrayed as filing cabinets, etc.

Usually, the degree of likeness implied by a user-interface "metaphor" is merely formal. One does not expect the GEM desktop to provide ringing phones, surly secretaries, or filing cabinets that lock accidentally. Every now and then, however, a user interface comes along that captures more profoundly the essence of the object or concept it portrays.

Zoomracks, version 2, a database management program from Quickview Systems, is fashioned to resemble a row of timecard racks. Each vertical row of cards is a database file; the cards its individual records. On first glance, you would think the metaphor were being

followed fairly loosely. Despite the graphic capabilities of the ST, the screen display resembles a set of timecard racks not at all. Yet as you become familiar with *Zoomracks*, you slowly come to realize how the timecard rack concept has been worked into the fibre of its user interface at the profoundest level.

Though the mouse can be used to select and activate databases (*Zoomracks*) and choose records (*Quickcards*) for display, it is, strictly speaking, redundant in *Zoomracks*. Access to program functions is accomplished via a dizzying array of single key, function key, Ctrl-key, and Alt-key combinations, arranged in a system of loosely interrelated menus. Commands range from the comfortably mnemonic (Q for Quit) to the arguably so (K for disk), and some mean different things in different modes or combinations.

Speaking of "modes," *Zoomracks* has them in abundance: modes for looking at disks, modes for looking at cards, modes for editing cards, each with its own more or less unique subset of commands. Obvious key-to-function relationships have been "rethought" here—instead of using the arrow keys to move up and down through racks and cards, *Zoomracks* substitutes incomprehensibles such as F9 and Ctrl-X.

Just like a real timecard rack, in other words, the *Zoomracks* user interface is a tool only a bureaucrat could love. In the rest of us, it incites resentment even as it attempts to inspire timely productivity. But—also like a timecard rack—you can learn to live with *Zoomracks* if you have to.

Documentation

The manual is a big help: well organized, clearly written and illustrated, with some practical examples and a complete index, it leads the new user efficiently through the several phases of creating files and manipulating information with the program. Doing so turns out, after you discover all the little tricks, to be a fairly straightforward process, and *Zoomracks* offers some unique features that may make it the ideal choice for certain applications.

As noted above, the *Zoomracks* system works in terms of racks, or database files, nine of which can be loaded into memory and displayed at once (though only one can be manipulated at a time). Sitting in the racks are cards—records—each with its top line visible above the one beneath. Scrolling up and down the individual racks, each of which may contain thousands of cards, requires no more than a few magic passes and a whispered curse. If necessary, a feature abbreviates text on the display as needed, to promote readability.

Thus, with several racks on-screen, it is possible to survey a substantial amount of information from multiple files almost without lifting a finger. For some applications (such as maintaining callback lists of names and phone numbers for a telemarketing department) this kind of "hands off" functionality is ideal—but *Zoomracks* is capable of considerably more.

By pressing a key (or a mouse button), you can "zoom in" on a single card for review or editing. Depending on the card format you have established, each card may contain from one to 27 named fields (*Fieldscrolls*), each of which may contain (and here's the real kicker!) up to 250 80-character lines of formatted text—a capacity of 6750 lines of text per record. A fairly complete editor is available for making changes, and commands exist to help you move from field to field within a card, scroll through fields, move to the same field in adjacent cards, etc., all at this more infor-

By JOHN JAINSHIGG

mative, "zoomed in" level.

Text capacity of 6750 lines is substantial—enough to make *Zoomracks* a serious contender for certain kinds of archiving work, academic note-taking (we are told PhD candidates make up a substantial portion of *Zoomracks*' constituency), personnel recordkeeping, storage, retrieval, and mail-merging of legal or contractual boilerplate and form letters—even a crude kind of outline processing, abetted by the fact that *Zoomracks* is good at hiding as well as revealing information.

Output and Macro Facilities

A good deal of effort has gone into designing the *Zoomracks* output formatting facilities. Report formats, label formats, form letters, and other filters are easy to design, and formatting commands give you complete control over output positioning, justification, and other variables, and (provided you know how to use them) control over the special features of your printer.

Likewise well-designed is the macro facility—essentially a mini programming language. The macro system can, if used correctly, largely offset the ob-

System and Price: Atari ST; \$79.95
Summary: Powerful text-oriented data-handler with a kinky user interface. Impressions mixed.
Manufacturer:
Quickview Systems
146 Main St.
Los Altos, CA 94022
(415) 965-0327

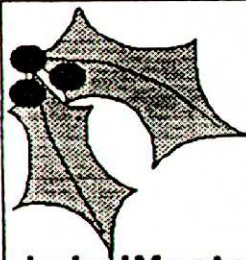
scurities of the built-in user interface by completely automating the process of working with *Zoomracks*. In fact, the macro-building vocabulary is so rich that it should be possible to configure what are, in effect, custom applications within the *Zoomracks* framework: data-entry systems, specialized retrieval procedures.

Other features include the ability to redefine the field format of a database without losing information—very rarely seen in a program of this type, and very helpful; a limited calculating ability; built-in help files; the ability to display *DEGAS* picture files (though not,

unfortunately, the ability to make them part of a database); and other nifty stuff.

A number of card-format templates for fundamental applications are included on the *Zoomracks* distribution disk, and instructions are given for modifying these templates to suit your own purposes. The program is not copy-protected. A full-featured (minus SAVE functions) demonstration version is available from Quickview at nominal cost.

When all the metaphors are stripped back out of the way, *Zoomracks* is revealed as a fairly powerful, full-featured, text-oriented information management program that stands somewhere between the simple, one-function "mailing list" utility and the more powerful, high-end database management system. Like the former, *Zoomracks* is designed to give you "hands on" access to your information—to skim it, riffle through it, and play around with it. Like the latter, *Zoomracks* is also capable of playing intermediary to a degree—helping to keep the mass of your data under control. ■



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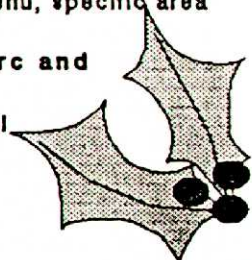
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Giving Your ST The Time Of Day

*Battery-backed
clock/calendar cards
from Navarone
and Shanner*

For most ST users, setting the internal clock at the beginning of each work session is nothing more than a minor inconvenience. (Some don't bother setting it at all.) But those who depend on accurate date/time stamping to keep their files in order or who use time-management, home-control, or other time-dependent software, sometimes balk. For them, a battery-backed clock/calendar card (along with software that automatically sets the system time at boot-up) is almost a necessity.

Two such products are evaluated here—one from Shanner International, a well-known distributor of ST software and peripherals; the other from Navarone, an established maker of TI-99/4A, PCjr, Commodore, and Apple hardware and software, now breaking into the ST market. Both appear in the form of modules designed to plug into the ST cartridge port. Both come with a disk containing several utilities: an install program for initial setting of the clock card; an /AUTO/ folder utility to set the system time from the card at power-up; and an optional CLOCK desk accessory, included as a convenient alternative to the Control Panel. Beyond these superficial similarities, however, each unit has its own merits and distinct shortcomings.

LCM-2000 Clock Module

The Shanner LCM-2000 Clock Module is about 2½" × 3"—the size of a credit card—and about ½" thick. In use, the card is held firmly by the edge connector at the ST cartridge port, providing some protection against accidentally disturbing the connection while the device is in use.

The module contains a single PC board sporting three ICs, a number of other small components, and a coin-type Lithium battery. The board is sandwiched between two saw-cut and routed sheets of opaque, quarter-inch plexiglas, held together with four screws. Minor irregularities in construction (the edges of the plexiglas enclosure, for example, are left rough), give the unit a handmade look, though I have no reason to doubt its sturdiness or reliability on this account.

A brief user's manual is included, along with support software on a single-sided disk. The manual is fairly well-written and provides simple instructions for installing and using the device.

Internal time must be set on the LogiKhron once on installation and periodically thereafter to correct for "leap days" and Daylight Saving Time. It is hard to understand why neither the card nor the support software includes logics to render this subsequent setting unnecessary—particularly ironic since the internal clock in the ST does "leap day" housekeeping all by itself.

To set the clock card, you use either the application program or the desk accessory supplied on disk. Aside from the fact that the accessory can be called up from within any GEM application (it occupies about 13K of RAM), these programs are functionally identical. When called up, they access the clock card, read the current date and time, and present these figures for editing in a standard dialog box. Clicking CANCEL disposes of the program without altering the clocks—appropriate, for example, if you are using the desk accessory to check the time. Clicking OK updates both the external and the internal clock to match the displayed date and time—whether or not it has been altered by the user.

This would be acceptable if the date/time display were updated as the minutes went by, but it isn't. Shanner apologizes for the lack of a realtime display, but fails to warn that the clocks may be



accidentally reset if you make the mistake of leaving the frozen display on-screen for a few minutes, then click OK instead of CANCEL.

Once the clock is set, the manual suggests installing a startup program on your boot disks to access the clock and set the system time automatically when you turn on your ST. The requisite /AUTO/ folder (containing the program) is included on the Shanner distribution disk, so most users need simply copy it to whatever startup disks they use.

The /AUTO/ program executes invisibly, so you can't tell if it has worked unless you check internal time with the Control Panel. (Because Shanner's application and accessory check only the card time, they are of no help here.) More disturbing, although both the application and the accessory inform the user if the clock card is disconnected, the /AUTO/ program—cornerstone of the system—raises no alarm in this situation.

In summary, Shanner's LogiKhron card has some good things going for it. The hardware seems simple and reliable, and the software interface functions well—up to a point. To derive full benefit from the peripheral, however, you must remain attentive in its use.

The LogiKhron LCM-2000 is available for \$49.95 from Shanner International Corp., 453 Ravendale Dr., Mountain View, CA 94043. (800) 828-6637.

By JOHN JAINSCHIGG

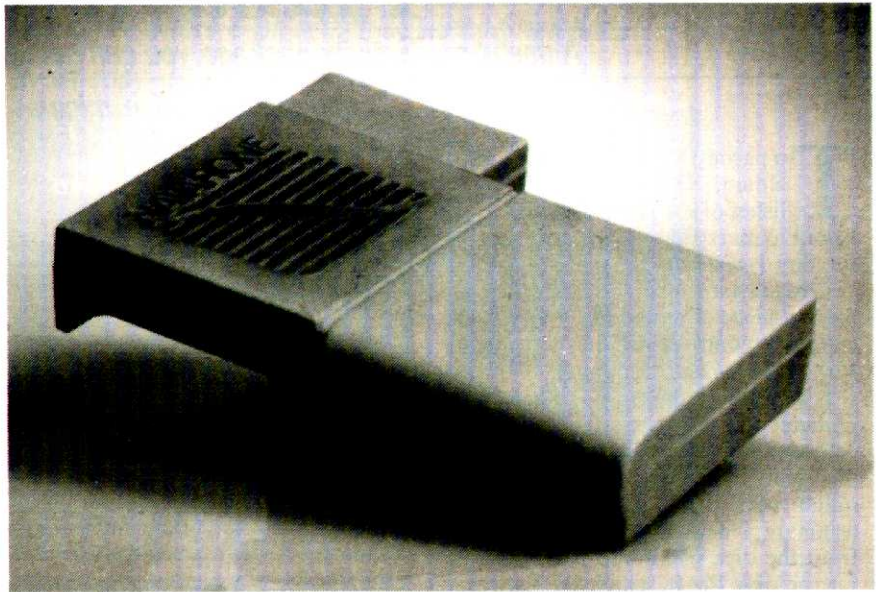
Timekeeper

Navarone Corporation has considerable experience making cartridges for the TI-99/4A and Commodore 64, and their expertise is shown to good advantage in the design of this clock module for the ST. The Timekeeper is fairly substantial in size—about 4" × 6". Made of gray plastic, color-matched to the ST housing, the Timekeeper is self-supporting, resting flat on the desktop when installed. This places a minimum of stress on the ST cartridge port connector, although the size of the Timekeeper may make it an easier target for accidents than the Shanner device.

Inside, the Timekeeper module is quite complex, its commercial-grade PC board bearing eight ICs, a range of small components, and the common coin-type Lithium battery (said to be user-replaceable). All of the cartridge port lines are extended across the board to another card-edge connector on the opposite side, meaning that even with the Timekeeper in place, the cartridge port is still effectively at your disposal. The extra ICs serve to switch the clock circuit onto the bus—so that it can be read—and off again so that other cartridges and cartridge-interfaced devices can take over. Pretty neat.

Along with the module comes a single-sided disk that contains both support software and documentation files. Some of these README files are saved as text, others in 1st Word format, making the process of printing them out more time-consuming than necessary. Moreover, the documentation is of very poor quality. Numerous misspellings and grammatical errors render it ugly and difficult to follow. Luckily, the procedures it describes for installing and using the Timekeeper are quite simple.

Like the Shanner device, the Timekeeper must be set correctly on installation and periodically thereafter to correct for diurnal and calendrical non-orthogonalities (a fancy way of saying "leap years and Daylight Saving Time"). An install application—the only program in the Navarone suite that permits direct manipulation of the card setting—is included on the disk. Double-clicking causes the program to access the clock card and display the current date and time for editing. The display is updated—keeping pace with the external clock—until you choose to change it. After doing so, you click on a single, clearly-labeled bar to set the clocks—external and internal—and exit.



After the clock is set, Navarone's startup utility should be installed in an /AUTO/ folder on your boot disk to access the clock card and set the internal clock automatically. When you boot the system with this startup, the current date and time are read from the card and impressed on the internal clock, and the card is commanded to switch out of the cartridge bus, leaving it free for other traffic. To bring the clock card back in-line, the system must be switched off and on again; thus the Navarone system accesses the clock card only once per session.

The only drawback of this approach is that if you subsequently change the setting of the internal clock, there is no way short of a re-boot to bring it back in synch with the card. Still, this is preferable to making the setting of the clock card vulnerable to accidental changes. If the card is not in place at boot time, the Navarone startup pulls the boot process into a loop—not exactly an elegant warning, but better than none at all.

The Timekeeper desk accessory is a fairly well-designed and useful tool with one unnerving quirk. Like the Control Panel, it permits you to read and/or change the setting of the internal clock (not that of the card itself!) from within any GEM application.

The current date and time are presented in an editable display, updated in realtime until you choose to change it. Clicking on the Timekeeper Control button of a window brings up a second menu that lets you activate the alarm feature of the accessory, change the

time-display format from 12-hour (AM and PM) to 24-hour military time, or activate a bizarre feature called "overprint."

When overprint is active, the date and time figures punch through any window that overlays the accessory display—updating about once every thirty seconds. Neat... but if you drag the overlying window, the date and time figures move with it, and a new set punches through in the original position thirty seconds later. You can cover your screen with date-time stamps this way! (Navarone is considering the removal of "overprint" from subsequent releases of the product.)

The alarm feature of the accessory is very cute. When active, it lets you set an alarm to ring at any hour. You can then deactivate the accessory and go on with your work. At the appointed time, the accessory window springs up again, flashing and beeping, only to be silenced by clicking on its CLOSE box.

Once you understand how Timekeeper works—a mild challenge, given the documentation—it becomes a well-designed, reliable and versatile device. By protecting itself against accidental resets and providing some limited feedback as to its status, Timekeeper approaches the kind of "set and forget" quality that you should look for in a simple peripheral of this kind.

Timekeeper is available for \$49.95 from Navarone Industries, Inc., 21109 Longeway Rd., Ste. C, Sonoma, CA 95370. (800)624-6545; (800)654-2821 in CA. ■

Habaview

*A useful productivity package you can get up
and running in five minutes*

To parody the immortal S. J. Perelman, if Haba Systems, publisher of *Habaview*, will have me, I want to marry them. Call me a romantic. Say I wear my heart on my sleeve . . . No matter. I guess I'm just a sucker for any piece of productivity software I can get up and running in five minutes without consulting a manual.

It's almost . . . almost *too* easy. The *Habaview* database manager is a fully orthodox GEM application that is immediately comprehensible to anyone familiar with basic ST operations. To originate a database, you select OPEN from the disk menu and enter a name for the disk file in which the database will reside.

You then design a form for the database records—a template of named fields to contain and identify the information you wish to store. For a mailing list, a typical form might contain fields for first name, last name, street address, city, state, zip, area code and phone number.

As you assign fields to your form, you also specify the type of information each field is intended to contain: generic text, strict alphabetic, numeric, date, time, or a Boolean type called Yes/No (appropriate for coding responses to survey questions and the like). By specifying field types, you provide *Habaview* with information it can use to structure the database file efficiently and recognize and prevent obvious errors when you start entering data.

The basic form may comprise up to 30 fields. As you add fieldnames, they appear from left to right as headings in the columns of an on-screen grid, much like a spreadsheet. Later on, when you have entered data, it will be displayed under these headings. Column widths are fully adjustable and can be modified at any time for best appearance.

Data Entry

The process of form design meshes smoothly into that of data entry. *Habaview* lets you rename or delete existing fields, and insert new ones at any point, regardless of whether data are present or not. It is possible to manage your data on a fairly ad hoc basis, skipping back and forth between refining your basic form and actually entering information. Almost everything is completely revers-

Type	Beds	Baths	Cars	Price	Pool	City
1 House	2	2	2	\$240,000	No	Burbank
2 House	2	2	1	\$200,000	No	Burbank
3 House	3	2.5	3	\$350,000	No	Encino
4 House	3	2	2	\$300,000	No	Encino
5 House	3	2	2	\$200,000	No	Encino
6 House	2	2	h	\$60,000	No	Ornard
7 House	2	1	1	\$50,000	No	Ornard
8 House	5	3	3	\$450,000	Yes	Santa Barb
9 House	5	3	3	\$400,000	Yes	Santa Barb
10 House	5	3	3	\$390,000	Yes	Santa Barb
11 House	3	2	2	\$310,000	No	Santa Barb
12 Apt	3	2	0	\$250,000	Yes	Santa Barb
13 Condo	2	2	1	\$210,000	No	Santa Barb

System and Price: Atari ST; \$49.95

Summary: Good low-end database manager with some nice features.

Manufacturer:

Haba Systems, Inc.
6711 Valjean Ave.
Van Nuys, CA 91406
(818) 994-1899

ible—changes can be undone, modifications to data abandoned and the original data restored automatically. You are encouraged to proceed with a reasonable degree of confidence that false steps are impossible, or if not, will be prevented.

To facilitate data entry, *Habaview* supports field-type checking and masking of illegal input; optional automatic initial capitalization of text fields (handy for mailing lists and other applications that handle proper names); automatic formatting and conversion of time and date information; automatic side-scrolling of data within field boundaries; and other helpful and ornamental features. Extensive text-editing capabilities are not supported—only a thousand characters are permitted in a record—and with such a small amount of text to handle, such features would be largely wasted.

Sorting

Once a database has been assembled, it can be sorted, searched through, dis-

played, and printed out in a variety of ways. Simple ascending and descending sorts can be carried out on any field: alpha, date, time, or numeric, under mouse control. Almost as easy are so-called "progressive sorts," which begin by sorting one field, taking the partially ordered output and sorting it again by some other criterion, etc.

In this manner, it is possible to determine ever-more-refined systems of ranking. Searches can be made by range ("Show me all customer records with pending balances between \$300 and \$500"), by example ("Show me the records of all people whose first names begin with N"), or by progressive combinations of criteria, each search winnowing only those entries selected by the previous search. Exclusion searches ("Show me the records of all people whose first names *don't* begin with N") are also permitted.

Using combinations of the above techniques, along with a little ingenuity, it is possible to do some fairly sophisticated data management. It should be noted, however, that because *Habaview* lacks a set of Boolean operators (AND, OR, NOT, XOR) and cannot evaluate complex conditional expressions, certain kinds of searches may be difficult or impossible to perform.

Output

What *Habaview* lacks in raw search-and-retrieval capability, however, it makes up for in the ease with which data can be formatted for display and printing. Column widths, centering, and justification of text, numeric, date, and time formats can all be fine-tuned with ease. Fields can be hidden or made visible at will. Records may be viewed in groups in fully formatted, one-line-per-record "list layout," or individually in one-record-per-screen "form layout."

What can be displayed on-screen can, in most cases, be just as easily printed out. While *Habaview* does not offer ultrasophisticated forms control, automatic report formats, or facilities for making use of special printer features, mailing labels, simple lists and reports are well within its grasp and easy to turn out. *Habaview* output can be sent to ASCII (or *HabaWriter*) files on disk and pasted into conventional documents.

Habaview is a well-designed, stable, and useful product appropriate for a variety of small-scale information management tasks. While it lacks the capacity and flexibility of high-end database programs, its forgiving nature and readily comprehensible structure will satisfy a wide range of users. ■

By JOHN JAINSCHIGG

Blazing Paddles is a long-lived graphics program that, in an earlier version for another computer, has won consistent praise for functionality and ease of use. This solid translation will appeal to artistically-minded Atarians of all ages.

At base, *Blazing Paddles* is a flexible, well-designed paint program in the *Micropainter* (Koala Technologies) mold. It offers a full range of painting functions, including line, dot, polygon, box, oval, mirror, fill, and airbrush, through a symbolic menu system superimposed on the drawing screen.

To select a drawing function, you point at its symbol using the on-screen cursor, and press the button on the input device. Once a function is selected, the menu disappears and you can draw over the full screen without impediment (the menu can be redisplayed by touching the spacebar).

The drawing screen is 192 pixels wide by 160 pixels deep—enough room and resolution for fairly serious work. The coordinate position of your drawing cursor is displayed at the bottom—very helpful when executing geometric figures and an unusual feature for a program of this type. The screen can be scrolled in four directions, wrapping around from top to bottom and side to side.

Blazing Paddles has a "magnify" feature that enlarges a small section of your drawing for pixel-by-pixel work. The magnified section is displayed on the bottom half of the screen, while part of your normal-sized drawing is displayed on top, the magnified portion clearly outlined. By moving the cursor left, right, up, and down, different sections of the drawing can be brought under scrutiny without leaving the magnify mode. The drawing color can also be changed without switching the display back to normal—a nice touch.

Color selection is unusually well-handled. Besides allowing you to assemble a palette of three foreground colors and one background color from among the 256 available shades, the program offers six additional color "mixtures." These are dense patterns formed from the colors in the basic palette which operate as halftones—creating the impression of additional colors and intermediate shades.

Unusual for a low-priced graphics package, *Blazing Paddles* makes some effort to provide rudimentary image-editing capabilities. Rectangular sections of your drawing, outlined by a flexible "window," can be cut out, moved around, and pasted down on the drawing surface at any point.

Blazing Paddles

Baudville offers 8-bit artists advanced functions

in an easy-to-use paint program



System and Price: 48K Atari 8-bit computers; \$24.95

Required peripherals: Joysticks, paddles, or graphics tablet.

Summary: A capable, easy-to-use paint program.

Manufacturer:

Baudville, Inc.
1001 Medical Park Dr.
Grand Rapids, MI 49506
(616) 957-3036

Advanced Features

Beyond these basic drawing functions, *Blazing Paddles* also supports a variety of more advanced graphics facilities, including the ability to handle text and "shapes"—complete, multicolored graphic forms.

Text is available in three sizes and a potentially infinite number of fonts, loaded from disk. Three such fonts—standard, italic, and boldface—are included with the package, and additional fonts can be purchased separately from Baudville.

Shapes are multicolored graphic forms that can be moved around and "rubber stamped" on the screen at any point. They are particularly useful when doing graphics work requiring a limited number of standard forms and appeal strongly to young children who lack the coordination for freehand drawing. Three libraries of related shapes are provided with *Blazing Pad-*

dles—a group of assorted barnyard scenes, buildings and architectural elements, and musical symbols. Additional shape libraries can be purchased separately.

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Blazing Paddles can print hard copies of your creations on a variety of standard dot matrix and color printers. Printouts are somewhat blocky, as expected, but reproduce the proportions of what you see on your screen fairly accurately. There is no particular trick to interfacing *Blazing Paddles* with your printer, provided it is compatible with one of the printers supported—be careful to check before buying!

Blazing Paddles supports a wide variety of input devices, ranging from standard eight-position joysticks to paddles, trak-balls, and graphics tablets (including the Atari Touch Tablet, Suncom graphics tablet, and Koala-Pad). Each of these input devices has its place in the overall scheme; while a graphics tablet may be perfect for free-hand drawing, a joystick is probably better for arranging preformed shapes on the screen, particularly if a small child is doing the arranging.

Baudville offers a supplementary data disk for use with *Blazing Paddles*. *Shapes and Fonts II* includes additional text fonts, Greek letters, chemical and flowchart symbols, and a wide variety of shapes, ranging from the artistic and educational to the recreational (droids, dolls, and monsters). Material on the *Shapes and Fonts II* disk, which sells for \$24.95, is also compatible with Suncom's *Animation Station*. ■

By **NICHOLAS E. JAINSCHIGG**

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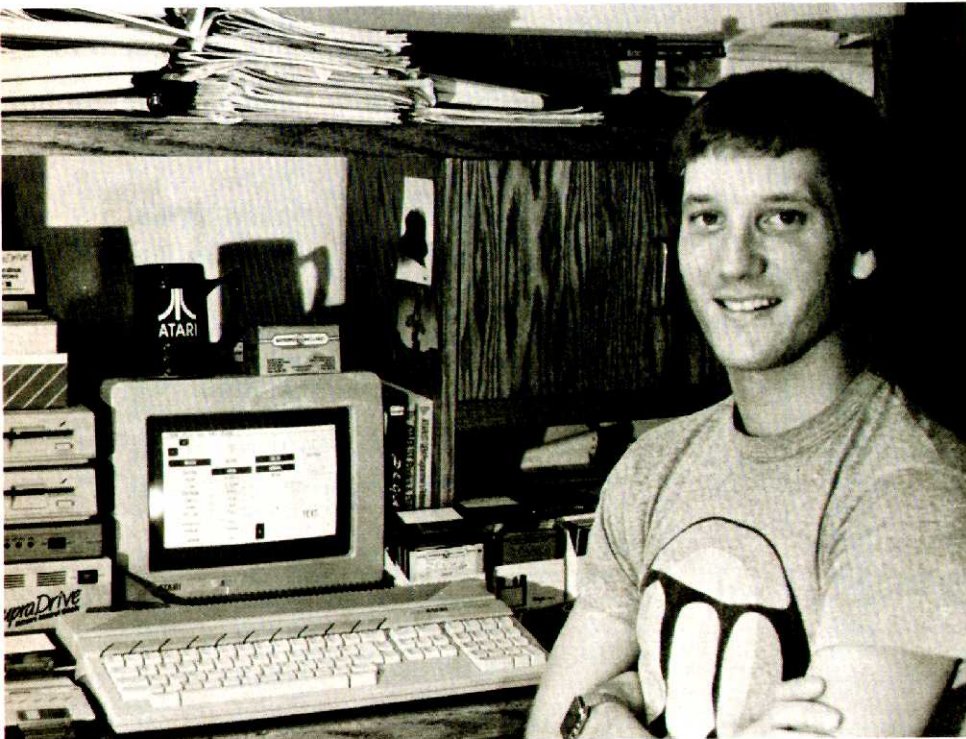
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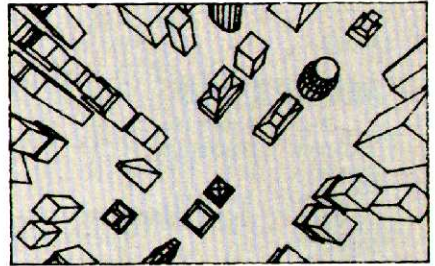
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Tom Hudson, author of DEGAS, CAD-3D, and DEGAS Elite, tells how he became a best-selling programmer in one easy lifetime.

Gradus ad Parnassum

By JOHN JAINSCIGG



Atari Explorer: Let's start with a few general questions. How old are you? Where were you born?
Tom Hudson: Well, I'm 27 years old, and I was born in Springfield, Missouri.

AE: Are you Springfield's most famous native son?

TH: Well, about 80 miles away is Joplin, where Dennis Weaver is from. Oh, but I think Bob Barker is from Springfield.

AE: You've lived in Missouri all your life?

TH: Pretty much, except for the three or so years I was in Massachusetts working for *Analog* magazine. I like Missouri; the climate's good, and the people are pretty nice.

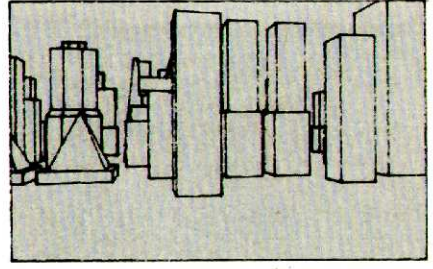
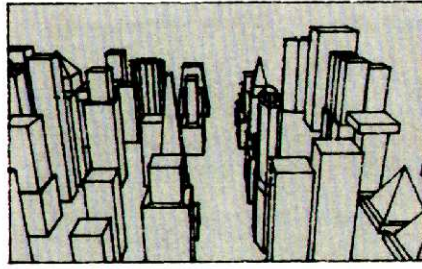
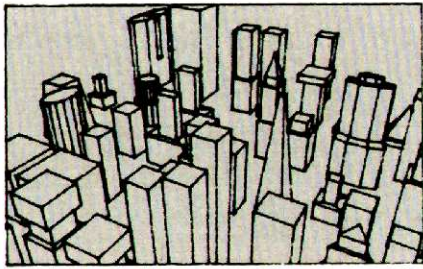
AE: What was your childhood like? Was there anything in your upbringing that predisposed you to programming?

TH: As to family, I have five sisters—no brothers—so I was lucky in that I always felt kind of special. Other than that, I've always had a real strong interest in high tech things. I used to watch a lot of science fiction shows in the early sixties—things like *Voyage to the Bottom of the Sea* and *The Time Tunnel*. They were important to me as a little kid.

They always had computers with blinking lights, and I thought it was just fascinating. I wanted a computer with blinking lights. So I would take a cardboard box and put holes in it, cover it with plastic, and put a desk lamp inside, and I'd have a computer. Everything sort of started there, and the more I thought about it, the more I decided I really liked working with electronics. I got electronics sets and things like that for Christmas and soon started putting together different kinds of equipment.

AE: What did your parents do?

TH: My dad was a salesman; he handled frozen food items for Sara Lee and Bird's Eye and some others. And my



mom is a clerk in a store.

AE: None of your immediate family had any engineering background?

TH: None at all. Except my grandfather, who was an inventor. And both my uncles were engineers—one worked for NASA and the other for the government. They worked in things like geology. I really wish I had gotten to know my grandfather—he sounds like he was a really sharp guy.

The aspect of my upbringing that contributed most to what I'm doing now is that I pretty much had free rein to do whatever I felt like doing.

AE: It sounds like your parents supported your impulse to tinker.

TH: Yes, absolutely. In fact, my parents' support is one of the things that put me where I am today. When I decided to take off from *Analog*, they fronted me some money and gave me all their support.

AE: They must be very proud.

TH: (Laughing) Well, that's what they say. It was an interesting little leap for me. I'd never tried to do anything by myself before.

AE: Where did you go to school?

TH: I went to Southwest Missouri State. Actually, I went to Drury College first. My course of study was in data processing, which was really a shame; at the time, there were no real computer science courses being given at those schools. Nobody told me that what I was really interested in was computer science, so I wound up taking data processing. I started college in '77, and with one thing and another it took me just about five years to get out with a Bachelor's degree.

AE: How did you first learn to program?

TH: Well, I took a couple of courses in high school. They had a vocational/technical center that offered a programming course. Part of the description of

that course said something about "wiring control panels," and that just stood out like neon; I thought to myself, "Wow! We'll be wiring control panels!" And I took the course for that reason.

It turned out that the course description was several years old and the "control panels" they were talking about were parts of an antique, punch card sorting machine they used to use for the course—you had to plug wires in to create some sort of logic for the machine to do sorting. We never, ever used it. We never even touched it. But it was always sitting there, reminding me that the reason I'd taken the course was to learn to use an obsolete piece of hardware. We

learned to program using an old IBM 1620.

So that's where it started, but it took about two years for me to really catch on. I didn't have a strong math background or any training in logic-building. In fact, I almost flunked my first year algebra course in high school and nearly blew away a geometry course, too.

When I sat down to do the computer stuff, they told us what to do, and we went ahead and did it. And I never, for two years, understood why we did it. I could, however, debug other people's programs; I could find technical flaws, but logic flaws were beyond me.

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1
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***“I like Missouri,
the climate’s good, and the
people are pretty nice.”***

AE: So you grasped syntax before you grasped the underlying logic of programming?

TH: Right. Then, when I started my first college course—in fact, on the first day of class—the teacher was reviewing some stuff, and it just sort of leaped off the board at me, like BANG! All of a sudden, I grasped the logic of programming. The next day, I started teaching myself Fortran, and after that, microcomputer assembler—because by that time, I had a microcomputer.

AE: What kind?

TH: My first micro was a CompuColor II (I still have it). I had worked with several micros—a TRS-80 first, then Apples over at a ComputerLand in Springfield. The thing that really sold me on the CompuColor was a *Popular Science* article about it. I saw that it had color, which I wanted, and built-in disk drives, which made a lot of sense; I had worked enough with cassettes to know I didn’t want to mess around with them.

So I saved my pennies and actually took out a loan to buy the CompuColor. At that time a 16K machine was \$1695. But it had a great monitor—a 30 Mhz color monitor—and that built-in disk drive, and I thought “Oh wow, you really can’t beat that—when you consider the price of an Apple, a disk drive, and a small color TV.” I also thought the graphics were better on the CompuColor.

AE: Did you write any software for the machine?

TH: I did a couple of things—mostly public domain. I wrote an Asteroids game on it. That was the machine that I really learned to use microcomputer assembly on. I had worked with mainframe assembly on IBM machines, but the CompuColor forced me to learn 8080 for the Asteroids program and a few other things.

AE: When did you get your first Atari?

TH: In 1981, I bought an Atari 400 with cassette, and started working on a version of Battlezone which Atari was going to market. We never really did wrap that up. We were working on it through ’82 and ’83, but nothing really ever came of it.

AE: Have you written any other software for the 8-bits?

TH: My first program for the 8-bits was a game called Buried Bucks—pretty simplistic. Imagic bought it, and we changed its name to *Chopper Hunt* and beefed up the graphics and improved the play action a little. Then Brian Moriarty [author Infocom’s *Wishbringer* and *Trinity*] and I got together at *Analog* and wrote a pair of programs for the old Atari called *Borrowing Money* and *Saving Money*. *Borrowing Money* was a loan program that let you ask what-if questions—pretty straightforward. *Saving Money* was the same kind of thing applied to savings accounts and annuities and things like that.

AE: How did you get involved with *Analog*?

TH: I had met Lee Pappas of *Analog* several years before—in ’78—and in 1980 he told me he was thinking of starting an Atari magazine. And I thought “Oh yeah, it’s going to be some kind of photocopied thing for a user group or something.” But they actually brought out a real magazine.

All this was during college, and at that time my objective was to get out with a degree so that I’d have something to fall back on. So, in the spring of ’82 when Lee called and told me they wanted to hire me as a programmer, I told him I wanted to finish college first. So I finished college and went on up to Massachusetts. That was the first job I ever had specific to micros. And that lasted three years.

AE: How did you come to move on?

TH: Well, mainly because of *DEGAS*.

AE: You wrote the program and split?

TH: Yeah. What happened was I wrote the program and brought it to Michael DesChenes. I said, "Here's this program, would you like me to finish it for *Analog* so we can use it in-house or maybe let Atari bundle it with the ST?" He said "no," so I said "no problem" and worked on it in my spare time. Then I contacted Batteries Included about the program, and they were very excited, because at that time they had done virtually no ST work at all.

It all happened very quickly. They wanted the program, but they wanted it to be finished in about a month and a half. So I sat down and thought about it real hard and realized that there was no way I'd be able to finish it unless I left *Analog* to work on it full time. That was pretty much it. I quit, went back home, set up an apartment, and split.

AE: So it was at *Analog* that you first came in contact with the ST?

TH: Yes. The first time I saw it, they didn't have any demos running or anything; the only thing we could do was play around with the GEM desktop. And I thought, "Nice computer." But there wasn't much information about the graphics, so I was really lukewarm. But then . . . I guess it was at the summer CES show last year . . . Atari was running demos of what ultimately became *Neochrome*. And I was absolutely staggered. They were the best I'd ever seen. Until then, the ST had kinda just been sitting there, because there weren't any languages to work with. And I was so busy with my other responsibilities at *Analog* that I really didn't have time to play with it. Well, after that CES I made time, because the graphics demos were so impressive I just had to know more about the machine.

AE: So you date your involvement with the ST to just over a year. Do you find it an easy machine to work on?

TH: Yes, it's pretty forgiving. You can do a lot of really great things on it. I don't like to bad-mouth the Amiga—it's a different machine, and it has a lot of nice things built in—but I believe it's inherently more complex. I have some friends, competent programmers, who have a much harder time working with it than with the ST, mostly because of the lack of flexibility imposed by the multitasking. The ST is pretty strong as a general-purpose machine; so I can write a program, and if it doesn't work, I can just find my mistake. There haven't been many times when something has

happened on the ST that I've had to puzzle over for a couple of days; problems usually turn out to be my own fault.

"At CES Atari was running demos of Neochrome. And I was absolutely staggered."

AE: Was it hard going at first, learning the machine?

TH: That took some time—some gearing up—but it always takes time to learn a new system. The documentation was pretty sparse for a long while; in the beginning, we didn't even have a Resource Construction Set, which is why the original *DEGAS* doesn't use regular dialog boxes. You just had to make do with what you had. You can usually program around any problems you encounter, and I think it's kind of charac-

ter-building. The more things you have to program around, the more confident you get, and that confidence is a really important component of success as a programmer.

AE: Is there any supplementary documentation you'd particularly recommend for somebody just learning to program the ST?

TH: Atari has done a pretty good job of filling in the gaps with its own documentation. The Developer's Package is really good, because you get the C language and all the development tools. Of course it costs a couple hundred bucks, but if you're serious about programming you should consider it.

The Megamax C is pretty good, and I hear the Mark Williams C is really nice. If you buy one of these compilers, I think the Abacus books will do a pretty good job of getting you going.

AE: What about C? Had you used it before the ST came along?

TH: The ST forced me to learn C because it was the only language avail-

THE ATARI
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II

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able. The Basic wasn't out, and there was no Pascal or Forth. The only things

AE: Writing *CAD-3D* must have been a challenging project. Would you tell us a

"Two people can do more together than they can separately, because they can bounce ideas off each other."

available were C and assembly. So that's what I learned.

I enjoy working in C for several reasons. First, because it's quick—I can sit down now and crank out a routine in pretty short order. Second, because it lets me save time by creating libraries of functions I use often. In fact, yesterday I blew away a file I was working on. I put my head down on the machine and said "I can't believe I did that." It was a pretty long program, but as it turned out, I was able to rebuild it in about 15 minutes. It was made up of building blocks that I had used in other programs, so I just went through my libraries, pulled out the routines I needed, and recoded the connections while they were still fresh in my mind. C makes it much easier to do things like that.

AE: What compilers are you using now?

TH: I'm using Megamax, and I have Alcyon C, which came with the Developer's kit. I mainly use Alcyon right now, because the programs I've been working with use floating point math really heavily, and with Alcyon you can use the Motorola Fast Floating Point libraries, which are very fast. Megamax, uses the IEEE format, which is quite a bit slower.

AE: What about other languages? Basic and so on?

TH: When ST Basic came out, I looked at it and didn't like it very much. Now, of course, there are other Basics, but for what I do, Basic is not a very good language, and I haven't invested in another version.

The best thing I can say about Basic in general is that it's quick—or at least it was quick until they started implementing it with windows . . . I really despise window Basics. But in order to prototype something, I'll often sit down and write it in Basic. To test an algorithm, to test a sequence of instructions involving math, I can set up a routine really quickly in Basic to make sure that it works without having to waste time compiling.

little about that?

TH: *CAD-3D* is the most complex and challenging program I've ever written. And if I had to do it again, I probably wouldn't do it, or I would hire someone to help me; it was very taxing. Among other things, I had problems with the mathematical precision in the program, and I had to figure out ways of handling them. It was really, really rough.

AE: The fundamental trigonometry of 3-D perspective display and rotation, stuff like that. Did that come easy to you?

TH: Oh, that was easy: any of the books on interactive computer graphics will give you all the transformations and instructions for image-handling.

AE: Does *CAD-3D* use trig functions directly to modify point sets?

TH: It's all matrix calculations. In fact, I'm thinking of changing that in the new release of the program, because of the way those transformations work. It's harder to handle some of the computations I'm performing that way, so I'm thinking of changing over to sines and cosines.

AE: Will that slow the program down?

TH: I don't know. I've never tried it. I have a basic set of 3-D transform routines that I use for absolutely everything, so I don't know what kind of performance change to expect when I start doing things differently.

Frankly, I don't even know how they work. I got these things out of a book, and I just plug things in and they come out a certain way. I guess if I thought about it I could learn enough to make it more efficient, but honestly, I don't know how to do a matrix. If somebody sat me down with a couple of matrices and asked me to do an operation on them—"add these two"—I would have to go back to my statistics book and figure out how to do it again.

AE: Is that how you usually approach a programming project? Doing research,

getting input, and then tying it together in a coherent way?

TH: Putting together a program, figuring out how it works, how it's organized—there's a lot of creative effort in that, and that's my job. As for the rest of it, in a way, yeah, it's essentially taking from many sources. No man is an island, and there's no way you can do everything yourself. In fact, I miss working with other people, now that I'm independent.

Two people can do more together than they can separately, because they can bounce ideas off each other. And if one person is stuck with a problem, instead of sitting there and puzzling over it for five or six hours, he can just ask the other person. I'd say that about 70 or 80% of the time the other person will have the answer or have a different approach to suggest. I'd kinda like to have somebody else around here, because I often encounter problems that would be easier to sort through if I had some additional input.

AE: Who do you turn to for that kind of input?

TH: Well, I get on Compuserve and ask around. You know, Russ Wetmore is there along with other really competent Atari programmers like Alan Page. In fact, I have to remember to ask him a question—I have to do something on the ST I've never done before, and he's worked a good deal with the RS-232 port and should have the answer. Rather than sitting around for four or five hours, I can just use the network and ask him.

I like to go to user group meetings and try to find out what people like and want. I try to go to as many as time allows. I showed an early version of *DE-GAS Elite* to some people in Wichita and got some good feedback. There are several Kansas City user groups, and I feel bad about not making it to meetings more often.

Working with people like Ian Chadwick has also been good for feedback. Ian has written the manuals for all three of my products. He's the kind of person who approaches a project like that just as if he were a regular user. He sat down with early versions of the programs and came up with pages of suggestions—whole laundry lists of features he'd like to see. Every time I've implemented one of his suggestions, I've been happy about it. And people at Batteries Included and *Antic* have also been very helpful.

AE: You're a sysop on the Atari 16-bit and Developer's SIGs on Compuserve. Has that been a rewarding experience?

TH: Oh yeah. I like being a sysop, because I enjoy helping people out; it's really rewarding. If you live in a vacuum, you really can't get much out of life.

AE: What do you see as your present role in the industry? People look up to you as a leader and a setter of the pace others will follow. Lately, some of your work has centered on graphics standards. Do you see yourself as a setter of standards?

TH: Yes, I think so. Any time you do something that's a first for a system, you're going to set some kind of standard. What I want to do in the industry is come out with products and find out what people want. Hopefully, they're going to want a lot of computer graphics products because that's what I'm interested in. But within that framework, to make that work on the computer you need standards. The big problem we have now is that *Neochrome* and *DE-GAS* use different file formats. Had I known they were going to come out with a successor to *Neochrome* as a commercial product, I would have followed their file format.

DEGAS Elite will read *Neochrome* files and it will offer the clip-art capability of cutting pieces out of pictures and storing them on disk as patch files in .IFF. I talked to Steve Ahlstrom and Dan Moore, the people who are doing *PaperClip Elite*, and to Russ Wetmore, and we all decided it would be in everybody's best interests to standardize on a graphics format. The Electronic Arts .IFF format for picture files was there and fairly complete, so we agreed to support that standard.

AE: Where do you see Tom Hudson Productions going in the next three years?

TH: For now, I'm sticking with the ST. I don't see any point in switching to another machine. So what happens in my future really depends on what happens to Atari, how things go for the company, whether the new machines are successful, and so on. If Atari comes out with a better-resolution graphics chip, for example, one of my first tasks will be to enhance my existing products to make use of it. But I'm going to play it by ear.

I'm a seat-of-the-pants kind of guy. I

haven't become filthy rich off the work I've done, but as long as I continue to have a good time, I'm going to continue doing it. Nothing's worth doing unless

pen is that you could fail, and what's the problem with that?"

The second thing you should cultivate if you want to be a really good program-

"Programming trains you to be an optimist."

you're challenged and are having a good time.

AE: Do you have any final words of advice for ST programmers?

TH: I've always thought that to be a programmer, you should be motivated by challenge. You have to look at every project as a challenge, and if you can't figure out a way to do something, you have to push yourself until you do. You never know you can do something until you've tried it. When I was first worrying about going out on my own, a good friend of mine said, "What's the worst thing that could happen to you if you do that? The worst thing that could hap-

pen is tenacity. Never, never give up. Always be optimistic. The more you work at something the better you get at it. You may have limitations—like a lack of math ability—but what you don't know, you can learn . . . cultivate resources. The important thing to remember is that you can do anything you set your mind to.

Programming trains you to be an optimist, and that's its own kind of problem. You can get so optimistic that you lose touch with the realities of a situation, with schedules and things like that. But the optimism you gain from programming improves your approach to all aspects of life. It's really uplifting. ■

THE ATARI
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The latest hardware and software
announcements for Atari
8-bit and ST computers

New Products



20Mb Hard Disk for ST

Supra Corporation announces a low-profile 20Mb hard disk drive for Atari ST computers. The 3.5" SupraDrive connects through the DMA peripheral port and is said to improve disk transfer speeds by as much as 300% to 1000% over standard floppy-based systems.

The drive is software compatible with the TOS operating system and applications software. It is also hardware compatible and will work with other standard DMA bus peripherals, including coprocessors and the CD-ROM player. The computer boots directly from the SupraDrive.

The SupraDrive comes with a utilities disk, which includes format, partition, and backup utilities. Partitioning allows the user to create up to four separate logical drives for file storage. Each partition appears as an icon on the GEM desktop and is treated as a completely separate disk drive. Retail price is \$799.

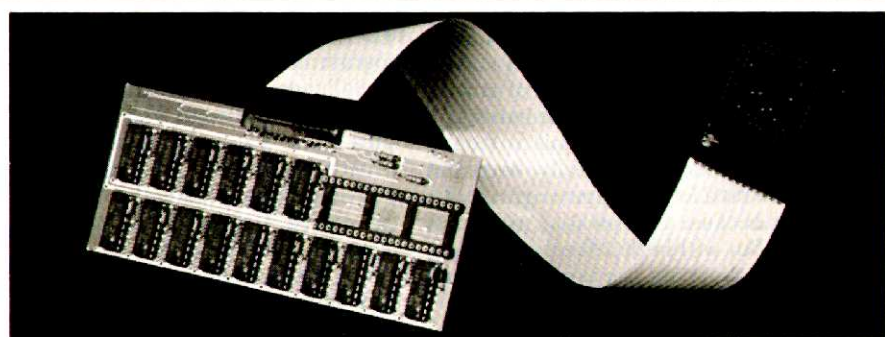
Supra Corporation, 1133 Commercial Way, Albany, OR 97321. (503) 967-9075.

1Mb RAMcharger for Atari 800

Magna Systems has announced the availability of RAMcharger 1Mb plug-in memory boards for the Atari 800 home computer.

The boards are Axlon compatible and require two 16K or one 32K board; the RAMcharger slides into the third slot. Smaller boards (512K and 256K) are also available.

Software said to take advantage of the additional RAM includes *Synfile+*, *Syncalc*, *AtariWriter Plus*, *Filemanager 800+*, *Printshop Companion*, *Omnimon*, *Omniview*, *Omnewriter 80*, Atari DOS 2.5, Sparta DOS, OSS DOSXL, MYDOS (included with RAMcharger), and TOPDOS 1.5+.



.5Mb Memory Upgrade for 520ST

Terrific Peripherals has released EZ-RAM 520, a 512K memory upgrade kit for the Atari 520ST. The kit, which increases RAM to a full megabyte, can improve program performance by making disk access more efficient.

Installation of the EZRAM 520 is simplified through the use of an EZ-Temp solder template, which allows all solder connections to be made on the template rather than on the motherboard. The kit comes with detailed, illustrated instructions.

Printer Interface for 600/800

The interface 72000 from BlueBox Interfaces allows connection of a Centronics parallel printer to an Atari 600 or 800 computer. The interface connects directly to the serial bus of the computer and requires no driver program. It can be daisy-chained onto a disk drive if necessary.

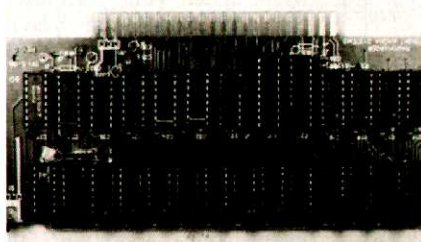
The complete interface, including a 5' cable and installation instructions, sells for \$59.

BlueBox Interfaces, 6925 Rosemead Blvd., #24, San Gabriel, CA 91775.

Also included in the kit is a high-speed digital signal cable designed to maximize data transmission rates while minimizing cross-talk interference. The memory banks are fully de-coupled with high frequency ceramic capacitors to ensure consistent clean power to the RAM chips.

The EZRAM memory upgrade kit carries a suggested list price of \$199.

Terrific Peripherals, 17 St. Mary's Ct., Brookline, MA 02146. (617) 232-2317.



10Mb Winchester Drive for ST

Haba/Arrays, Inc., has announced an external 10Mb hard disk drive for the Atari ST. The HabaDisk is a plug-in drive and stores the equivalent of more than 12 double-sided 800K disks. The transfer rate of the new drive is 5 megabits per second.

HabaDisk is compatible with the GEM desktop, DOS, and the ST mouse. It is self-powered and boasts 3msec. track-to-track access time. The drive retails for \$699.95.

Haba/Arrays, Inc., 6711 Valjean Ave., Van Nuys, CA 91406. (818) 994-1899.

Suggested retail price for the 1Mb RAMcharger is \$299.95. The 512K and 256K boards sell for \$199.95 and \$149.95.

Magna Systems, 147-05 Sanford Ave., Ste. 4E, Flushing, NY 11355. (718) 939-0908.

NEW PRODUCTS

SYSTEMS SOFTWARE

Beckmeyer Development Tools is now shipping MT C-Shell, a multitasking, multiuser, Unix-like operating system for the Atari ST. MT C-Shell runs TOS programs in a TOS-compatible file system. GEM is supported on the main system console, while another user operates from any standard ASCII terminal in a Unix-like environment using the C shell to run an assortment of Unix-like tools, included in the MT C-Shell package, and other TOS programs like compilers, linkers, and text editors. \$129.95.

Beckmeyer Development Tools, 592 Jean St., #304, Oakland, CA 94610. (416) 658-5318.

Metacomco has announced Cambridge Lisp 68000 for the ST. Features include an integral compiler, 15Mb address space, rational arithmetic, trigonometric and other built-in functions, garbage collection, integers of any size, vectors, floating point arithmetic, full tracing in interpreted and compiled code, and complete automatic space allocation without hard boundaries. \$199.95.

Also available from Metacomco is *Make*, a tool designed to aid in program development by automatically recreating files which are dependent upon other files. It acts as a batch file for the development process by recompiling and linking only those modules that are affected by changes. \$69.95.

Metacomco, 5353 #E Scotts Valley Dr., Scotts Valley, CA 95066. (408) 438-7201.

Philon, Inc. has released a new version of its Basic compiler for the ST. Fast/Basic-M, version 1.35 includes

graphics capabilities through support of the GEM VDI graphics interface. Graphics output is produced by using PEEKs and POKES into GEM VDI. \$129.

Philon, Inc., 61 Avenue of the Americas, New York, NY 10011. (212) 807-0303.



Mark Williams Company has begun shipping Mark Williams C for the ST. It features a complete implementation of the Kernighan and Ritchie C language plus recent extensions to C implemented under Unix. Included are such utilities as make, diff, cmp, egrep, wc, and sort. An assembler, loader, archiver, and advanced symbolic debugger are also included. \$179.95.

Mark Williams Company, 1430 W. Wrightwood, Chicago, IL, 60614. (312) 472-6659.

PRODUCTIVITY SOFTWARE

Abacus Software offers three personal/professional productivity packages for the Atari ST.

PaintPro is a GEM-based design and painting package that supports up to three active windows. Functions include free-form sketching, lines, circles, ellipses, boxes, fill, copy, move, spray, zoom, undo, help, and text capabilities. \$49.95.

TextPro features multi-column output, automatic indexing and table of contents, sideways printing (to Epson printers), up to 30 user-definable keys, a mode for editing C language source programs, and flexible printer driver installation. \$49.95.

DataTrieve is a data manager that uses pull-down menus for defining files and entering information through screen templates. The program can store data items in different type styles, create subsets of a file, and change file definitions. It supports RAM disk for high speed operation and can handle records of up to 64,000 characters in length. \$49.95.

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

Maillist from **Artworx** is a data manager that allows entries to be retrieved by name, key word, zip code, or ranges of these attributes. Address labels can be created in 1-, 2-, or 3-up format. \$17.95.

Artworx Software Company, Inc., 150 North Main St., Fairport, NY 14450. (800) 828-6573 or (716) 425-2833.

BOOKS

Info Books announces *The Tao of Programming* by Geoffrey James, a book that reveals the secret techniques of program development practiced by the ancient masters at the dawn of the computer age. According to the publisher, "The origins of The Tao of Programming are lost in the mists of time. The manuscript, labeled 'Destroy after processing,' was discovered amid a collection of obsolete punch cards."

The publisher also promises that the book will answer such questions as: "What is the meaning of life?" "Why do I exist?" and "How can I debug a program that locks the keyboard?" \$7.95.

Info Books, P.O. Box 1018, Santa Monica, CA 90406. (203) 470-6786.

Abacus has released *Introduction to MIDI Programming for the Atari ST*, a book written for the Atari ST music enthusiast who wants to learn the fundamentals of MIDI programming. Len Dorfman and Dennis Young, authors of the *XLent Software ST Music Box*, present an introduction to the capabilities of the MIDI interface.

The book includes source listings for a MIDI editor, driver, and animated player for any of the Casio CZ series synthesizers. \$19.95.

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

Computer Connection Mysteries Solved by Graham Wideman is now available from Howard Sams. The 272-page manual investigates the hows and whys of connecting a personal computer to its peripherals and introduces the available hardware, including printers, MIDI, Centronics, video hookups, and RS-232.

Featuring a variety of technical illustrations, the book stresses the importance of software, provides material on power connections, and discusses how to set switches for parameters. \$15.95.

Howard Sams & Co., 4300 W. 62nd St., Indianapolis, IN 46268. (800) 428-SAMS.

ENTERTAINMENT SOFTWARE

Infocom offers interactive adventure stories for the ST. *Moonmist* places introductory level players age 9 and up in the middle of an interactive gothic mystery. Included on the disk are four different variations, each of which has its own puzzles, treasure, hiding place, and solution. These variations give the game, Infocom says, greater replay value than any other Infocom story release to date.

Ballyhoo puts the player in the role of a small town circus goer who sticks around after the show to explore the exotic back lot and finds himself plunged into a mysterious underworld where crime and corruption take center stage.

Trinity leads the player to an alternate universe where magic and physics coexist, and every atomic explosion that has ever occurred is inexplicably con-

necting, the company has released an ST version of *The Activision Little Computer People Discovery Kit*. The new version contains a completely refurbished model of the 2 1/2 story "house-on-a-disk" software used to help the computer owner lure out and befriend his own Little Computer Person. \$49.95.

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

Techmate from **Szabo Software** is a chess program created specifically for the Atari ST, utilizing the unique computational advantages of the 68000, the fine resolution of the RGB monitor, and the convenience of the mouse. \$49.95.

Szabo Software, P.O. Box 623, Borrego Springs, CA 92004.

Quack Computer Company has released *Space Wasters*, a 3-D action game for the Atari ST. The game places the player in the role of the pilot of a Low Gravity Attack Vehicle on a mission to protect orbiting energy cells, the source of energy for his space station, from invading space viruses. \$49.95.

Quack Computer Company, 257 Robinson Ave., Bronx, NY 10465. (516) 689-8738.

IntelliCreations has announced *Gun-slinger*, an adventure in an Old west setting, for 8-bit Atari computers. The program uses a split screen format with graphics in the upper left section of the screen and command choices and text along the bottom. The player can use

sert battle that threatened England's presence in North Africa. In this tank simulation with arcade sequences, the player commands the German Afrika Korps against the computer. In *Bismarck*, the player can choose to command the infamous German battleship or the Royal Navy as it seeks to destroy the scourge of the North Atlantic sea lanes. *Swords & Sorcery*, a role-playing fantasy game, takes the player through the underground corridors of the underworld on a quest for material, physical, and spiritual power.

Saracen, an arcade-style adventure, sends a brave young crusader through 100 mazes of increasing complexity as he seeks to destroy the evil Saracen warrior. *Black Magic*, another 100-screen arcade-style adventure, takes the player into a world of fantasy, pitting good against evil.

IntelliCreations, Inc., 19808 Nordhoff Pl., Chatsworth, CA 91311. (818) 886-5922.

Electronic Arts recently announced that its conquer-the-world strategy game, *Lords of Conquest*, is now available for Atari 8-bit computers. A classic strategy game in which action takes place on a world map, *Lords of Conquest* is similar to the game of Risk, but takes advantage of the power of the computer to add depth and variety to the game. The game offers four levels of complexity. \$32.95.

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



nected. It is his job to explore this realm, crisscrossing time and space as he struggles to shape the course of history.

Each of the three games retails for \$39.95.

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

Activision has announced the discovery of Little Computer People in Atari ST computers. In conjunction with this

either a joystick or the keyboard to control the action \$29.95.

For players of *Mercenary—Escape from Targ*, IntelliCreations has released *The Second City*, a supplemental game disk containing new challenges. \$14.95.

Scheduled for release in early 1987 are five games for 8-bit machines recently licensed from PBS in England. *Tobruk* is a recreation of the fierce de-

Accolade has released *Fight Night*, a boxing game for Atari 800 computers. The game features strategy, graphics, and a boxing construction set. The one- or two-player game allows users to create hundreds of boxers with different combinations of heads, bodies, arms, and legs. \$29.95.

Accolade, Inc., 20833 Stevens Creek Blvd., Cupertino, CA 95014. (408) 446-5757.

Supercomputer on a Chip

Technology

Every few months, it seems that all the semiconductor houses announce new "super chips." Some of these really are advances—the Intel 80386 and Motorola 68030, for example—but others seem more hype than reality. However, one recent announcement from TRW Inc. really does deserve to be called "super." Currently, the most densely packed chips contain the equivalent of about 1 million transistors; this new TRW chip will contain 35 million.

The new chip is a joint development effort between TRW and Motorola under contract from a Department of Defense program to develop very high speed integrated circuits (VHSIC). The military needs VHSIC chips for new weapons systems, particularly "smart" weapons which must evaluate data from a variety of sensors in real time.

Making a chip more powerful usually means adding more circuit elements (called "features"). To do this means that either the features must be smaller to fit on the substrate or the chip itself must be larger. To achieve this quantum leap in power, TRW is doing both.

In current state-of-the-art chips, the

TRW estimates that the chip will be able to perform the work of more than 10,000 conventional chips.

By **DAVID H. AHL**

circuits are about three microns wide (a micron is one-millionth of a meter, about one tenth the size of a human hair). A few of the latest chips use circuits as small as one micron, but the circuits on this new TRW chip are just one-half micron in width. To produce such tiny circuit features requires an advanced method of circuit etching with beams of electrons or ions.

Large chips; Low Yield

Even more dramatic is TRW's progress in making a bigger chip. Currently, most chips are just under 1 cm square; the TRW chip is 3.5 cm square, giving it nearly 15 times the surface area of current chips. Until now, the main problem with making a chip this large was extremely low yield.

In manufacturing, many identical chips are deposited on a silicon wafer about 3" in diameter. After the depositing process, each chip on the wafer is tested. Those that pass inspection are cut from a wafer and wired into a carrier, the familiar insect-like rectangular piece of plastic with tiny prongs on either side called a dual inline package (DIP). The percentage of chips that test out satisfactorily is called the yield. Yields above 60% are considered excellent, while yields below 10% are generally uneconomic.

As the size of the chip increases, so does the probability that it will be rejected. Just a minute speck of dust can ruin an entire chip, and with 15 times

the surface area of conventional chips, the probability of manufacturing flaws in the TRW chip is extremely high. TRW's solution was to build software into the chip to bypass flawed transistors and even entire circuit areas automatically using a process called "sparing." In other words, TRW put in spare circuits, one or more of which are put into operation if one of the primary circuits fails. TRW claims that the chip will function properly even if as many as one-third of its circuit components fail.

While sparing has been tried before, it has never been done on such a large scale. Until now, the big problem with the process has been the question of exactly where on the chip to put the spare circuits. TRW has developed a proprietary software program to find optimum locations, a program that TRW calls "the heart of our superchip capability."

The superchip has more than 150 times the number of circuit features found on today's conventional chips and 35 times the number on the most advanced chips. However, because they are contained in a single unified package, TRW estimates that the chip will be able to perform the work of more than 10,000 conventional chips. Moreover, by eliminating the need to hook hundreds or thousands of individual chips into a system, the superchip will reduce manufacturing costs and improve reliability of computers, robots, avionics systems, and other products. ■

Photos courtesy of TRW Inc.

Holiday Gift Ideas

High (and not-so-high) tech products to add to your holiday gift list

This season, dealer shelves and catalog pages are full of high-tech products for your holiday gift giving (and receiving). Unfortunately, although the catalogs make every product sound like the greatest thing since sliced bread, many of them prove disappointing when they arrive at your door. For example, have you ever tried to clean your keyboard with one of those mini vacuums? If so, you know how poorly they really work. Or how about the fabric case designed to hold the infrared remote controls for your TV set, VCR, and CD player? Pretty silly.

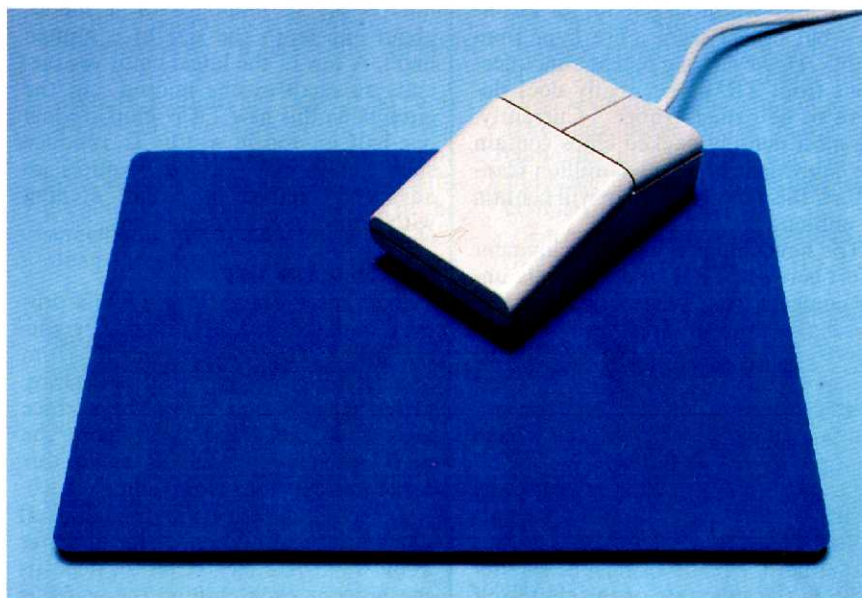
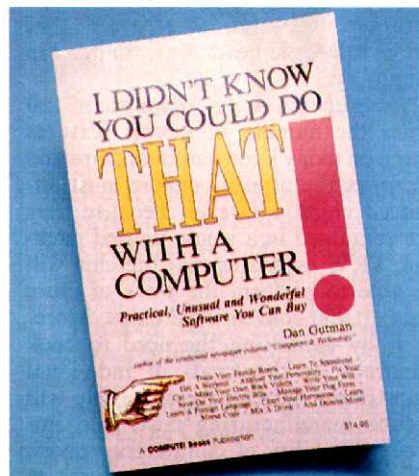
We did some early shopping in catalogs and stores to bring you these gift suggestions. We think you will find the products presented here live up to their claims, represent a good value, and are worthwhile, fun, or both. Happy holidays!

By **DAVID H. AHL** and **JOHN B. JAINSCHIGG**

Weirdware

Dan Gutman's book *I Didn't Know You Could Do THAT with a Computer* is essentially a 308-page compendium of weirdware. It will direct you to software that will help you manage your hog farm, make your own rock videos, study for your Bar Mitzvah, read other people's minds, or simply prepare for the SAT. The bulk of the book consists of easy-to-read one- or two-page descriptions of offbeat programs.

A handy appendix lists all the programs and the computers on which they run in chart form. A great gift for all those folks who are forever asking, "But what would I do with a computer?" \$14.95. Compute Books.

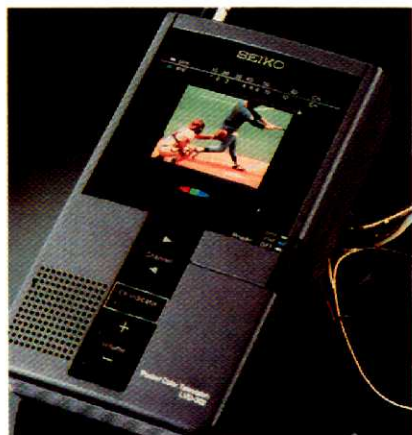


Mousterpiece Mouse Pads

"Those mice were designed to withstand years of constant use," says Randy Hain, Atari's Director of Service. "If a mouse starts acting funny, you just take the lockplate off, tip out the ball, and blow into the housing. That's it. Every once in a while we get a call for a replacement ball, but that's no problem either. We have extra mouse balls." Okay, okay. So maybe there isn't that much reason to buy a mouse pad. Sheesh! But they sure are neat-lookin'!

And they sure do make that 'ol rodent run smoo-o-o-th! And what the heck, at this kind of price, who can argue?

So, indulge. Astra's mouse pads come in two sizes—7" x 9" (\$6.95) and 9" x 11" (\$9.95). Made of virgin neoprene bonded to nylon, they are tacky on one side to grip the desktop, slick on the other to give your mouse the motion. And they're almost criminally snazzy. Astra Systems, Inc., 2500 South Fairview, Santa Ana, CA 92709. (714) 549-2141.



Pocket Color TV

Seiko's LVD-302 thin film transistor (TFT) pocket color television set has spectacular picture quality thanks to the 70,400 pixels (picture elements) in its two-inch screen—more than three times the number in older pocket units. Perfect for outdoors, the picture brightness actually increases in sunlight. It has full VHF/UHF coverage with its built-in telescoping antenna. The set measures 5.8" × 3.25" × 1.1" and weighs just 12 ounces; price is around \$300.

Krypton/Lithium Flashlight

How often have you switched on a flashlight to find it dim and fading just when you needed it most? Tekna's waterproof Micro-Lith is powered by a lithium battery that has a higher energy density (more hours of use) and longer shelf life (10 years with no loss of charge) than any other type of battery. Micro-Lith is just 4" long and very lightweight. But with its special krypton gas bulb, it is twice as bright as conventional lights—and the bulb lasts twice as long. About \$15.



RC Dune Buggy

The difference between a monocoque frame chassis dune buggy and a standard RC car is like day and night. Monogram Model's 1/10 scale Thunder and Lightning cars have fully sprung trailing arm front suspension, operating front and rear shock absorbers, sealed rear suspension and differential gears, and pliable front bumpers. A Mabuchi electric motor propels the vehicle at speeds up to 20 mph (scale speed 200 mph!). They come with a two-channel digital proportional transmitter to allow graduated steering and speed control. Standard model, about \$135; deluxe model with NiCad batteries and charger, about \$175.

Surround Sound Decoder

The starfighter races in from behind, ion guns blazing at the back of your head. Then, whoosh! the fighter streaks in front of you and roars off into star-filled space in pursuit of the man in black.

Star Wars delighted theatergoers with vivid images and thrilling special effects. But it was thanks to Dolby Surround Sound that these thrills were not lost on the ear. Now this sound system can be brought into your home. New home decoders re-create theater sound effects from Dolby encoded videotapes, videodisks, and television multichannel sound (MTS) broadcasts.

Surround sound comes from four discrete channels—left front, center front,

right front, and rear—three of which are recreated in home decoders (right front, left front, and rear). In most home units, the center front channel is split between the right and left channels, thus your ears re-create a "phantom" center, just as they do with stereo tapes and records. Also, in most home installations, people want two speakers in the rear, so all of the home decoders provide two speaker outputs for the rear channel.

Priced in the \$300 to \$500 range, the new decoders come as separate hi-fi components or in combination with rear and/or front and rear channel amplifiers. The Technics, SSI, and Fosgate units offer an optional center front channel. Other manufacturers include

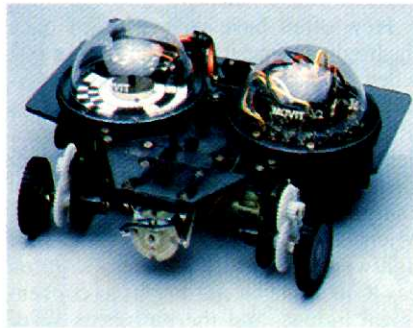
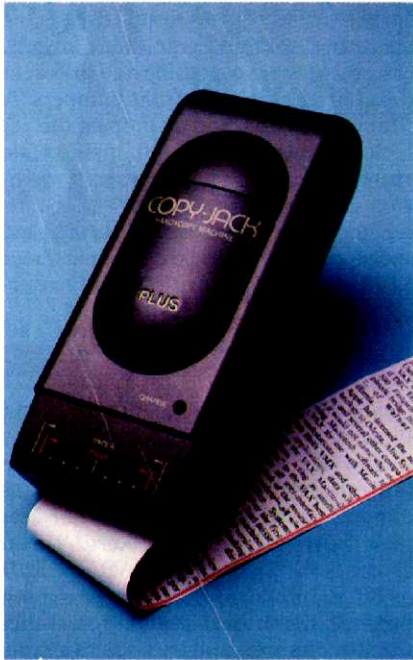
Denon, NEC, Yamaha, Teac, Akai, Pioneer, and Marantz.

The rear channel speakers should be full-range units, although power handling capacity can be somewhat less than the front channel speakers. A good choice is the Speakerlab DAS-2 (\$129) or DAS-3 (\$189) for two reasons: both produce sensational sound from tidily small enclosures, and both are available in a variety of lacquer colors which blend in with any decor.



Copy-Jack

Copy-Jack, a miniaturized version of an office copier, weighs less than a pound and is about the size of a small camera. To make a copy, you slide Copy-Jack smoothly over a page with the copy button depressed. The copy trails out of one end of Copy-Jack—full size—on a 1.6" wide roll of heat sensitive paper. It uses a solid-state optical sensor, digitizes the image, and transfers it to the copy paper; no toners or chemicals are needed. To copy a 12" long newspaper column takes about five seconds. Of course, it takes several passes to copy a wider sheet, and the copy strips must be taped together. \$350.



Movit Kits

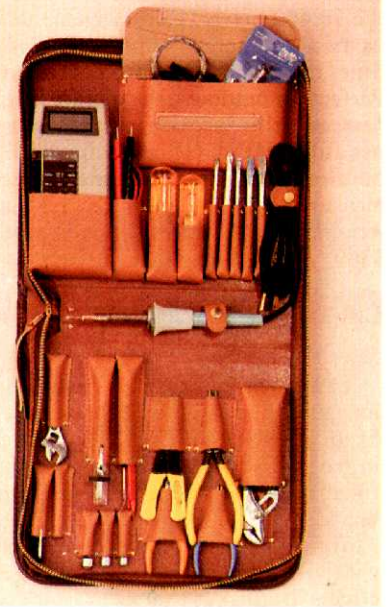
Movits are do-it-yourself kits, each one of which makes a different robot or fantasy vehicle. These kits, from Japan,

require intricate mechanical construction and electronic wiring; no special tools are needed, however—just a good measure of patience.

Each Movit employs a different sensor and moves in a different way. Tsunawatari Monkey, for example, moves hand-over-hand along a cord in response to a hand clap. Other Movits respond to a whistle, light, or touch, while some use wired controllers similar to an RC car. The Movit WAO even boasts a 4-bit processor and a built-in programming language. Movits are priced from about \$12 to \$100. OWI Incorporated, 1160 Mahalo Pl., Compton, CA 90220. (213) 638-4732.

Portable Tool Kit

To set the DIP switch on your printer, you need a #1 Phillips head screwdriver, but you remember you left it in the garage and try to make do with a #2. One tip is broken off your needle nose pliers and your adjustable wrench has disappeared altogether. Sound all too familiar? A zipper tool kit with a place for every tool will keep your tools from getting lost, will ensure you always have the right tool for the job, is easy to carry around, and will tuck away in a desk drawer. A Telvac kit (\$99) comes in a heavy-duty vinyl zipper case and contains 33 useful tools for computer users: four types of pliers, five nutdrivers, eight screwdrivers, two wrenches, a knife, a hemostat, a wire stripper, and soldering equipment. The Jensen JTK-16 kit (\$127) is similar but adds sets of jeweler's screwdrivers and hex keys.



Printer Stand

Have you been making do? Propping your printer up on bricks, milk cartons, or pieces of the styrofoam packing it came in because you can't see spending \$30 or \$40 for a printer stand? We have a better idea. The Amaray printer stand is made of a single piece of sturdy, fashionable, smoke-colored acrylic with a center slot for paper feed. Suitable for 80-column printers, it requires no assembly, and sells for a mere \$14.50. Amaray International Corporation, 14935 N.E. 95th St., Redmond, WA 98052.



Multicolored Microflopiss

For most of your mass-storage needs, utilitarian disks in chic understated Atari grey are ideal—the go with ev-

erything (everything from Atari, anyway) and save your files reliably and in uniform, quiet good taste. Every now and then, however, you run across a special file: a file you want to save in a specialway . . . with a little fanfare, a little razzmatazz. Well, why not dress up that special file by saving it on a brightly-colored DSDD 3½" disk?

Certified error-free (i.e., always correct) and exceeding ANSI specifications for sheer glamour, these festive floppies come ten to a box in sugarplum blue, pine green, sunny yellow, mandarin orange, and Santa Claus red with matching labels. So dress up that special file for the holidays—it'll thank you for it all year round. Cenna Technology, Inc., 185 Cottage Ave., Sandy, UT 84070.



Magazine Indexes

EasyFind is a simple, easy-to-use, magazine indexing program that costs only \$7.95. Available for 8-bit Atari home computers with 40K of RAM, *EasyFind* is written in Basic and fully modifiable. The real kicker, however (you didn't *really* think we were going to suggest you manually index your magazine collection, did you?), is that Sierra Services has already indexed all your favorite magazines for use with *EasyFind*. Indexes to *Analog*, *Antic*, and *Compute* are currently available (starting in January, *Atari Explorer*, too!), covering issues from 1983 to present. Cost is only \$4.95 per year of any one magazine.

The indexes are in the form of standard ATASCII text files, and reference articles by magazine, date, page, author, title, and description. They can be modified and added to using *Atari-Writer* or other word processor (Sierra sells quarterly updates as well). Searches are by keyword or phrase, and run fairly fast. Sierra Services, P.O. Box 40454, Bellevue, WA 98004, (206) 881-0512.



Pulsecoach and Pulsewatch

For those who exercise, a pocket exercise/pulse monitor from Biotechnology may be the ticket. The Pulsecoach (\$149.95) monitors heart rate while you exercise as well as keeping track of maximum and average speed, distance traveled, stride rate, and elapsed running time. Pulsewatch (\$59.95) monitors your pulse using a finger sensor and sounds an alarm if your pulse is higher or lower than your target range.



Compact Binoculars

Remember when compact binoculars were nothing but repackaged opera glasses? Although the principles of telescopes (and binoculars) are nearly 2000 years old, new research on lenses and prisms has led to small binoculars with the magnification and field of view of much larger units. For example, an 8-power × 22 mm pair gives a 430-foot wide view at 1000 yards, considerably better than most 7×35 standard units, yet it fits easily in the palm of your hand. By Nikon and others (available from Sears); \$35 to \$95.



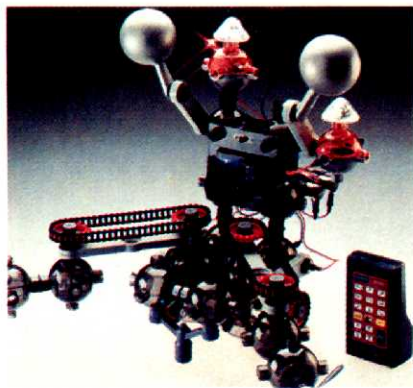
Bassmate Computer

An essential item in the tackle box of the high tech angler is Telko's Bassmate Computer. After you enter the current conditions—season, water temperature, depth, time of day, weather, wind, and so on—Bassmate recommends the best lure—classified by body type, color, and size—and the correct retrieval motion. Bassmate, which sells for \$59.95, has a built-in clock and comes with a water temperature thermometer. Telko, 8655 N.W. 56th St., Miami, FL 33166, (305) 594-0003.



Lego Technic Sets

"Technic" is the designation given to the more advanced Lego construction sets. Parts are interchangeable with standard Lego sets but are more intricate. Special Technic parts include rotary gears, worm gears, pulleys, ratchet and pinion assemblies, universal joints, and a battery-powered motor. The kits can be used to build many types of vehicles, aircraft, and construction equipment. Technic Sets are priced from \$16 to \$35.



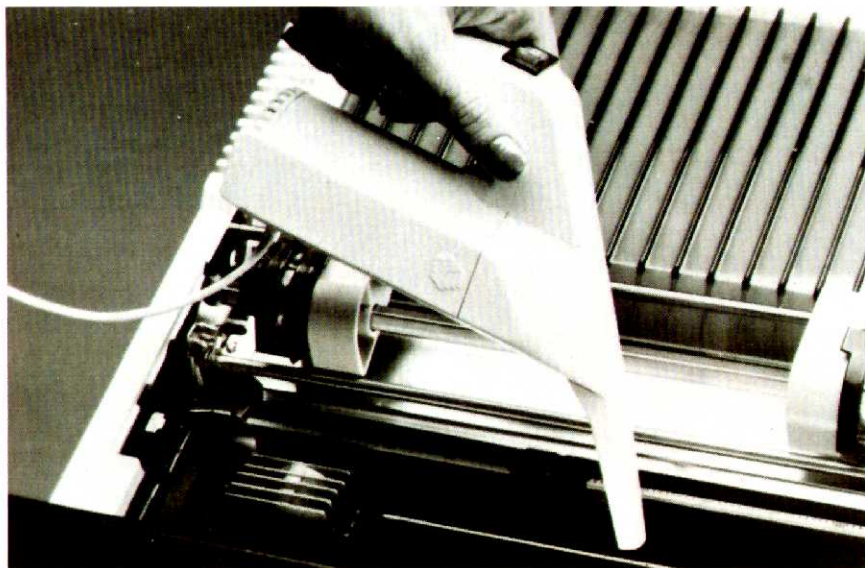
Capsela Infrared System 5000

Capsela kits have been popular for years with their transparent spherical modules that can be assembled into a wide variety of motorized vehicles, robots, structures, and fantasy objects. Now, an infrared remote control lets you control your creation from up to 25 feet away. The handheld controller can transmit 17 different instructions, including motor A forward, turn right, sound on, and light on. In addition, in "computer mode," it is capable of storing a sequence of 94 commands. Great fun for kids and adults alike. Price around \$130.

System Sweeper

If periodic maintenance is your bag (your vacuum cleaner bag, that is) you probably think you know all about those weird little, asthmatic, battery-powered vacuum cleaners people tell you to use to clean out the pocket fluff from between your keys and under your printer platen. Well, take the Babel fish out of your ear, kiddo, and listen to this: the

System Sweeper is no asthmatic little toy vacuum. It runs on regular house current and really, well, you know ... aspirates. At \$39.95, it comes with three attachments and a built-in dust compartment that unsnaps for emptying. And it doesn't sound like a dentist's drill, either. Microcomputer Accessories, Inc., P.O. Box 6691, Los Angeles, CA 90066. (213) 301-9400.



CompuCovers and DiskWallets

Users who wish to prolong the life of their Atari equipment will appreciate these snug-fitting covers for keyboards, disk drives, monitors, and other peripherals. Made of waterproof, fabric-backed vinyl and plastic, CompuCovers are available in sizes for Atari 800, XL, and XE computers, and for 520 ST computers, monochrome and color monitors, and disk drives. Custom covers are also available, as are covers bearing the logo of your business or group.

And while you're at it, why not help your favorite Atari ST user protect his disks as well? DiskWallets, made of tough nylon, provide lint- and static-free protection for up to six 3 1/2" diskettes. Compact and brightly colored, with convenient Velcro closure, DiskWallets are the perfect alternative to clumsy disk boxes for users on the go. CompuCover, Inc., P.O. Box 310, #1 Andalusia, Mary Esther, FL 32569. (904) 243-5793.



Integrated Telephone Answering Machine

Panasonic's two integrated telephone/answering machines feature beeperless remote control, automatic on-hook dialing, and speed dialing. Beeperless tone remote allows you to activate functions such as change of outgoing message, playback/reset, repeat, skip, and backspace from a remote



Touch Tone telephone. The units use standard cassettes for both incoming and outgoing messages. They have programmable ring control (1 to 9) and security codes (99,999 codes). The VA-8025 (\$169) has a 10-number memory while the VA-8045 (\$219) has a 20-number memory and call forwarding.

Cleaning System

Atari ST systems are built to last, but they still need to be taken care of. Their worst enemies: dust, dirt, and head-clogging oxide buildup from low quality magnetic media. To extend the useful life of your system, you should probably clean it periodically. Trouble is, computers and drives are delicate little beasts.

Enter Automation Facilities Corp., producers of Microclene and Floppiclene. Microclene (\$24.95) is a complete, self-storing computer cleaning kit, containing all the hard-to-find swabs, lintless wipes, nonabrasive cleansers, and other supplies needed to keep your ST system clean and bright. Floppiclene (\$19.95) is an integrated-wet/dry, non-abrasive cleaning system especially for high-performance 3 1/2" disk drives. Automation Facilities Corp., 6383 Rose Lane, Carpinteria, CA 93019. (805) 684-5464.



Video Vegas

If you've ever needed an excuse to avoid a trip to Las Vegas, here it is. Baudville's *Video Vegas*, available for both 8-bit (\$29.95) and ST (\$34.95) systems, offers four classic distractions—a Lucky 7 slot machine, Draw Poker, Keno, and Blackjack—guaran-

teed to keep you occupied and your money in your pockets where it belongs.

The games are full-featured, professional simulations, incorporating realistic casino odds. Play is as challenging as Vegas itself, but not likely to turn you into an impoverished drifter, either. The XL/XE version of *Video Vegas* is written in Basic and can be examined and changed to your liking (the ST version is written in C and, as yet, no plans have been made to include C source code with the program). The educational value of this package, part of Baudville's Hacker Jack series, thus goes far beyond card counting (which, for those so inclined, it also teaches). Baudville, Inc., 1001 Medical Park Dr., S.E., Grand Rapids, MI 49506. (616) 957-3036.

Still Looking?

Our favorite catalog comes from the Boston Computer Museum. If you're still wondering what to get your favorite hacker for the holidays, here's where to look. You've never seen so many frills and furbelows, so many electronic nifties—digital tchatchkes galore! We are talking diskettes made of milk chocolate; abacus and photocell jewelry; cufflinks made of hybrid microcircuitry; floppy-disk-patterned neckties . . . the works!

Pick of the season for kids: a flock of four rubber stamps that say "User Friendly" and "Technically Perfect" among other coy lines (\$18 including two stamp pads). For adults, a seriously beautiful gunmetal card case, inlaid with a microchip (\$45 and you have to supply your own calling cards). The Boston Computer Museum, 300 Congress St., Boston, MA 02210. (617) 542-0476. ■

The Other Side Of The Pond

By PREEVA ADLER



Computing in England as seen from this year's Personal Computer World Show

Several years ago, the British government made computing a top priority for its citizens, implementing computer literacy and programming courses through the BBC.

"Every school child in England has had computer experience," says Jeff Fenton, president of GST software in Cambridge, "and because of the BBC program, Acorn, the company that manufactures the machine that bears the BBC name, dominates the market here."

Other computer brands are available in the U.K., but their names—Electron, Sinclair Spectrum, Tatung Einstein, and Amstrad—are unfamiliar to most Americans. Commodore machines—64s, Vic-20s, Plus 4s, and 16s—are also popular. The price of the Apple II has placed it beyond the reach of most British families.

The Macintosh is promoted as strictly a business machine, but it faces serious competition from the major business computer brands, which include IBM and clones (about 60% of the market) Amstrad, Apricot, Olivetti, Psion, Sanyo, and Victor.

Atari, too, is a strong force in the British computer market. Exact figures are hard to get, but Atari is a significant presence in the U.K. market and continues to grow. Most of the new software introduced at the Personal Computer

World Show in London this fall featured Atari versions.

"Exact sales figures are confidential," said Atari President Sam Tramiel, "but I can tell you that we have sold hundreds and hundreds of thousands of computers in England. Our inventories are down to almost nothing."

We spoke to some English Atari enthusiasts at the show and asked them what initially attracted them to the Atari; most cited value and superior color graphics. As in the U.S., Atari users in the U.K. are a loyal bunch.

Computer Shows

The primary sources of information for Atarians in England are Atari-specific magazines and two large annual computer shows, both of which are

sponsored by general computer magazines. The Which Computer? Show, held each January by *Which Computer?* magazine, is a business-oriented show. The Personal Computer World Show, held each September in London by *Personal Computer World* magazine, was patterned after Jim Warren's early West Coast Computer Faires and so has a much more eclectic look and feel to it.

The PCW show runs for four days, two days of which (Thursday and Friday) are crowded with trade visitors. The remaining two days can best be described as a zoo, as visitors from all over the world mob the booths and demonstrations in search of the latest products and news.

PCW is held in two connected buildings: the National Hall, a lovely glass-roofed space with two levels, and the Olympia 2, a smaller building with three levels. The business exhibitors were located in the Olympia 2, and the personal computer exhibits in the National Hall.

Walking through the two buildings, a change from last year became apparent: the business side of the show had shrunk somewhat, but the personal side was flourishing. The signs were brighter, the booths more expensive this year than last. And loud. The loudest noise came from the game companies, like Firebird



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OLYMPIA LONDON

and Elite, who set up booths with raucous video narrations emanating from one or more projection TVs—this in addition to the din caused by numerous computers running their software at outrageous volume.

One haven was the Beyond Software booth where one ST was demurely running a quiet sample screen of their (unreleased) Star Trek game, and the rest of the large booth was devoted to about six screens, all running the same Star Trek episode.

The Atari Presence

On the second floor, between the National Hall and Olympia 2, was the Atari booth, the largest at the show. The location was chosen, said Atari personnel, to demonstrate that Atari bridges the gap between personal and business computing.

(Another reason might have been that there wasn't a space large enough to accommodate it on the main floor of either of the buildings.) The Atari booth was 1000 square meters, about 9000 square feet—considerably larger than most houses—and was referred to as "the Atari village."

The village was populated by Atari-

related companies, including about 20 established software developers, about 15 new ones who did not have their own labeled spaces, three distributors, and two Atari magazine publishers. Throughout the show, the booth was crammed with people—looking and buying.

Atari had taken advantage of the PCW show and its prominent position there to make London aware of its presence. One entire wall of the National Hall was covered with an Atari banner, and the street outside the show had an Atari banner draped across it.

Even a few double-decker busses beckoned Londoners to the Atari exhibit.

The English Atari community is healthy and growing. As evidence, we saw Les and Sandy Ellingham's magazine, *Page 6*, which has come a long way from the almost-newsletter it was last year; they have a four-color cover now and more advertising than ever. Another magazine, *Atari User* has seen its subscriber base double in the past year. User groups are doing well too. (The way English user groups support themselves, by the way, is to hire themselves out as consultants.)

There is no equivalent of the FCC in England, making the introduction of new machines much easier.

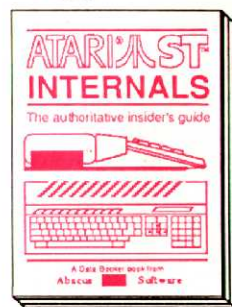
Atari Announcements

Atari announced four exciting new products at the show: the 2080STF, the 4160STF, the Blitter (short for block transfer chip) upgrade, and an MS-DOS box. Prices for the first three products were announced as follows: £1149 (about \$1800) for the monochrome 2080STF, £1459 (about \$2200) for the monochrome 4160STF, and £60 (about \$100) for the Blitter upgrade.

Don't get too excited, though. The 2 and 4 meg machines might be shipping sometime soon in England, but that doesn't necessarily mean that they will be available in this country before the second half of 1987.

The reason is that the FCC must approve any new home electronics product sold in the United States, and the approval process can take months. There is no equivalent of the FCC in England.

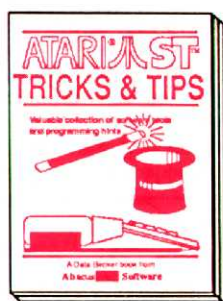
A Wealth of Information from the name you can count on



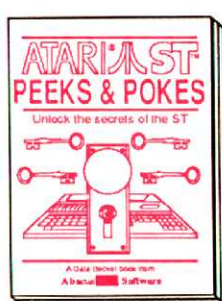
ATARI ST INTERNALS
The authoritative insider's guide
Essential inside info on the ST. Descriptions of sound & graphics chips, internal hardware, I/O ports. Commented BIOS listing. Indispensable reference for your ST library. 450pp \$19.95



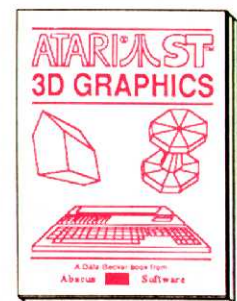
ATARI ST GEM Programmer's Reference
A complete guide to programming the ST using the GEM environment manager
Easy-to-understand format covers the workings of GEM. Examples are in C and assembly. Covers VDI and AES functions and parameters. Serious programmers should not be without. 410pp \$19.95



ATARI ST TRICKS & TIPS
A valuable collection of software tips and programming hints
Fantastic collection of programs & techniques. Programs include: super-fast RAM disk; time-saving printer spooler; color print hardcopy; plotter output; accessories. 260pp \$19.95



ATARI ST PEEKS & POKES
Unlock the secrets of the ST
Enhance your programs with these quick-hitters. Explores different languages BASIC, C, LOGO & machine language, using the various interfaces, memory usage, disk access. 180pp \$16.95



ATARI ST 3D GRAPHICS
Fantastic! Rotate, zoom, and shade 3D objects. Programs written in fast machine language. Learn the mathematics behind 3D graphics. Hidden line removal, shading. 3D animation. 350pp \$24.95

Machine Language
Write fast programs for your ST using 68000 machine language. Explains number systems, register usage, structures, internal system routines. 280pp \$19.95

BASIC to C
Move from BASIC to C language fast. Parallel examples show techniques and constructs in both languages. Pointers, variables, arrays, data structure. 230pp \$19.95

ST Beginner's Guide
For the first-time user. Get a basic understanding of the ST. Explore LOGO and BASIC. Simple explanations. Illustrations. Glossary. Index. 200pp \$16.95

Optional diskettes are available for \$14.95 each. Call now for the name of the dealer nearest you. Or order direct using your credit card. Add \$4.00 per order for shipping. Foreign orders add \$10.00 per item. Call or write for your free catalog. Dealers inquires welcome—over 1500 dealers nationwide.

Abacus

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however, making the introduction of new machines much easier.

Neither is there a Blitter upgrade in your immediate future, although this time we can't blame the FCC. Company sources would not reveal release dates, but the product is a certainty for 1987.

The MS-DOS box as shown was about the size of a hard disk drive. No price was mentioned, and the announcement was definitely an "announcement" as opposed to an "introduction," Atari was saying, "Hey, we can do this, guys," rather than "Get out your credit cards, folks."

English Ingenuity

In the U.K., as in the U.S., the trend is toward using microcomputers for almost every business function, but there are still some businesses that buy more expensive minicomputers because they need multiuser capability—they want several people to be able to use a database or a program simultaneously.

To address this situation, VME Trade Organisation, a relatively new company doing what the English call "badge engineering" has put a modified ST at the heart of a new multitasking business system. On display at PCW

was a machine running a printer, communications software, a 20Mb hard disk, and three terminals. The system will support up to three users: one at the ST, one on a terminal attached via the modem port, and the other via a special cable plugged into the MIDI port.

VME Trade Organisation claims to have 40 retail outlets in the United States, so watch your business papers for their advertising.

Serious MIPS

Let's talk speed. K-Max is an upgrade box that plugs into the ROM port of the ST and makes it run 10 times faster. Enticing as it is, this is not a casual purchase; it sells for about \$2300. For that money, however, you get an ST that runs at 7.5 MIPS (million instructions per second). For comparison, an Atari 800 runs at about .2 MIPS; the VAX 11-780 is rated at about 1.5 MIPS; and the Atari ST is rated at about .75 MIPS.

The heart of the upgrade is a Transputer T414 chip from INMOS, a semiconductor company owned by the British government. The INMOS Transputer in the K-Max is rated at 7.5 MIPS, and the board has space for two of them for a final rating of 15 MIPS.



The Transputer is one of the first RISC (Reduced Instruction Set) computers, computers that achieve amazing speed by doing only a few instructions and doing them all *fast*.

What Else Is New

For those who would like to try a language that is like Basic but faster, there is a cartridge-based language called Fast ST Basic being produced by Computer Concepts. It is a complete environment which is quite fast, has a sophisticated programming editor, seven different variable types, and other features. There is also a new Forth available for the ST, GEM Forth from Microprocessor Engineering, Ltd. The most notable feature of this Forth is its multitasking capabilities.

On quite a different (but no less noteworthy) plane are some new games for the 8-bit machines from Red Rat Software. Among them are *Panic Express* (our favorite), *A Day at the Races*, *Freaky Factory*, and *Rocket Repairman*.

Atari in Antarctica

On the non-commercial side of the show, we saw a fascinating slide show put together for PCW by Lieutenant Commander Howard Oakley, detailing the results of some of the experiments he recently conducted on Brabant Island at the South Pole.

The expedition he was with worked on more than 18 projects in Antarctica, and Oakley chose an Atari ST over a PC XT for compiling data because, "we had to prepare papers, presentations, and talk shows, and we wanted a machine that someone like myself could use—sitting and talking and illustrating points with graphics."

This year Antarctica . . . next year, who knows where PCW attendees will find Ataris at work. Why not plan a trip to England next September to find out? ■

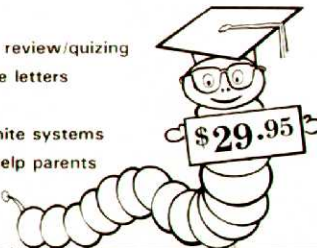
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Gem* based educational software for the Atari ST* for children ages 2 to 6 years. Packed full of giggles and hours of fun. "ST ALPHA-BYTES" uses delightful graphics to introduce children to letters and words.

Features:

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Look for "Let's Count ST" from Mission Softs
DEALER INQUIRIES WELCOME

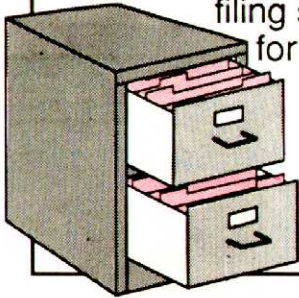
*ATARI ST is a trademark of Atari Corp
Gem is a trademark of Digital Research Inc



We have the software you've been looking for!

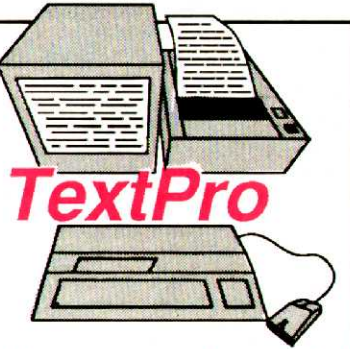
DataTrieve

The electronic
filing system
for the ST



ST DataTrieve

Data management was never this easy. Online help screens; lightning-fast operation; tailorable display; user-definable edit masks; up to 64,000 records. Supports multiple files. Includes RAM-disk programs. Complete search, sort and file subsetting. Interfaces to TextPro. Easy yet powerful printer control. Includes five common database setups. **\$49.95**



TextPro

Word processor for the ST

ST TextPro

Wordprocessor with professional features and easy-to-use! Full-screen editing with mouse or keyboard shortcuts. High speed input, scrolling and editing; sideways printing; multi-column output; flexible printer installation; automatic index and table of contents; up to 180 chars/line; 30 definable function keys; metafile output; much more. **\$49.95**

PaintPro

Create double-sized pictures

PaintPro

Multiple windows

For creative illustrations on the ST

ST PaintPro

Friendly, but powerful design and painting program. A *must* for everyone's artistic and graphics needs. Up to three windows. Cut & paste between windows. 36 user-defined fill patterns; definable line patterns; works in hi-med- & lo-res; accepts GDOS fonts. Double-sized picture format. **\$49.95**
PaintPro Library #1 5 fonts, 300+ electronic, architectural, borders & clip art designs. **\$19.95**

Forth/MT

Multi-Tasking
Full-Featured

ST Forth/MT

Powerful, multi-tasking Forth for the ST. A complete, 32-bit implementation based on Forth-83 standard. Development aids: full screen editor, monitor, macro assembler. 1500+ word library. TOS/LINEA commands. Floating point and complex arithmetic. **\$49.95**

AssemPro

The complete 68000
assembler development
package for the ST

ST AssemPro

Professional developer's package includes editor, two-pass interactive assembler with error locator, online help including instruction address mode and GEM parameter information, monitor-debugger, disassembler and 68020 simulator, more. **\$59.95**

PowerPlan ST

Full-powered Spreadsheet
37 math functions - 14 digit precision
Large size - over 4.2 billion cells
Multiple windows - up to 7
Graphics - 7 types of graphs

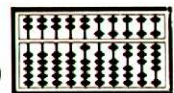
PowerPlan ST

Powerful analysis package. Large spreadsheet (65536 X 65536 cells), built-in calculator, notepad, and integrated graphics. 37 math functions, 14 digit-precision. Seven windows to show one of seven types of charts or another section of your spreadsheet. **\$79.95**

ST and 1040ST are trademarks of Atari Corp.

Other software and books also available. Call or write for your **free catalog** or the name of your nearest dealer. Or order directly using your VISA, MC or Amex card. Add \$4.00 per order for shipping and handling. Foreign orders add \$10.00 per item. 30-day money back guarantee on software. Dealers inquires welcome—over 1500 dealers nationwide.

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Reader Game Rankings

By DAVID H. AHL

In this issue of *Atari Explorer*, we are initiating a reader game ranking system. To have your opinions included, simply send us a postcard or letter with the name of a game (or as many games as you want) and your personal ranking of it (from 0 to 10—0 is horrible in all respects, 10 is absolutely sensational). We will then add your ranking to the database which will be published each issue.

Of course, for this issue we don't have any reader rankings so these are my opinions based on my own play of the games, reviews in other magazines, and hearsay.

Send cards to Game Rankings, Atari Explorer, 7 Hilltop Road, Mendham, NJ 07945.

Name	Manufacturer	Rating
Strategy Games		
Kampfgruppe	SSI	8.0
Silent Service	Microprose	8.0
M.U.L.E.	Electronic Arts	7.5
Flight Simulator II	subLogic	7.5
Battle of Antietam	SSI	7.5
Star Fleet I	Cygnus	7.5
Hippo Backgammon	Hippopotamus	7.5
Sargon III	Hayden	7.5
Rommel	Game Designers' Workshop	7.5
War in Russia	SSI	7.5
Decision in Desert	Microprose	7.5
Crusade in Europe	Microprose	7.0
Seven Cities of Gold	Electronic Arts	7.0
Computer Baseball	SSI	6.5
Micro Logic Baseball	Micro Logic	6.5
Carrier Force	SSI	6.5
Gulf Strike	Avalon Hill	6.5
Halley Project	Mindscape	6.0
Wizard's Crown	SSI	6.0

Name	Manufacturer	Rating
Adventure Games		
Ultima IV	Origin	8.0
Ultima III	Origin	7.5
Enchanter	Infocom	7.5
Temple of Apshei	Epyx	7.5
Spellbreaker	Infocom	7.5
Rogue	Epyx	7.0
Zork (all)	Infocom	7.0
The Pawn	Firebird	7.0
Ultima II	Origin	7.0
Deadline	Infocom	7.0
King's Quest II	Sierra On-Line	6.5
Borrowed Time	Activision	6.5
Hacker II	Activision	6.5
Ballyhoo	Infocom	6.5
Hitchiker's Guide	Infocom	6.5
Planetfall	Infocom	6.5
Wishbringer	Infocom	6.5
Suspended	Infocom	6.0
Hacker	Activision	6.0

Action Games

F-15 Strike Eagle	Microprose	7.5
Time Bandit	Michtron	7.5
Archon I	Electronic Arts	7.0
Lode Runner	Broderbund	7.0
Championship Lode Runner	Broderbund	7.0
Mean 18	Accolade	6.5
Jump Man	Epyx	6.5
Diablo	Classic Image	6.5
Spy vs. Spy	First Star	6.0
Archon II	Electronic Arts	6.0
MiG Alley Ace	Microprose	6.0
Thunderhead	Avalon Hill	6.0
Star Raiders II	Atari	5.0
Orbit: A Trip to the Moon	Antic	4.0

Stop Taking Vitamins

If you think the vitamins you are now taking are doing you any good, wait until you hear the latest news on why they may not.

By Joseph Sugarman

This may come as a shock. But according to the latest research, those vitamins that you take every day may be doing you absolutely no good. For example.

FACT: Your body should be taken after a meal—never before. The body must first have protein, fats, or carbohydrates in the digestive tract to properly break down the vitamins for proper absorption.

FACT: Your body has a need for a natural vitamin balance. Too much of one vitamin may cause another vitamin to be less effective. For example, vitamin A should be taken with Vitamin E but excessive iron should not.

FACT: If you take too much calcium, you may deplete the magnesium in your system. And you need magnesium to convert food into energy.

FACT: Some vitamins are best taken in the morning and others at night. For example, the trace element chromium helps break down the sugar in your food which in turn creates energy—perfect to start the day. But at night you should take Calcium which has a relaxing effect—perfect for the evening.

FACT: Athletes or people who exercise a great deal need vitamins more than people who don't exercise. Vitamins are depleted at a much faster rate during exercise than during any other period of time.

But there was a series of other facts that surprised me too. For example, despite everything I've just mentioned on the care in taking vitamins, there are those people who absolutely need vitamins because of the mental or physical activity that they undergo. People on a diet, under stress, those who smoke, women who take contraceptives and even those who take medication—all rob their bodies of some of the essential vitamins and minerals that they need to help combat the various habits or conditions they are under.

And with proper vitamins in the proper balance and at the proper times, you will have more energy and vitality. Little changes may take place. Your nails may become stronger, your hair may become thicker and your skin may be more elastic which will keep you younger-looking longer.

DOCTORS HAD IDEA

About two years ago a group of doctors had an idea. They realized that many people were taking vitamins and not really noticing any difference in their health. They also realized that, based on the latest nutritional findings, the vitamins people were

Stop taking that innocent looking vitamin pill until you read this report.

taking may not have been doing them any good. So they formed a group of advisors consisting of nutritionists, dieticians, dermatologists, biochemists and physicians, and they worked on the development of a vitamin program that incorporated all of the latest information on vitamins, minerals, nutrition, food processing—even stress research. They realized that vitamins were a two-edged sword. They could either help you or hurt you.

They then took all this information and developed the most effective combination of vitamins and minerals, formulated four tablets—one for the morning and one for the evening—and one for men and one for women and then started a test program that lasted over two years. The results speak for themselves.

It was perfect for weight loss programs and it was perfect for people under stress. It helped many increase their energy levels. Smokers benefited. Some under medication benefited. And before long the company that had developed the program became the fastest growing vitamin company in the United States. And no wonder.

SEVERAL BENEFITS

With the proper vitamin and mineral balance, taken in the right quantity in the right combination and at the right time, several obvious benefits occur. First, you may develop a better mental outlook because you've got the energy and the zest to accomplish more. As a result of the trace elements copper, zinc and manganese, your body is helped to make its natural anti-aging enzymes that keep you fit. Improvements in your vitality translate into everything from better job performance to a more fulfilling sex life.

JS&A has been selected by the vitamin company to introduce their medically formulated vitamin program. Every two months we send you a two month's supply of 120 fitness tablets—one to be taken after breakfast and one after dinner.

During the first two months, you will have ample opportunity to notice the difference in your energy level, your mental attitude and your overall stamina. You should notice little things too, like the strength of your fingernails, your thicker hair. Your complexion may even take on a glow. Some of you may notice all of these changes and others may notice just a few.

But you should notice a change.

If for any reason, you do not notice a change, no problem. Just pick up your phone, and tell us not to send you any more vitamins. And if you ask for a refund, you won't even have to send the empty bottle back. It's yours free for just giving us the opportunity to introduce our vitamins. However, if you indeed do notice a difference (which we are confident you will), you'll automatically receive a two-month's supply every eight weeks.

ONE MORE INCENTIVE

I'm also going to give you one more incentive just to let me prove to you how powerful this program really is. I will send you a bonus gift of a fitness bag with your first order. This beautiful bag will hold all your fitness gear and it's great too for short vacation trips. It's a \$20 value but it's yours free for just trying the vitamins. Even if you decide not to continue, you keep the fitness bag. I am so convinced that you will feel and see a difference when you take these vitamins that I am willing to gamble on it with this unusual offer.

Vitamins indeed are important. And with today's research and new nutrition technology, you have a greater chance to achieve the fitness and health levels that may have eluded you with the typical store vitamins or the poor advice we may get in health food stores or from friends. Here is a safe, risk-free way to get one of the best vitamin programs in the country, formulated by a physician, with the right combination of vitamins, minerals and trace elements, in a convenient program that assures you of delivery every two months. I personally take and highly recommend them. Order your trial quantity, today.

To order, credit card holders call toll free and ask for product number (shown in parentheses) or send a check and include \$2.50 for delivery.

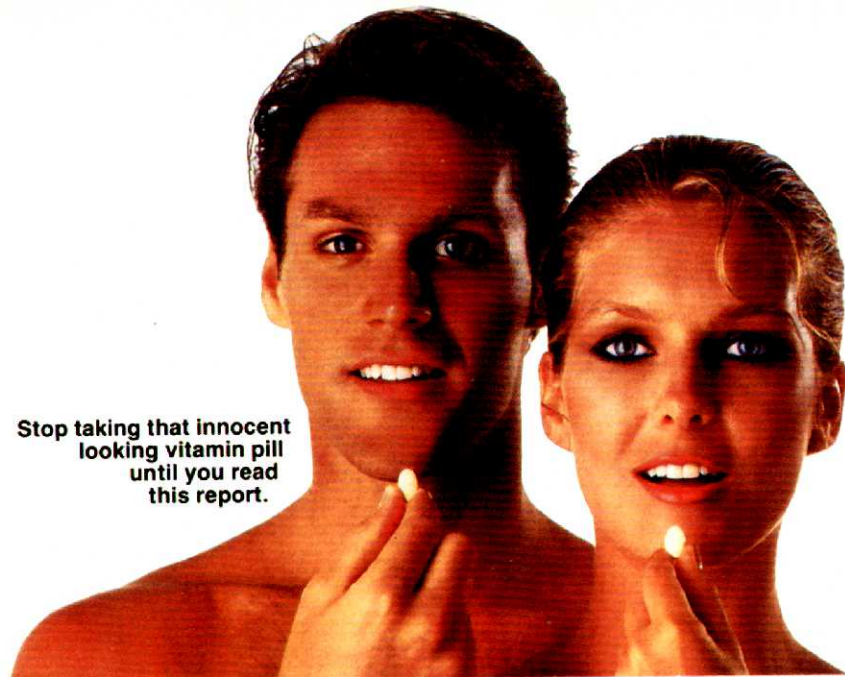
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Women's Vitamins (1156S).....\$24

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Donald Duck and Winnie the Pooh join the hi tech generation

Atari Classroom

By **BETSY STAPLES**

I believe in computers as educational tools, tools that can enhance the efforts of human teachers and eliminate some of the drudgery from their jobs. That is why I deplore the current dearth of new educational software for Atari computers.

The educational software scene was not always so bleak for Atarians; there was a time when the Minnesota Educational Computing Consortium converted to Atari format many of the excellent packages originally developed for their pioneering state-wide educational computing program. There was even a time when Atari owners with school-age children could find almost any kind of educational program, from a preschooler's interactive storybook to a college-level chemistry course on Atari disks or tapes.

What happened? I wish I knew. All I do know is that when I went through the collection of software that has been sent to us for review over the past six months, I could find only two educational packages.

First Byte has released four "talking" educational programs for the ST—*Speller Bee*, *KidTalk*, *MathTalk*, and *First Shapes*—but I have not yet seen them. If all goes well, I will have a report on them for you next issue.

Gersham Blumstein, head of software development for Atari, recently hinted that a nice collection of educational programs for the ST is currently being tested at Atari. We can assume that, if it meets Atari's standards, we will see it on dealers' shelves in the spring.

Fortunately, the two packages we did receive are good ones. *Donald Duck's Playground* and *Winnie the Pooh in the Hundred Acre Wood* have both been

available for other computers for some time, and I am happy to see that they have now been released in Atari ST format.

Both programs will work on either a 520 or 1040ST with either color or monochrome display. The graphics are nothing short of fantastic, however, and they lose much of their appeal on a monochrome screen.

Donald Duck's Playground

By reading the instruction booklet for *Donald Duck's Playground* you learn that Donald wants to build a park for his nephews, Huey, Dewey, and Louie. Your job is to help him earn money and then buy equipment for the playground.

At the beginning of the game, you are asked to press Ctrl-J if you want to use a joystick. Although Donald's movements can be controlled from the keyboard, even adults found it frustrating to do so, so if you don't have a joystick, be sure to buy one when you buy the game.

Having pressed Ctrl-J, you are ready to guide Donald through one of three gates at the end of Main Street to choose a skill level. Our playtesters found the Beginner level quite challenging and noticed only minor differences in the higher levels.

The next scene shows Donald on Main Street. You must guide him into one of four buildings to find a job.

At the airport, Donald gets a job sorting packages for McDuck Airlines. As packages marked with three-letter airport codes move by on a conveyor belt, you help him choose the ones that belong in the tram cars on the runway behind him.

In the produce market, Donald's job again involves sorting; he must catch

three different kinds of fruit being thrown from the produce truck and toss it into the proper bins.

In the toy store, Donald needs your help to match things yet again. This time, however, the task is considerably more complicated; faced with a wall full of shelves holding toys, he must examine the toy to be put away, move a ladder to a spot near an identical toy on the shelf, pick up the toy, climb the ladder, and deposit the toy on the shelf. To make things more interesting, you and Donald must also contend with vibrations generated by the passing AMQUACK special by throwing a lever to activate a shield to keep the toys in place. The train schedule is displayed on the screen, and you soon learn just how long it takes Donald to get to the lever in time to save the toys, because the cost of broken toys is subtracted from your paycheck.

Our playtesters liked the toy store best of the four workplaces and kept returning to it when they needed more money. At one point, however, we noticed a look of panic on a little girl's face as she raced to beat the train, and asked if she thought the game would be better without the train. "Oh, no," she replied, "I love the challenge."

The fourth job Donald can choose is at the railroad station. There he must guide the AMQUACK special to its next stop by operating the levers that control the switches on the line. Even older playtesters found this task difficult at first, but they caught on quickly, and eventually the station became a popular stop.

Each time you guide Donald to one of his jobs, you must select the length of the shift you will work—from two to nine minutes. After that shift, you report to the payroll department to collect the money you have earned. The amounts earned are small—between one and ten cents per toy, delivery, package, or fruit—so your pay is displayed as piles of coins and, eventually, bills.

Any time you have money in your pocket, you can cross Main Street and enter one of the three stores in which playground equipment is sold—at very reasonable prices. After you have made a selection, you must pay for it, using the joystick to indicate which coins or bills you want to place on the counter. If you don't pay with exact change, you must open the cash register drawer and select the proper amount of change.

After you have made some purchases, you will probably want to take



Donald Duck works in the Produce Market.



Winnie the Pooh welcomes you to his house.

Donald to the park to watch his nephews play. Donald pauses and looks both ways before he crosses the railroad tracks in front of the park and enters the playground.

Suddenly, you find your joystick controlling a nephew instead of Donald, but that's all right, because you will have fun climbing ladders, romping in the tree house, and enjoying the equipment you have purchased. If you return to Main Street and buy more things, they will appear in the park on subsequent visits.

Our playtesters all enjoyed *Donald Duck's Playground* immensely. The suggested age range is seven to eleven, but we found that our seven-year-old had some trouble controlling the joystick and preferred to "help" another player. The arrangement she liked best was when her older sister made the money and she spent it.

The documentation is well-done and includes several pages of activities children can do without the computer for further practice in matching and money-handling skills. Instructions for each of the jobs Donald takes on in the stores are complete, but we found that an adult's help was needed the first time a child tried a new one.

Donald Duck's Playground is a winner. Our playtesters loved it, and the skills they practiced while playing it are definitely useful and worth practicing. The storyline is interesting—even noble—and, combined with the wide variety of activities offered, keeps players engrossed for hours.

Winnie the Pooh

Another game that kept our playtesters engrossed for hours was *Winnie the Pooh in the Hundred Acre Wood*, an

System and Price: Atari 8-bit (Donald only) and ST; \$24.95

Summary: Two engrossing games that teach useful skills.

Manufacturer:

Sierra On-Line, Inc.

Coursegold, CA 93614

(209) 683-6858

adventure game designed to develop reading comprehension, problem solving, logic, and mapping skills in players aged seven and up.

This time, your assignment is to find an assortment of missing belongings in the Hundred Acre Wood and return them to their owners.

You start in Christopher Robin's playroom and move around in the Hundred Acre Wood using either the keyboard or the mouse; in this case, our playtesters had no preference. There are 30 locations, all of which will be familiar to readers of the beloved A.A. Milne books and in any of which may be found a lost item.

When you come upon an item, you must decide to whom it belongs and then figure out how to get it to the owner. You might, for instance, find a tiny pair of mittens near Eeyore's house of sticks. "Hmmm," you might say to yourself, "I think Roo is the smallest animal in the Wood. Perhaps these belong to him." You would then consult the map that comes with the package, discover that Kanga and Roo live at the opposite side of the Wood from Eeyore, and begin to make your way there.

When you got to Kanga's house, however, you would learn that Roo was not

there. Kanga would tell you that he was playing nearby in the sand pit. You would consult the map again and move east to find him. There you would drop the mittens, and be thanked by the grateful Roo.

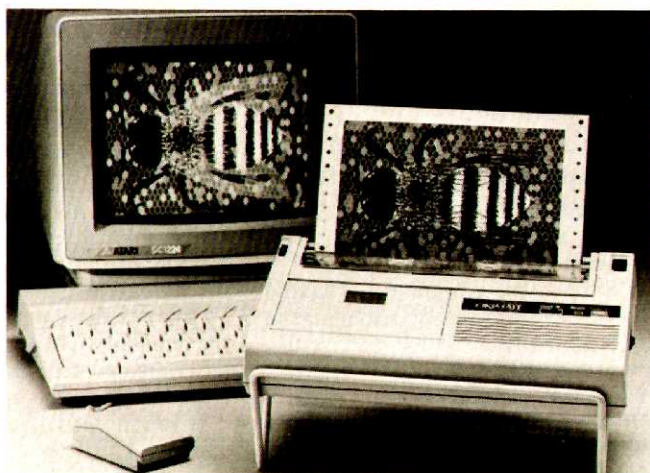
This process sounds much easier than it is. Often, it is not at all obvious to whom an object belongs, and you may have to take it to several of your friends before you find the rightful owner. Your task is further complicated by the mist, which can descend upon the Wood at any time, causing you to wander far from where you want to be. Or you could be thwarted by Tigger, who periodically pounces, bouncing you around the Wood and making you drop whatever you are carrying. And then there is the blustery wind, which can come up at any time and redistribute any undelivered articles throughout the Wood.

If you succeed in returning all the lost articles, Christopher Robin throws a party in your honor. The main form of entertainment is singing, something the ST does very well; the computer plays the Winnie the Pooh song while the words are displayed on the screen.

Our only quibble with the game designers concerns this sequence: there is no way to escape from it. You can cycle through the verses of the song until you are as blue as Eeyore, but you can't quit or play again without rebooting. We think players should be offered the choice of playing again or returning to the desktop at the end of every game. The documentation is clear and complete, and includes three pages of suggested activities to reinforce map reading skills. The controls are easily mastered by players of all ages, but the ability to read is definitely a prerequisite in this game. ■



Okimate 20 Personal Color Printer



The Okimate Personal Color Printer is a compact 80-column uni-directional printer suitable for relatively low volume printing. It uses a 24-pin dot matrix printhead, so both text and graphics are of very high quality. It handles both continuous feed computer paper and single sheets. Two ribbon cartridges are furnished with the printer, so you need not use the color cartridge for text or monochrome graphics.

Okimate calls the printer a "ribbon transfer printer." In contrast to printers in which the pins on the printhead strike an inked ribbon, the 24 pins on the printhead are actually tiny heat elements. These elements press against the ribbon, which is coated with a wax-like substance. When an element is heated,

the ribbon substance melts onto the paper, forming a series of tiny dots that make up a character.

Some types of paper work better than others for ribbon transfer printing. Smooth paper works best, while porous, rag bond, and other rough textured papers should be avoided. Oki furnishes 60 sheets of fanfold paper with the printer and sells boxes of 250 sheets for \$6.50. Although several other types of paper are recommended in the manual, we did not find them widely available at local office and computer supply dealers. Consequently, you will probably have to buy paper from Oki. In fairness, we should mention that Oki's price is competitive with that of other vendors, so this is not an onerous situation.

Physically, the Okimate is very compact, measuring 13" wide by 7.5" deep by 2.25" high, and weighing just 6.2 pounds. It has only three controls, an on/off switch on the side, a ready/pause ("Select") push button on top, and a five-position print darkness slide switch. Also on the top of the printer is a typewriter-like paper release lever and a paper advance knob. A formfeed is accomplished by holding down the Select button for two seconds.

Features

Internally, the Okimate has an 8K buffer which is divided into two domains, one for receiving input from the computer and one for printing. Thus, it can simultaneously receive and print. In theory, the buffer should hold about four double-spaced pages of text; in practice, the printer ties up the computer until it has about 1.4 pages left to print.

Type: 24-pin, color, dot matrix
Feed: Friction and pin
Speed: 80 cps/draft; 40cps/NLQ
Interface: Parallel
Price: \$169, plus \$99 for ST interface
Summary: An outstanding value for light duty and color printing
Manufacturer:
 Okidata
 532 Fellowship Rd.
 Mt. Laurel, NJ 08054
 (609) 235-2600

By DAVID H. AHL

The printer has a great many built-in options. Some of these are selected by internal switches and others by software. Depending upon the software package you are using, you may or may not be able to use the software selectable features easily.

For the most part, the features selected by internal switches should be selected once and left alone. These include characters per inch (10 or 17), length of page (11" or 12"), paper out detector (on or off), skip perforation (on or off), slash zero (on or off), and graphics line-feed spacing. The factory setting will probably be suitable for most users.

Several software features can be set from the Install Printer menu in TOS: paper type (continuous feed or single sheet) and print quality (draft—7 × 9 dot matrix or near letter quality—14 × 18 dot matrix). On our system, this feature did not work correctly; the printer *always* came up in NLQ mode and selecting draft quality in the TOS menu had no effect. Furthermore, the otherwise excellent printer manual incorrectly describes the commands necessary to change print modes. The manual also speaks of a downloadable NLQ character set with an 18 × 18 dot matrix, but we never did determine where it comes from or how to load it. Frankly, the standard NLQ character set has an excellent appearance and another quality level hardly seems necessary.

Speed and Style Options

When printing, the Okimate is no ball of fire. The specifications claim a print speed in the utility print mode of 80 characters per second and 40 cps in NLQ mode. We found that the actual service speed was slightly less than this. In practical terms, this means that it takes about 1.5 minutes to print a double-spaced page in NLQ mode.

Graphics mode has a rated speed of 15 lines per minute, a line being 80 columns wide (8") and about 0.15" high. Four-color printing takes more than four times that amount of time, as each of the four colors on the ribbon must be passed by the printhead whether or not it is printed. In practical terms, an illustration like the 15-line stamps graphic shown here (6.5" × 2.3") required 8.14 minutes to print.

In text mode, the printer can print italics or boldface if your word processing package sends the correct control characters. It can also print superscripts and subscripts, again assuming it receives the correct control characters

from the software. In addition, it has two built-in Atari character sets. Set 1 consists of characters with ASCII decimal values from 1 to 127. This is the standard character set and consists of upper and lower case letters, numbers, and other commonly used symbols.

The command CHR\$(27);"7" lets you enter Character Set 2. Don't expect to be able to enter this mode from your word processing package; we were able to enter it only from Basic. Set 2 gives you access to the upper ASCII decimal values (128-255), which consist of graphics and scientific symbols.

There are a number of other advanced commands which let you control the printer at the individual dot level. For the most part you will not need these features unless you are a hard core printer enthusiast or a masochist—*or both*.

For printing graphics, the Okimate comes with a Color Screen Print disk. The programs on this disk reside in upper memory and let you make color printouts of images on the screen. The disk contains three programs: a fast screen print program (uses 20.3K of memory), a slower screen print program (uses 5.1K), and a demo print program with two sample images.

Getting Started

Installing the printer is simplicity itself. You just plug the control module for your particular computer (ST or XL) into the side of the printer and connect the cable to the control module and computer.

The printer ribbon comes in a simple pop-in cartridge; two ribbons come with the machine, a black one and a color one. The black ribbon is said to have a life of 120,000 characters (about 75 pages); the color ribbon can print about 35,000 characters (about 15 screen prints).

In contrast with so many other printer manuals, the 32-page manual with the Okimate is clearly written and well illustrated. Ribbon loading, paper loading, replacing the printhead, cleaning the unit, and even elementary troubleshooting are all illustrated with detailed two-color drawings.

Our only quibbles with the Okimate are speed and ribbon life. The NLQ print speed is about one-quarter as fast as low-to-mid end plain paper dot matrix units; thus the time difference is substantial when printing a long document. Ribbon life, also, is considerably less than fabric ribbons on other print-

This is draft mode.

Near letter quality (NLQ).

This is italics.

This is an underline.

This is 17 characters per inch.

This is a _{subscript} and a ^{superscript}.

Double width.

Character Set 2:

á ì ó ú ñ ñ ã õ ÷ ÿ
ı ¼ ½ ¾ ì « » ã õ ø ø
é Ê Æ Å ö " ' † ‡ Ø
⊙ ⊠ ⊡ ⊢ ⊣ ⊤ ⊥ ⊦ ⊧
⊨ ⊩ ⊪ ⊫ ⊬ ⊭ ⊮ ⊯
⊰ ⊱ ⊲ ⊳ ⊴ ⊵ ⊶ ⊷
⊸ ⊹ ⊺ ⊻ ⊼ ⊽ ⊾ ⊿
⊺ ⊻ ⊼ ⊽ ⊾ ⊿ ÷ ≈ ° •

ers—although the ribbon life and quality are about the same as the one-strike carbon ribbons available for other printers.

All-in-all, for the price (\$169 for the printer and \$99 for the ST Plug 'n' Print interface module), the Okimate is an outstanding performer. It is not for the professional writer or business user who prints dozens of pages per day, but if your text printing needs are light or you want to make color screen prints, you won't find a better value. ■

***For the price, the Okimate
is an outstanding performer.***

A reliable nine-pin printer that offers near letter quality at a reasonable price



Star Micronics NL-10

Imagine my frustration. I had been using a low-end dot matrix printer that simply was not designed to handle the volume of work I churn out. It was never intended to produce scores of attractively printed manuscript pages every day—and it didn't. Instead, left to its own devices, it produced a couple of neat, if not especially attractive, pages followed by scores of mangled sheets or one sheet with thousands of characters printed on the same line.

Imagine, then, my enthusiasm when I received the Star Micronics NL-10 for review, plugged it in, and watched it print page after page of nicely formed characters with nary a pause.

Endowed with both pin and friction feed capability, the NL-10 handles both continuous form and single sheets of paper well. A lever on the left-hand side adjacent to the platen has settings for pin feed, single sheet, autofeed, and

manual adjustment. All of these settings function as expected except the autofeed, which is intended to snatch a single sheet from the plastic paper guide and wrap it automatically around the platen, pausing right where it thinks you ought to begin your letter. The problem is that, because the paper bail is automatically moved forward to allow the paper to feed freely, the paper zips around the underside of the platen and then heads skyward where it invariably collides with the plastic printer cover and destroys itself before you can remember where the power switch is.

The combination of the single sheet and manual adjustment settings, while nowhere near as satisfying as autofeed in theory, work quite well for inserting single sheets of letterhead. Envelopes feed in nicely, but then challenge you to trick the paper-out sensor into thinking you are using a full sheet of paper. It can be done, of course, but why can't someone create a low cost printer with an envelope setting? I resent having to waste time defeating "features" that ought to be helping rather than hindering me.

The NL-10 is sleek and attractive, measuring 15.7" X 13.2" X 4.1" and, despite its beige plastic shell, complements the streamlined design of the Atari ST very nicely.

Print Quality

The nine-pin printhead produces both draft and near letter quality characters. The quality of the draft mode is adequate but unremarkable. The NLQ mode, while it would never be mistaken for daisywheel output, is quite acceptable for all but the most formal correspondence and a great deal more attractive than most dot matrix print.

The advertised speed of the printer is 120 cps in draft mode, which includes 80, 96, and 136 characters per inch, and 30 cps in NLQ mode. This translates into roughly 25 seconds to print an average double-spaced page in draft mode and 1:33 for an average double-spaced page in NLQ. Print mode is set manually from the front panel of the printer.

Other switches on the front panel include on/off-line, top-of-form, paper feed, and boldface. Various combinations of these switches produce italics and forward and reverse microfeed.

System and Price: Atari ST; \$379

Port: Parallel interface cartridge available

Speed: 120cps/draft; 30cps/NLQ

Summary: A versatile, reliable workhorse.

Manufacturer:

Star Micronics America

200 Park Ave.

New York, NY 10166

(212) 986-6770

By BETSY STAPLES

You can also use them to set both right and left margins. A small orange light glows when the machine is on and blinks when either the cover is off or the paper is out. DIP switches are easily accessible at the back of the printer.

The NL-10 is completely compatible with *1ST Word* when installed as an Atari SMM804. Boldface, italics, and underscore all print perfectly in both draft and NLQ modes.

To their credit, the designers at Star Micronics elected not to extend the Epson-compatibility of the NL-10 to include awkward placement of the printer cable. On the NL-10, the parallel connector is off to one side at the back, leaving the paper path unobstructed.

And speaking of the parallel connector: you must specify that you want a standard parallel interface cartridge when you purchase the printer. The cartridge slides into a slot on the back of the NL-10 and provides the connector for your cable. You get one cartridge with the printer, and you can purchase addi-

This is normal NLQ mode.
This is NLQ italics.
This is normal draft mode.
This is NLQ bold.

tional ones (for use with different computers) for \$60 each.

Documentation

The instruction booklet that comes with the printer is complete and straightforward; the most complicated function it describes is the automatic paper feed, which we already know doesn't work. It tells you everything you need to know to get the printer up and running.

The manual that comes with the interface cartridge is really more of a textbook on printing with Basic than an instruction book for the average user. In close to 200 pages, it tells you how to print everything from italics to graphics from Basic and provides detailed in-

structions for creating your own downloadable character sets. Whether or not you plan to do more than print an occasional term paper or letter to Mom, it is nice to know that the capability is there and well-documented.

During a month of heavy use, the Star Micronics NL-10 has proved itself a reliable, versatile workhorse. Producing reams of tidy manuscript in draft mode and very respectable business letters in NLQ mode, it has never once jammed or unilaterally implemented austerity measures by recycling used paper.

If your use is moderate to heavy and you want good quality NLQ output, the NL-10 would be a good choice to fill your printer needs. ■

Remember Creative Computing?

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An Introduction To GEM VDI

First in a series, the article and program presented here demonstrate aspects of programming the Atari Graphics Environment Manager in C.

The Atari ST computer is the epitome of power and affordability. With high processing speed and dazzling graphics, it offers a level of technical sophistication beyond anything in its price range. Yet, despite its incredible complexity, programming the ST can be surprisingly simple. The reason is GEM.

This is the first article in a series devoted to explaining GEM and its features from the programmer's perspective. Covered will be such abstruse subjects as window manipulation, drawing commands, and use of the mouse. Although GEM applications can be written directly in assembly language, or in any high-level language that supports the various interfaces required, the programs and examples in these articles use C.

There are several practical reasons for choosing C as a medium for demonstrating GEM. First, C is a "systems language," well suited to expressing the concepts involved in system interfacing. Second, C is capable (in most implementations) of producing stand-alone programs that can justifiably be called "applications."

Third, and perhaps most important, C is the high-level programming language of choice for the ST environment. ST documentation is designed with C in mind throughout, and implementations of C for the ST incorporate, in their packaged libraries, GEM-related functions that are consistent with this documentation.

By BOB COCKROFT

Sample programs in this series are composed using Mark Williams C (Mark Williams Company, 1430 West Wrightwood, Chicago, IL 60614, \$179). The Mark Williams product is a robust, fairly inexpensive development suite that conforms well to the Atari GEM reference standard. Readers should, in most cases, however, be able to compile these programs under Alcyon, Lattice, Megamax, or other popular compilers, with few changes.

GEM Overview

GEM is conveniently viewed as an elaborate collection of function calls, ranging from low-level graphics functions to high-level functions for memory management and event handling. GEM consists of two main sections: the Virtual Device Interface (VDI), providing services for drawing lines and polygons, handling text and fill patterns, and the like; and the Application Environment Services (AES) package, which performs memory management and message passing, manages the desktop environment of icons, windows, and menus, and provides facilities for the control of screen objects and the mouse.

The Virtual Device Interface

As any experienced programmer will realize, the process of putting text on a computer screen differs—at the mechanical level—from the process of sending text to a printer. Part of the job of an operating system is to insulate the programmer from the most elementary mechanics of this "device-dependent" I/O. The GEM Virtual Device Interface provides a collection of functions for handling graphics and text data that are, insofar as possible, device-independent. It does so by letting the programmer address a "virtual device"—a kind of generic, "normalized" peripheral without any severe quirks—and then abstracting (via various device drivers) from this virtual device to whatever "real world" peripherals

(screens, printers, etc.) it supports.

Responsibilities of the VDI include:

- Drawing circles and ellipses.
- Drawing arcs and pie sections.
- Drawing lines and bars.
- Filling and creating fill patterns.
- Creating fonts and displaying text.
- Displaying colors.

Controlling the mouse at the mechanical level.

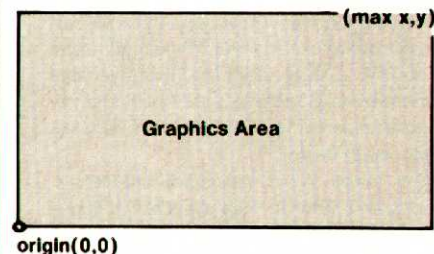
Conveying information about the keyboard.

Maintaining mouse and text cursors.

The NDC and RC Coordinate Systems

The VDI supports two coordinate systems for organizing a graphics display. The Normalized Device Coordinate (NDC) system refers to a virtual graphics display that is not limited to the resolution of any particular output device, but merely to that of the current graphics mode. It is organized like the positive quadrant of the Cartesian coordinate system, with the origin (point 0,0) in the lower left-hand corner as shown in Figure 1.

Raster Coordinates (RC), by contrast, store information in a way that reflects the requirements of a physical device. Thus, information stored as Raster Coordinates does not have to be changed by VDI prior to output. Like the NDC system, Raster Coordinates place information in a Cartesian grid. However, the origin of the Raster Coordinate grid is in the upper right-hand corner, and Y coordinates increase in magnitude downwards—in the opposite



NDC System

Figure 1.

direction from NDC, as shown in Figure 2.

Note that, unlike the NDC coordinate space, the maximum resolution of the Raster Coordinate system is in line with that of the device supported.

Line Drawing with VDI

The program Linedem, presented here, demonstrates some general aspects of working with GEM's VDI as well as applying most of the line-related calls of the VDI.

There are three steps involved in writing a program that uses VDI. The first step, common to all GEM applications, involves defining certain data structures used by GEM to pass information back and forth, and initializing the application via a call to the AES package.

The second step involves opening a virtual workstation, a kind of I/O channel that helps organize communications between your program and the output device it accesses (in this case, the screen). The third step involves calling the various individual functions you require, addressing each to the virtual workstation you are using.

Initializing an application is a function, not of VDI, but of AES—the application environment services package. It is done by a call to the AES function `apl_init()`. Before this call is made, several global arrays—`contrl[12]`, `intin[128]`, `ptsin[128]`, `intout[128]` and `ptsout[128]`—must be declared to provide space for GEM to store information relating to the various functions your application accesses. Once these arrays are declared, you can basically forget about them—GEM automatically copies parts of these arrays into and out of the local control structures you declare in managing your application.

Once initialized, the next responsibility of a *fundamental* application (like the desktop, for example) is to open a *physical* workstation for output to the screen, defining graphics mode and various graphic attributes. The privilege of

opening such a physical workstation is limited to systems-level applications, however, because only one physical workstation can be opened to a particular device. Applications such as ours that run under the desktop environment can skip this step, proceeding to open a *virtual* workstation that inherits attributes of the current physical workstation.

The first step in opening a virtual workstation is to obtain a *handle* (a pointer) to the currently-open physical workstation. To do so, the function `graf_handle()` is used:

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

where variables "handle" and "dummy" have been declared as short integers. The result of the `graf_handle()` call is to place the handle ID in variable "handle." The "dummy" variable receives four values corresponding to the size of the workstation text font—extraneous for purposes of Linedem.

The second step is to set up a 10-element integer array called `work_in` that contains information describing the virtual workstation you want to set up. The values of individual elements of `work_in` control the following workstation attributes:

- `work_in[0]` — Device ID number.
- `work_in[1]` — Linetype.
- `work_in[2]` — Polyline color index.
- `work_in[3]` — Marker type.
- `work_in[4]` — Polymarker color index.
- `work_in[5]` — Text face.
- `work_in[6]` — Text color index.
- `work_in[7]` — Fill interior style.
- `work_in[8]` — Fill style index.
- `work_in[9]` — Fill color index.
- `work_in[10]` — NDC or RC coordinates; 0 for NDC, 2 for RC.

Linedem sets `work_in[0]` to 1, indicating that the application uses device #1, the screen. Elements 1 to 9 are set to default values of 1. Element 10 is set to 2, indicating a choice of raster coordinates. This is done using a FOR block and an assignment statement, in the following manner:

```
/* set all defaults to 1 */
for (i=0; i<10; work_in[i++]=1);
/* use raster coordinates */
work_in[10]=2;
```

The third and final step is to open the

workstation, via the call:

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

The first argument to `v_opnvwk` (open virtual workstation), "work_in," is the name of the workstation descriptor array defined above. The second argument is a pointer to your workstation handle. The third argument, "work_out," references a 57-element short integer array designated to receive information back from VDI concerning workstation operation. Immediately after the call to `v_opnvwk`, two external variables, `xres` and `yres`, are used to store the maximum horizontal and vertical limits to the raster coordinate screen, returned in `work_out[0]` and `work_out[1]`. These values depend on the current screen mode.

Drawing the Line

Once the workstation is open, using VDI to draw a line, as Linedem does, is a simple matter of setting line style, end types, line width, and color attributes, and calling the VDI polyline routine.

Setting Line Style

The VDI includes seven line styles—six supplied, one user-definable. The style ID numbers are:

- 1 = Solid
- 2 = Long dash
- 3 = Dot
- 4 = Dash dot
- 5 = Dash
- 6 = Dash dot dot
- 7 = User-defined

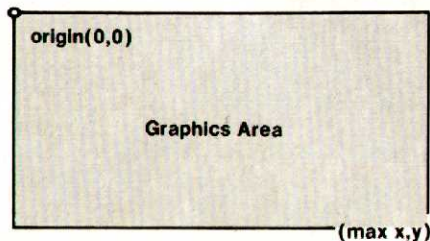
To set the line-style, call the `vsl_type()` function with the appropriate number, accepted as input from the user.

```
vsl_type(handle, style);
```

The user-defined line style is not supported in Linedem. Should you select it or enter a meaningless value, unpredictable results will occur. Note that for the sake of simplicity, Linedem incorporates no error checks on input values. Therefore, experiment as you will, but be prepared for unusual results.

Setting Line Width

Line width is set by calling the `vsl_width()` function. The first argument to `vsl_width()` is your virtual workstation handle. The second must be an odd number, representing the number of pixels wide you want subsequent lines to be. Note that setting line thick-



Raster Coordinate System

Figure 2.

ness greater than one pixel (the default) will cause the system to ignore line style settings and make all lines solid.

Setting Line End Styles

Line-ends are set to one of three shapes, using the `vsl_ends()` function. The first argument to `vsl_ends()` is your workstation handle; the second and third arguments, values for the end-style you want used at the start- and end-point of your line, respectively. Values for the three types of line-ends are:

- 0 = Squared (default)
- 1 = Arrow-shaped
- 2 = Rounded

Setting Line Color

Setting line color is a two-step process. The first step is to assign RGB settings to a particular color register using the `vs_color()` function. The second step is to tell VDI to use this register in drawing lines, using the `vsl_color()` function.

Register 0 is dedicated to storing the background color, so it is irrelevant to foreground graphics like lines. There are, however, 15 foreground registers available in low res, three in medium res, and one in high res (monochrome) that *can* be used to specify the color of a line. Setting a color register is done by initializing a short integer array of three elements, containing the Red, Green, and Blue settings (0-7) for the color effect you require, and calling `vs_color()` in the following manner:

```
/* value for red component */
rgb_in[0] = red;
/* value for green component */
rgb_in[1] = green;
/* value for blue component */
rgb_in[2] = blue;
vs_color(handle,color_index,rgb_in);
```

where `color_index` is the number of the register you want to set (1-15 in low res; 1-3 in medium res; 1 in high res). Note that you can pre-set as many color registers as are available in the graphics mode you are using, simply by resetting the values in the RGB array appropriately and calling `vs_color()` each time with a different index.

Once the color registers are set, telling VDI to draw lines using the color in a particular register is done with `vsl_color()`.

The general form of this instruction is:

```
vsl_color(handle,color_index);
```

Linedem



- Any Atari ST Computer
- Mark Williams C-Language Development System

```
#include <stdio.h>
#include <gemdefs.h>
#include <osbind.h>

/* Global control arrays for VDI interface */

int contrl[12];
int intin[128];
int ptsin[128];
int intout[128];
int ptsout[128];

/* Global variables for application */

int handle, dummy, xres, yres;
int work_in[12], work_out[57];

main()
{
    int i;
    char ch;

    /* Set input control array to default values */

    for (i=0;i<10;work_in[i++]=1);

    /* Set raster coordinates */

    work_in[10]=2;

    /* Initialize AES application */

    appl_init();

    /* Obtain handle for fullscreen physical workstation */

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

    /* Open virtual workstation, recover screen limits */

    v_opnvwk(work_in,&handle,work_out);
    xres=work_out[0]; yres=work_out[1];

    /* Get rid of mouse cursor */

    v_hide_c(handle);

    /* Do linedrawing demonstration */

    do {
        linedemo();
        while (!Bconstat(2));
    } while ((ch=Bconin(2)) != '\33');

    /* Clear screen, home cursor, make cursor visible */

    printf("\33E\33e\n");

    /* Show mouse */

    v_show_c(handle);

    /* Close virtual workstation */

    v_clsvwk(handle);

    /* Exit Application */

    appl_exit();
}
```



```

/* Function: perform line demonstration */
linedemo()
{
    int pxyarray[4], rgb_in[3];
    int style, width, beg_style, end_style;

/* Clear screen, home cursor, make cursor visible */

    printf("\33E\33e\n");

/* Set line type */

    printf("1 = solid\n2 = long dash\n3 = dot\n");
    printf("4 = dash dot\n5 = dash\n6 = dash dot dot\n\n");
    printf("Enter line style: ");
    scanf("%d",&style);
    vsl_type(handle,style);

/* Set line width */

    printf("\n\nEnter line width: ");
    scanf("%d",&width);
    vsl_width(handle,width);

/* Set line end styles */

    printf("\n\n0 = squared\n1 = arrow\n2 = rounded\n\n");
    printf("Enter first line end style: ");
    scanf("%d",&beg_style);
    printf("\nEnter second line end style: ");
    scanf("%d",&end_style);
    vsl_ends(handle,beg_style,end_style);

/* Set line color */

    printf("\n\nEnter 3 color variables (red, green, blue).\n");
    printf("Each may range from 0 - 1000.\n\n");
    printf("Enter red value: ");
    scanf("%d",&rgb_in[0]);
    printf("\nEnter green value: ");
    scanf("%d",&rgb_in[1]);
    printf("\nEnter blue value: ");
    scanf("%d",&rgb_in[2]);
    vs_color(handle,2,rgb_in);
    vsl_color(handle,2);

/* Get coordinates */

    printf("\n\nEnter X coordinate of starting point.\n");
    printf("(May range from 0 - %d): ",xres);
    scanf("%d",&pxyarray[0]);
    printf("\nEnter Y coordinate of starting point.\n");
    printf("(May range from 0 - %d): ",yres);
    scanf("%d",&pxyarray[1]);
    printf("\n\nEnter X coordinate of ending point.\n");
    printf("(May range from 0 - %d): ",xres);
    scanf("%d",&pxyarray[2]);
    printf("\nEnter Y coordinate of ending point.\n");
    printf("(May range from 0 - %d): ",yres);
    scanf("%d",&pxyarray[3]);

/* Clear screen, home cursor, make cursor invisible */

    printf("\33E\33f\n");

/* Draw line */

    v_pline(handle,2,pxyarray);
}

```


Linedem demonstrates some general aspects of working with VDI as well as applying most of the VDI line-related calls.

where color__index is the number of the register you want to use. Note that Linedem sets and uses Register 1 automatically.

Drawing the Line

Finally, you are ready to draw your line. This, once again, is a two-step process. First, you must declare and initialize an integer array of four elements (in Linedem, this array is called pxyarray), to store the X- and Y-coordinate values of your endpoints. Once this is accomplished, the line is drawn using the v__pline function, as follows:

```
v__pline(handle,2,pxyarray);
```

where the value 2 indicates how many (X,Y) coordinate pairs pxyarray contains. The v__pline() function is capable of drawing multi-line figures and

polygons as well as single lines. To accomplish this, of course, you would have to supply a larger array, containing additional (X,Y) values.

Using Linedem

Linedem was composed and tested using the Mark Williams C development system for the ST. To compile the listing under the Mark Williams system, enter it into a file called "linedem.c," using MicroEMACS or an equivalent editor. Compile it from the \$ prompt of the Mark Williams "msh" shell, using the command:

```
cc linedem.c -laes -lvdi, or
```

```
cc linedem.c -VGEM
```

The expressions "-laes -lvdi" and "-VGEM" link in AES and VDI libraries. Other C development systems (Me-

gamax, for example) may link in this material automatically as part of the standard compilation process.

Once successfully compiled, Linedem can be executed directly from the shell \$ prompt by typing:

```
linedem.prg
```

or from the desktop by double-clicking on the linedem.prg icon. After one run-through, the program will pause. Pressing Esc at this point will cause it to terminate; while pressing any other key will cause it to repeat.

Linedem employs header files for standard I/O (for the printf() and scanf() functions), GEM definitions, and OS bindings (for the BIOS I/O functions Bconstat() and Bconin(), used to check the keyboard). Certain kinds of screen control (clearing the screen, homing the cursor, making the cursor visible and invisible) are accomplished by using printf() to output sequences of control characters. See references under "screen control" in the Mark Williams C manual for further information. ■

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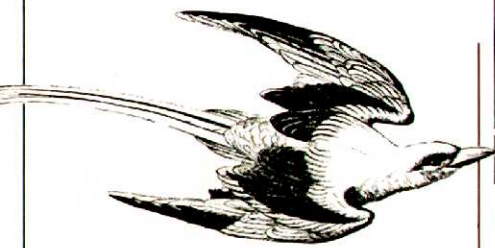
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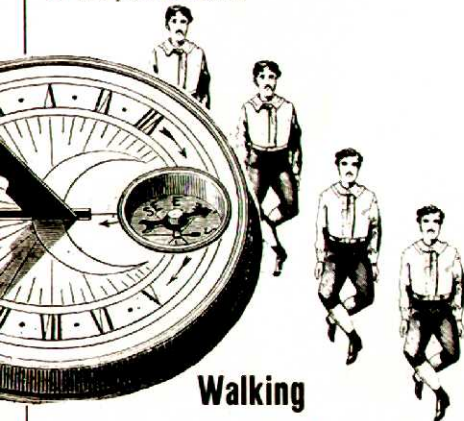


Parrots and Canaries

The Elephant Nose Pet Shop sells parrots and canaries; a parrot costs twice as much as a canary. A bird-loving lady came in and purchased five parrots and three canaries. If, instead, she had bought three parrots and five canaries, she would have spent \$20 less. What is the price of each bird?

Marbles

Karen has exactly three times as many marbles as Kevin and four times as many as Brian. They have fewer than 200 marbles among them. How many marbles could each person have. You may want to write a program to find all of the possibilities.



Walking

Out for some exercise, four programmers, Al, Bill, Chuck, and Don, start from the same point to run and walk on a circular path, the length of which is exactly one mile. Al runs at five miles per hour, Bill jogs at four mph, Chuck walks at three mph, and Don saunters at two mph. If they keep going at this rate, how long will it be before all four again meet at the starting point.

Puzzles & Problems

By DAVID H. AHL

Some of these problems can be solved in your head, some require pencil and paper, and still others require that you write a computer program. Answers are on page 83.

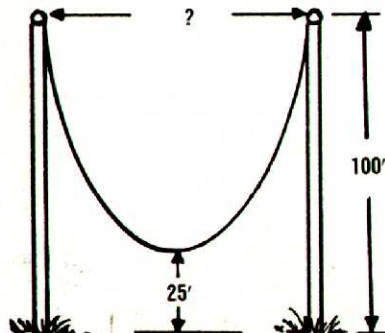


Bottle of Wine

A bottle of wine costs \$10. The wine was worth \$9 more than the bottle. How much was the bottle worth?

Two Flag Poles

This old problem from Professor Albert Hopkins should be easy for the modern computerist. "In the back of the Crystal Palace stand two flag poles, each 100 feet high, with a 150-foot rope hanging between them. The middle of the rope is 25 feet above the ground. How far apart are the poles?"



The Theater Line

They'd been standing in line quite a while outside the theater and Paul was bored. "Here's a job for you," his father said. "Say the first person in the line is number one, the second number two, and so on. Figure out the total of all those numbers for the people ahead of us."

After some busy minutes up and down the line with pencil and paper, Paul came back to report. "There are exactly one-third as many kids as grown-ups," he declared. "But it's funny that the grown-ups' number comes to three times the kids' number."

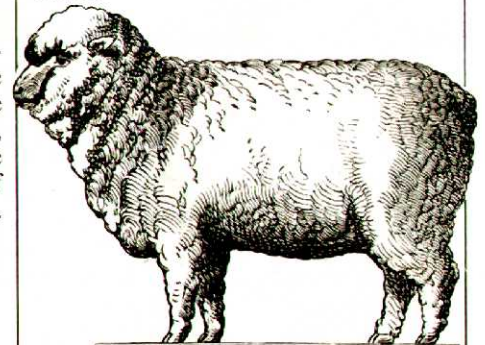
"What's the total then?" his father asked.

"Between 800 and 1000," replied the boy."

What is the total of the numbers? And how many kids and grown-ups are on the line?

Old Vase

An antique dealer bought an old vase for \$7, sold it for \$8, bought it back a year later for \$9, and sold it a second time for \$10. How much profit did he make?



Sheep Farmer

A sheep farmer in New Zealand had different breeds of sheep in four paddocks. In the second paddock were twice as many sheep as in the first, in the third twice as many as the second, and in the fourth twice as many as in the third. He had 1035 sheep in total. How many sheep were in each paddock?

If you take a piece of paper the size and thickness of this magazine page and fold it in half, how many folds do you think you can make? If you haven't actually ever done this, STOP READING and try it right now.

Upon first being presented with this problem, most people think they can make 20 or 50 or even 100 folds. In fact, as you probably discovered if you actually tried it, it is difficult to make more than six folds. If you start with a large sheet of newspaper, you may be able to make eight folds, although after the seventh fold, the packet to be folded will be well over $\frac{1}{8}$ " thick and about the size of a large postage stamp.

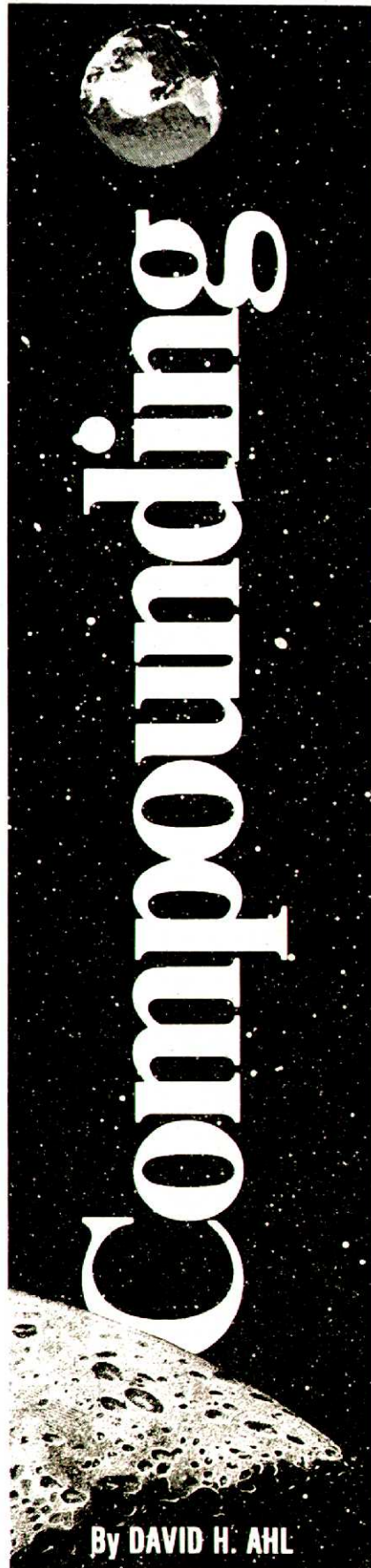
It is interesting to carry this process further (using a calculator or computer rather than actually folding paper). Let's say we start with a piece of paper the size of a football field and $\frac{1}{1000}$ " thick (considerably flimsier than this magazine page). Have a guess; how many times can it be folded?

Twenty? Thirty? Not likely. It is difficult to identify the precise point at which the task becomes impossible, but after the 13th folding, the resulting package is about 4' square and 8" thick. Now think about bending that.

If you haven't warmed up your computer yet, this is the time to do it, because we will soon exceed the capability of most calculators. Let's say that we can get an extremely large piece of our very flimsy $\frac{1}{1000}$ " thick paper and fold it in half exactly 100 times. Having done that, we want to stand on top of it. How long a ladder would we need to reach the top?

By now you have some idea of what to expect—or do you? After 20 folds, the packet is over 87' thick, but just six more folds brings the thickness to over one mile; hence we will need a pretty long ladder for 100 folds. After 38 folds, the stack, if laid on its side, would reach from Boston to San Diego. After the 53rd fold, the stack will reach past the sun, and by the 83rd fold, it will reach the center of our galaxy. I leave it to you (and your computer) to calculate the precise height of the stack after 100 folds.

Perhaps the most famous story told about doubling concerns the invention of the game of chess. The game, or so the story goes, was invented by a mathematician in old England. The king was



By DAVID H. AHL

so pleased with the game that he offered the inventor any reward he cared to name. The inventor simply asked for one grain of corn on the first square of the chessboard, two on the second, four grains on the third square, eight on the fourth, and so on. The king thought this a very cheap price to pay for such a fine game and readily agreed.

However, after consulting his court advisors, he was not at all pleased to learn that the total quantity of grain required would more than equal the entire world output for many years to come. H. J. R. Murray in his book, *A History of Chess*, calculated that the quantity of grain needed ($2^{64} - 1$) would be enough to cover England to a uniform depth of 38.4'. (Just exactly how many grains is this?) Reportedly, the king had the inventor beheaded for imposing such a mathematical joke on royalty.

Doubling is just one form of compounding, i.e., computing a new number based on a multiple of the original number. Compound interest on a bank account is perhaps the most familiar form of compounding, although there are many others. The formula to compute a compounded amount is simplicity itself: the new amount is equal to the old amount plus the old amount times the rate of growth.

$$P(\text{new}) = P(\text{old}) + P(\text{old}) * R$$

Thus, we can write a simple Basic program to calculate compound growth for practically any situation.

```
10 INPUT "Starting amount"; P
20 INPUT "Compounding rate"; R
30 INPUT "Number of times"; N
40 FOR I = 1 TO N
50 P = P*(1 + R)
60 NEXT I
70 PRINT "Amount at end ="; P
```

If we wanted to be more efficient, we could eliminate the repetitive calculations in Lines 40-60 and replace them with the general formula for computing compound amounts:

$$40 P = P * (1 + R)^N$$

In the doubling problems above, R is simply set to one, while in compound interest problems, R must be set to the rate of interest expressed as a decimal such as .05 for 5% or .12 for 12%. Armed with this information, you

Item	1975 Price	1985 Price
Hershey bar	\$.25	\$.45
CBS LP record	4.95	8.95
Toyota Corona/Camry	4238.00	8978.00

Table 1.

should have no trouble solving the problems below.

Uncle Bert

Your uncle Bert deposited \$1000 for you in a savings account the day you were born. He passed away on your 40th birthday, and the account is now yours. If it has been earning 6% annual interest, how much would you inherit?

Had it been in a bank which compounded interest monthly (1/2% per month), how much would have accumulated?

Inflation

In the inflationary days of the early 70's, consumer prices were rising at an average rate of 8.8% per year. Assum-

ing this rate had continued for 25 years from 1975 to 2000, what would be the prices of the items listed in Table 1 by the year 2000?

Fortunately, the current rate of inflation is only about 2.3%. Assuming this rate were to continue for 25 years, what would be the prices of the items listed in Table 1 in the year 2010?

Only a Penny!

On your first birthday your father gives you a gift of a penny, which you promptly swallow. He promises to double the amount of the gift every year until you reach your 21st birthday. How much will you receive on the day you come of age? And how much in total will you have received over the years?

Pollution

Eric County in upstate New York is one of the most heavily polluted areas in the United States. In a study of the residents of the county, it was found

that the number of people dying from respiratory diseases is doubling every five years. In 1950, there were 263 deaths attributed to respiratory diseases. How many deaths will there be in the year 2050, assuming this same rate of increase?

Bristleworm

The bristleworm can reproduce by splitting itself into 24 segments, each of which grows a new head and tail. Starting with just one worm and assuming hospitable conditions, how many bristleworms will result from ten splits? From 20 splits?

Manhattan Island

We are told that the Dutch settlers paid the Indians the equivalent of \$24 for Manhattan Island in 1626. Assuming the Indians on January 1, 1627 had put that sum in investments paying 6% annually and left all of the money fully invested, what would be the amount of their holdings in 1975? You will be interested to compare this answer with the 1974 assessed value of Manhattan—some \$6.4 billion. ■

Answers on page 81

Next issue: Extended Precision Numbers.

Thanks to Frank Tapson and Charles Reeves whose articles in *Creative Computing in 1975* provided the basis for this article.



"...I'm Professor Cantrell...or, if you prefer,
200 trillion quarks to the nth..."

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How to Win Friends and Influence User Groups

A complete guide to making it to the top of your local club

By **DAVID D. BUSCH**

The user group is a phenomenon that has been around nearly as long as there have been computers. Users of big mainframes, often encouraged by manufacturers, banded together in self-defense to exchange ideas and discuss problems. When the microcomputer opened the field to small business and personal computer owners, user groups sprang up like mushrooms after a rain. Atari groups were at the forefront and are still among the most active in the movement.

A great deal takes place at a user group meeting besides simply exchanging computer information. Like it or not, the average user group conclave has a rigid pecking order. Those with the fanciest array of hardware, those who think in machine language, or who can speak the most high-level languages frequently garner the most respect and attention at gatherings. The most articulate, best-looking, and most charismatic do OK, too. But where does that leave you and me?

Gaining a high position in the user group pecking order can be an important part of enjoying Atari computerdom to the fullest. After all, how can you expect one of the leading lights of the group to give you a copy of that great utility program he has written if you are best known as the author of a program which simulates the rolling of a 14-sided die?

There are two ways for the newcomer to become a sought-after member of the inner circle and to join the coterie of microcomputer heavyweights. The first

is to buy and study every available book on your Atari model. That requires a lot of hard work and can fill your head with much useless information that you will never, ever need outside of user group meetings. For example, when was the last time you really, really needed to know where IOCB#7 is?

The lazy person's way of gaining a modicum of peer respect is to bluff his or her way to stardom. This technique hinges on a very important fact: user group members who understand everything there is to know about Atari computers probably won't be the ones asking you questions.

Here are some tricks you can use to establish a formidable user group reputation.

Don't Say Dumb Things

First of all, try not to say dumb things. If there is a small group of members who get all honey-eyed over BOS (or some other obscure operating system), simply avoid them. At the very least, don't ask them if you might have better luck with one or another brand of tape when loading programs into your-cassette-based 600XL.

Instead, find a less advanced clutch of users whom you can impress. The majority of computer hobbyists respect programmers. There are a great many people who bought their Ataris primarily for games and never really got much past FOR/NEXT loops in the manual. You can dazzle them by showing off one or two actual working programs. These needn't really do anything useful. Just

explain that the software is a specialized application for your business, then drop some jargon.

Examples: "Well, this program calculates the actuarialized life expectancy of an assigned risk on an interest-adjusted basis."

Or "I use this program every day to determine how many Carbon-14 rods are needed in the containment area to delimit the half-life of the critical reaction."

Or "This particular program uses critical path analysis to optimize the routings undertaken by my garbage truck."

In any given user group, there will always be a few people who have actually written programs. You can impress them by liberally sprinkling your code with impressive-looking lines, which don't really have to perform any useful function. Here are a few tips to make your program look more complicated than it is.

Use Dummy Lines

Use PEEKs a lot. When PEEKing, the value obtained doesn't have to be used by the program. For example:

```
100 A4=PEEK(18341) : A5=PEEK(17627)
: A6=PEEK(15322) + 256*PEEK(15323)
```

All but the most sophisticated programmer can't help but be impressed by a line like that. I regularly use that line as the first or second line of every single program I write. It actually offers more

protection than a copyright notice, because people who copy the program are terrified to remove it.

When employing dummy lines, simply remember not to use those variables for anything within the program, except to carry out dummy calculations on other dummy variables. I once wrote a program which does nothing more than convert Celsius temperatures to Fahrenheit, but managed to pad it out with 300 dummy program lines which made it a very impressive effort, indeed.

You can also spruce up your program with POKES, but you must be more cautious. You can't just POKE values here and there, or even re-POKE memory locations with the value you just PEEKed there. It might have changed. Your best bet is to find a few harmless or unused addresses, and POKE numbers there (8-bit Atari users may wish to try locations 203-209 and 1536-1791 decimal for starters).

Certain commonly-used Basic statements can also be reliably replaced with POKES. Atari 8-bit owners may wish to try POKEing to locations 709-712 decimal, instead of using SETCOLOR. Unfortunately, this sort of thing may require some actual programming knowledge and is not recommended for the neophyte who just wants to look like an expert. (Experts-in-the-making, however, can POKE their way to glory with Ian Chadwick's book, *Mapping the Atari* [Compute Publications, 1985].)

Use 255

Use the number 255 whenever possible. For example, if you have a variable A, which will never exceed 10 (or so) in a typical program run, you can safely insert the following line:

```
100 IF A=255 THEN POKE(A+16326),0
```

The value 255 holds deep significance, even for those who don't know a word of assembly language. Using dummy hexadecimal code is another good dodge. The ADR function is useful for placing dummy hex in an appropriately functional (looking) setting:

```
100 ML=ADR("FOFFA10EAF9B")
```

While we're on the subject of hexadecimal and assembly language, a time-honored Atari programming technique involves placing machine code in a

string and executing it directly. Simulating this technique is easy—just dimension a string, say 50 characters long, then assign it as follows:

```
100 DIM ML$(50):ML$="(Weird graphic characters go here!)"
```

To get the weird characters, just hold down the Control key and wail away on the letter keys. Try some inverse or lowercase. Be creative!

Compile It!

Compile your program. Basic compilers are widely available for both 8- and 16-bit Ataris. If you know a little C, all the better, just don't show them your source. Turn your program into machine code and don't tell anyone what you've done. Let them all think you wrote a 26547-byte-long assembly language program all by yourself. Few will wonder why a miles-per-gallon calculator needs to be that long or that fast (calling it MPGCSYS.PRG doesn't hurt, either).

The only problem with pretending programming expertise is that sooner or later, some 12-year-old genius will come up to you at a meeting and ask you a question you can't handle, such as

"Why can't I use stdio.h functions with the -VGEM switch?" or "Could you tell me how to rechannel the E: device?"

Stay cool, and remember the cardinal rule of faking computer expertise: if he's so smart, why is he asking you a question? When anybody asks you a really difficult question about a technique, tell him you prefer to use an elegant little subroutine developed by Dr. (fill in any name from War and Peace).

Or, better yet, stare into the distance and murmur vaguely about a "recent operating system update report" by Leonard Tramiel (Atari's director of software and a major technical heavy-hitter, his name is talisman among those who know bytes best). If worse comes to worst, you can always use a technique Leonard himself has perfected—stare mildly at the interloper, shake your head in bemused puzzlement, and ask "Why would you want to do that with all the other facilities at your disposal?" Do this enough times, and even the techiest techies will quail.

Following these guidelines should put you well on your way to becoming one of the leaders of your local user group. Be prepared though, for extra demands on your time if the ruse works so well that you are elected president. ■

Answers to Compounding Problems

Only a Penny!

On your 21st birthday you would receive \$20,971.52. Over the years, the total would come to \$41,943.04.

Pollution

In 2050 there would be 275,775,488 deaths due to respiratory illness in Erie County. Obviously, this is absurd, because this number exceeds the entire current population of the U.S. Researchers making predictions of this sort should be very careful, because compounding, particularly doubling, gets out of hand very quickly.

Bristleworm

Under ideal conditions, one worm could produce 95,367,431,640,625 offspring in ten generations. We don't have room to print the number of offspring after 20 generations.

Manhattan Island

Invested at 6% (not unreasonable), the Indians' original \$24 would have grown to about \$16.3 billion by 1975, more than 2.5 times the assessed valuation of the city.

Chessboard

To cover a chessboard, doubling the number of grains on each square, would take 18,446,744,073,709,551,614 grains of corn.

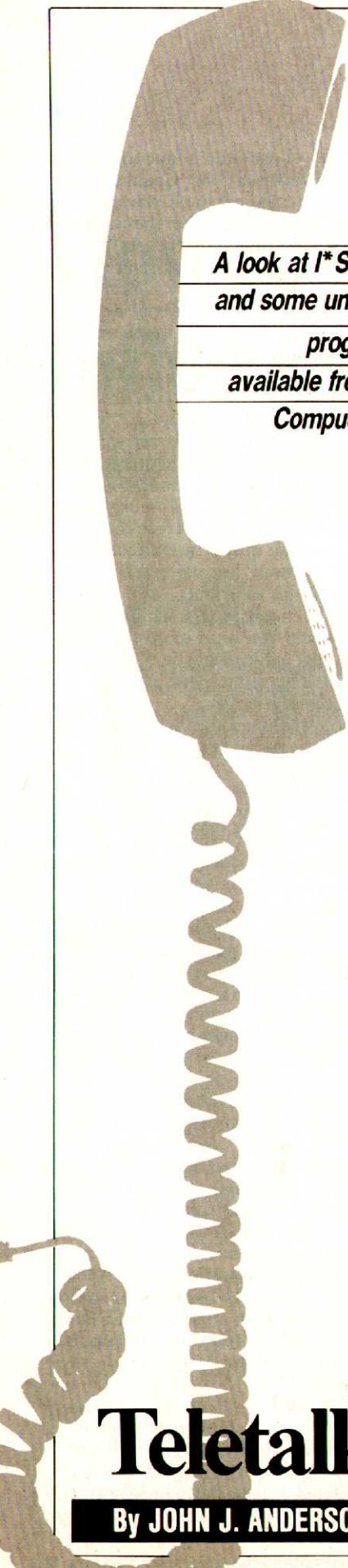
Uncle Bert

You would receive \$10,285.72 if it was compounded annually, \$10,957.45 compounded monthly.

Inflation

Starting from the prices in 1975 and 1985, in 25 years the cost of the items would be as shown in Table 1a.

Table 1a.	8.8%	2.3%
Hershey bar	\$2.06	\$0.79
CBS LP record	40.77	15.80
Toyota car	34,904.60	15,851.50



**A look at I*S Talk
and some unusual
programs
available free on
CompuServe**

Teletalk

By JOHN J. ANDERSON

We don't usually make it a habit to review software in other than full release versions, but we'll make an exception in the case of *I*S Talk* from Batteries Included (30 Mural St., Richmond Hill, ON L4B 1B5, Canada. (416) 881-9941). This telecommunications program offers all the features of its competitors along with a few handy capabilities all its own. Although the disk we recently received did not have each and every feature enabled, we saw enough of *I*S Talk* and know enough about the fine reputation of Batteries Included to conclude that they will soon have another hit on their hands.

*I*S Talk* combines the graphics power of GEM with the convenience of the *I*S* series, which is designed to mate with sister packages to create a customized integrated environment. The result is a communications package that is both easy to learn and easy to use.

With its pull-down menus and clear visual presentation, the program makes it easy for beginners to get at the functions they need. At the same time, an abundant supply of shortcuts and function-key commands insures that as a user advances, so can the nature of the user interface. Thus, the experienced user will never find himself bogged down in endless mouse-dragging and menu selection.

Among the foremost features of *I*S Talk* are: a large memory buffer for capturing information; complete facilities for transferring information between disk files, modem, printer, screen, and memory buffer; xmodem protocol transfers using checksum or CRC error detection alongside complete filtering capability of both input and output; selected TOS functions available within the program; full-featured editing, including a built-in spelling checker; an independent, split-screen compose window; a phone directory with auto log-on and auto redial; powerful shortcut macro keys, including a "replay" macro function that can playback *mouse movements and clicks* as well as keystrokes; and a memo/message calendar. The program sells for \$49.95.

*I*S Talk* works very intuitively, and although beginners will certainly want to read the documentation, they should also be able to get up and running very smoothly and quickly. Authors Stephen Couchman and Michael Reichmann have managed to create a flexible user interface that can gracefully grow in sophistication along with its user.

I am still using *Flash* for my telecommunications, but remember, I am still waiting for a full-fledged version of *I*S Talk*. It will be interesting to see how well it works alongside other *I*S* packages, all of which are designed to allow me to create a custom-integrated workspace. I will be getting back to you on this topic.

Where To Go

And where should you head once you are all suited up and ready to telecommunicate? Well, the biggest single enclave of Atari enthusiasts can be found on the AtariSig of CompuServe, so that's a mighty good place to start. There the largest, most active Atari user's network in the country meets 24 hours a day. The Sig has been split into three forums, one for 8-bit machines, another for the ST series, and a third for software developers. It is one of the most active Sigs on CompuServe, and you really ought to visit if you haven't done so already. Their library of programs available for download is growing constantly.

Have you ever thought about the title of this magazine? It fittingly describes a distinct type of enthusiast—an explorer of uncharted territory, a cartographer of unknown potentials, an astronaut of inner space.

When a machine is new and information is hard to come by, a place like CompuServe, where you can meet and talk shop with other Atari Explorers, becomes indispensable. The ST is in this position now, and in its most important function, the 16-bit forum of AtariSig acts as a clearing house for all the latest intelligence.

Some information is stored as retrievable text files. Other information comes in the form of programs and program data. If you use a terminal package that allows xmodem protocol uploads and downloads, a cornucopia of material is available to you for no more than the cost of your connect time.

Do you remember the arcade hit *Asteroids*? Well if you were a fan, you should download a program called *Megaroids* from Data Library 1 in the 16-bit forum. Written in Megamax C by Mike and Mitch Bunell, the game features smooth color animation and excellent playability. It is a beautiful example of the power of Megamax C and is provided free to Sig members for that purpose.

Outside of the original arcade game, with its unique vector graphics, this ver-

The experienced user of I* S Talk will never be bogged down in endless mouse-dragging and menu selection.

sion is the best implementation of Asteroids I have ever seen. It must be downloaded from two files, MEGAR-O.PRG and MEGARO.RSC, and total download time is about ten minutes, but it is well worth the time and effort.

More Free Programs

Is it desk accessories you seek? Two excellent desk accessory games are also available from DL1. The first is called PUZZLE.ACC and was written and compiled in Megamax C. Using the mouse, you move tiles to put the puzzle pieces in proper order. Not exactly the most fun you will ever remember having, but it is nicely executed and sports a touch of color, too.

A recent addition to DL1 is MINO-S.ACC, a much more sophisticated desk accessory puzzle. It pulls down a three-dimensional maze in first person perspective. You wander through the maze by clicking on the window scrollbars. Getting out is difficult, and you can elect to use a "helper" to push you through a little faster. The game is genuinely absorbing, and the graphics are nicely done. Both accessories are relatively short files and download in just a few minutes. Note that they must be placed on a boot disk and renamed DESK #.ACC in order to run. Finally,

some interesting accessories with which to replace the TOS disk demo and VT-52 emulator!

One of the neatest graphics demos I have seen is available in DL5. It is called KLEIDO.PRG and runs in low or medium res. It is a very smooth, multicolor graphics animation that has a very attractive three-dimensional look to it. In low res, it runs especially fast as it cycles through 16 colors. You might also have a look at QUX2.PRG in DL5. This one, although not in color, is also very fast and quite impressive. It runs in all modes, and is incredible in monochrome high res.

One of the best finds in the 16-bit forum is NEO.PRG, also in DL5. It is a partially-featured version of the powerful *Neochrome* paint program for the ST from Atari. It takes a while to download the file, which is over 30K, but, again, it is well worth the time and effort.

Neochrome v.0.5 allows you to turn your ST into a color palette and sports a magnify feature, which even the magnificent paint program *DEGAS* lacks (though Batteries promises we will see it in new versions). Even if you own *DEGAS*, you will probably want *Neochrome* as well.

Next issue: Utilities, pictures, and text via CompuServe. ■



You're not a daughter; you're a human modem.

Puzzles & Problems Answers

Parrots and Canaries

A parrot costs \$20 and a canary \$10.

Marbles

There are ten possible solutions. They are:

Karen	Kevin	Brian	Total
12	4	3	19
24	8	6	38
36	12	9	57
48	16	12	76
60	20	15	95
72	24	18	114
84	28	21	133
96	32	24	152
108	36	27	171
120	40	30	190

Walking

They will meet in one hour, by which time Al will have run five miles, Bill four, Chuck three, and Don two.

Bottle of Wine

The common answer (wrong) is \$1. If the bottle were really worth \$1, then the wine, being worth \$9 more, would be worth \$10 and together they would cost \$11. But since they actually cost just \$10, the wine must be worth \$9.50 and the bottle 50 cents.

Two Flag Poles

The poles must be right next to each other since that is the only way the loop of a 150-foot rope can hang down 75 feet (or 25 feet above the ground).

The Theater Line

The formula for the total of all integers from 1 to N is $(N*(N+1))/2$. If there were K kids and 3K grown-ups, the total is 4K. If you substitute 4K for N, you should be able to determine that the number total is 820 and there were 10 kids and 30 grown-ups on the line.

Old Vase

People look at this problem in many ways, some of which seem to lead to the incorrect answers of either \$1 or break even. The correct answer is \$2 which can be proved simply by the fact that the dealer's total outlay is $\$7 + \$9 = \$16$, and his total return is $\$8 + \$10 = \$18$, for a profit of \$2.

Sheep Farmer

The first paddock had 69 sheep, the second 138, the third 276, and the fourth 552.

Sounds that will curl your hair

Programming Challenge

By JOHN JAINSHIGG

Welcome back, folks. Entries for Challenge #1 ("TV Snow"—September/October '86) continue to pour in, but as yet, the panel of distinguished judges has been unable to reach a final decision. A few entries have actually approached what we've defined as "benchmark performance" (our benchmark being a TV tuned to Video Disco Sri Lanka through a busted satellite dish), but no entry has been *so* perfect that we've felt moved to close the competition. The upshot: keep those entries coming! Next month, a winner fer sure!

Challenge #2

It's a dark and stormy night ... A door slams. Somebody screams. A shot rings out. Suddenly, a pirate BBS appears on the horizon ... (The plot thickens.)

Rouse yourself from that ruddy, blood-sated, *apres*-Halloween torpor, and consider the effects of sound on the human nervous system. Sound unnerves in ways overt and subtle. It unnerves with volume and suddenness (the BANG of firecrackers at your feet); with persistence (the tick-tick-tick of a June bug against the windowpane); and

with tonal quality (the whine of a dentist's drill ... shudder). The human nervous system is a delicately balanced thing, and there are lots of ways sound can give it a little nudge off-center.

This month's challenge is to do just that—create a programmatic sound effect that'll jam the bearings of a normal, hearing individual. As always, any Atari computer is acceptable, any language is fine, and any normal, hearing individual will do (though Mom is the classic subject for this kind of experiment). Note that this does *not* constitute license to drive Mom around the bend *permanently*.

To help establish benchmarks for the competition, Atari 8-bit owners may wish to type in the listing shown below, a program designed to render a facsimile of the "Theremin" sound effect commonly heard in Grade B horror flicks. If RUN at midnight, with the lights turned down low (and the monitor turned up high), it should produce the desired effect (ranging from a shrill scream to a peremptory: "Turn that thing OFF!") in any subject within earshot. Note that if Mom has had a particularly tough day at the office, the possibility of assault with a blunt instrument should be considered. Damage incurred in this manner is not covered under Atari's warranty, especially if it's to your head.

Next issue: Creativity be damned! It's back to Fundamental Algorithms.

General Rules

Programming Challenge entries must include:

- A fully-documented listing of the main program, including documented source code for any assembly language.
- An executable copy of the program on magnetic media compatible with standard Atari disk or cassette peripherals and operating systems.
- A brief commentary on the program and a capsule autobiography.

Please label all materials clearly with your name, address, and telephone number. Only original, unpublished programs will be considered. All entries become the property of Atari Explorer magazine. Entries may not be submitted by employees of Atari (U.S.) Corp. or its subsidiaries, nor by members of their immediate families.

Send entries to:

Programming Challenge
Atari Explorer
7 Hilltop Road
Mendham, NJ 07945

Theremin Effect

ATARI KEY

- Any Atari 8-Bit Home Computer
- Atari Basic

```
10 DIM A(3)
20 FOR I=0 TO 3:READ V:A(I)=V:NEXT I
30 FOR I=1536 TO 1593:READ V:POKE I,V:NEXT I
40 SOUND 0,0,0,0:POKE 53768,80
50 POKE 53761,160:POKE 53763,168
60 POKE 203,0:POKE 204,0:A=USR(1536)
70 FA=INT(RND(0)*2000)+1000
80 FOR I=0 TO 3:F=FA*A(I)
90 FH=INT(F/256):FL=F-FH*256
100 POKE 203,FL:POKE 204,FH
110 FOR D=1 TO 500+1000*(I/3):NEXT D:NEXT I:GOTO 70
1000 DATA 1,.5,.52,.75
2000 DATA 104,162,6,160,11,169,6,32,92,228,96,206
2010 DATA 57,6,208,37,169,5,141,57,6,166,203,164
2020 DATA 204,173,56,6,240,9,24,138,105,20,170,152
2030 DATA 105,0,168,142,0,210,140,2,210,173,56,6
2040 DATA 73,255,141,56,6,76,95,228,0,5
```


During their heyday in the 1960s, the Beatles pioneered the use of recording techniques that made their music sound different from anything that had come before. It seemed they could include almost any sound, from exotic East Indian instruments to an entire orchestra, in their recordings.

The instrument that let the Beatles perform this feat was called a Mellotron, a complicated device that recreated sounds with the aid of dozens of magnetic tape loops, each corresponding to one of the keys on a piano-type keyboard. By pressing a key, a player would bring one of the tapes in contact with a playback head, reproducing a pre-recorded sound. Needless to say, because of its complexity and cost, the amazing Mellotron never caught on, and only a handful were ever built or sold.

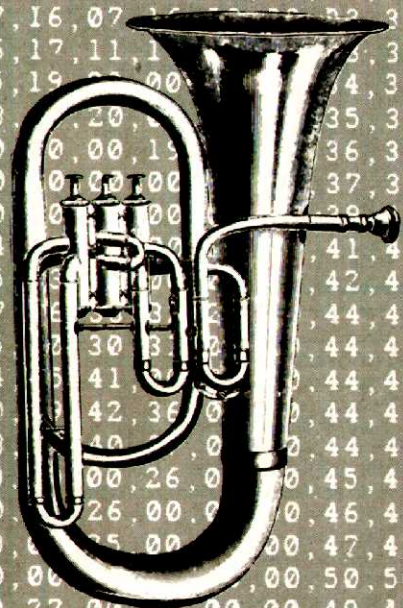
Now, twenty years later, however, a digital version of the same idea, called a digital sampling keyboard, has become a popular tool in the production of music and sound effects for the record industry, as well as for television and film soundtracks. Among these professional instruments are the Fairlight CMI, the Synclavier, the Kurzweil musical instrument, and the E-mu Emulator. All reproduce digitally recorded real-world sounds with remarkable fidelity and realism, giving musicians the ability to play any recordable sound—from the string section of an orchestra to a chorus of human voices—through a simple, keyboard interface.

The *sampling* process involves recording short snippets of sounds—the actual “samples”—in computer memory. Special microchips, called analog-to-digital converters (ADCs), measure the amplitude of a sound's waveform many, many times each second, producing a stream of binary numbers that describe how the waveform changes over time. This process is called digitizing.

To play the sounds back—converting them from numbers into audible sound—the digital record is pumped through another special circuit called a digital-to-analog converter (or DAC), which, as its name implies, performs the reverse function of an ADC. Once the

Sampling made simple—

Hippo's ST Sound Digitizer



Sound Chip

By TIMOTHY ONOSKO

numbers have been reconverted in this way, the necessary analog sound signal is ready to be amplified and heard, once again, by the human ear.

The fidelity of a digital recording depends on two measures of *resolution*—the range of steps onto which the amplitude of the waveform is mapped each time a measurement is taken, and the rate at which these measurements are taken over time. The former measure is referred to as the *quantization* of the system—expressed as the number of bits that make up each measured value; and the latter is referred to as the *sampling rate*.

The larger the number of measuring steps used (larger quantization) and the faster the sound is sampled (higher sampling rate) the more realistic the recording becomes, free from noise and

distortion. Very simply, the more information about the original sound that is stored in memory, the better the result.

This principle also makes possible the digital audio compact disk (CD). Sound is recorded on a CD at more than 44,000 samples per second (44 KHz sampling rate) using 14 bits of quantization to measure and represent the sound.

There are actually several different methods of sampling and playing back sounds. Some of these are linear encoding (the simplest), zero-crossing, delta-slope modulation (FM), pulse code modulation (PCM, used in compact disks), pulse width modulation (PWM), pulse amplitude modulation (PAM), etc. Each differs in the mathematical way that the table of numbers is stored and sounds are recreated. Often, complex error-checking schemes are used to insure absolute accuracy.

If you want to learn more about the technical details of digital sound recording, one excellent reference work is the *Sony Book of Digital Audio Technology* (TAB Books, \$11.95).

Digital sampling keyboards record and play back sound, but also perform another nifty trick. They can scale the frequency of the sound, adjusting the rate of the data going through the DAC so that it will sound higher or lower when one key or another is played. In this way, only one sound needs to be sampled, then adjusted to provide frequencies across the musical scale.

So, in the end, these digital sampling keyboards are nothing more than computers dedicated to recording, storing and manipulating sound. If this is the case, why not use an existing microcomputer to perform the same feat?

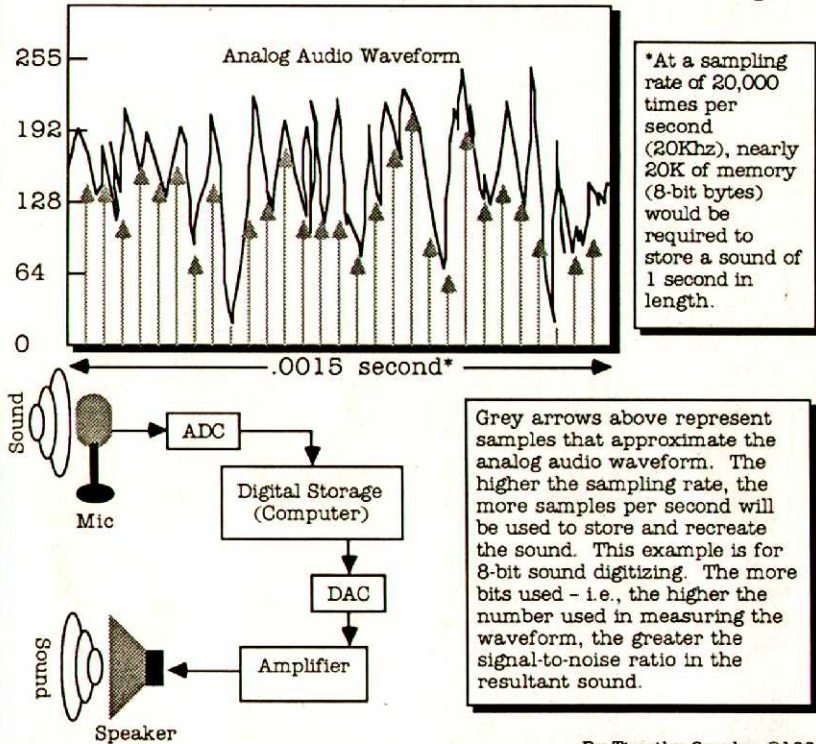
I Hear Your Computer

It would be cavalier to say that sampling and playing back sounds is an easy task for a microcomputer. Though experiments in sound synthesis on micros have come all the way from producing simple beeps to faithfully reproducing human speech in the decade or so that little computers have been around, digital recording is another story.

Before going any further, an historical note is in order. In the late 1970s,

Digital Sound

From Vibrations in the Air, to Numbers and Back Again



The sound from the 16-bit version of the Digitizer will exceed the quality of a compact disc.

microcomputer pioneers like Hal Chamberlin, Frank Covitz, and Bill Seiler concentrated on digital-to-analog sound reproduction using a machine considered primitive today, the Commodore Pet. Chamberlin and his small, New England-based company, MTU, created and sold a rudimentary DAC board for the original KIM single-board 6502 microprocessor computer. Covitz adapted Chamberlin's original software and greatly embellished the idea of creating artificial sound waveforms to play through the DAC board.

Seiler developed an inexpensive board that emulated Chamberlin's DAC board, and the design was widely circulated among Pet user groups around the country. Other microcomputer hackers developed circuits using ADCs for recording sound, and before the whole thing was over, the Pet was recording and playing back real-world, as well as digitally synthesized sounds. This was not high-quality sound, but it was quite a trick for a little machine with only 8K of memory.

The Atari ST eliminates many of the barriers faced by those early sound

hackers. Its 16-bit, 68000 microprocessor and half megabyte or more of memory can store more sounds, faster, than the Pet ever could. Reams of memory are not just a luxury when it comes to digital sounds, they are a necessity. Even short samples can occupy lots of memory.

Moreover, the ST incorporates a MIDI (Musical Instrument Digital Interface) port, making it ideal for this application. More on this, later. But the computer alone does not provide all the hardware and software needed to become a digital sampling musical instrument. The necessary add-ons come from Hippopotamus, Inc., a small and innovative hardware and software company in Los Gatos, CA.

Hippo has designed a simple circuit board, the ST Sound Digitizer, with both an ADC and a DAC for recording and playing back sounds, that links to the ST via the cartridge port. The software included in the package is enough to get started in recording and editing sounds.

The Digitizer, itself, is about as simple a piece of hardware as you will find. On the back of a small metal box are two audio jacks, one to connect to a sound source (a microphone, audio cassette recorder, compact disc player) and the other for connection to an amplifier and speaker. Two knobs on the front of the device vary the levels for recording and playing back. That's it. The rest is accomplished by the software.

Hippo's software serves three purposes. One portion is for the record, play, and editing functions. Another serves as a digital oscilloscope. Ostensibly, the oscilloscope is provided for setting the levels of sounds to be digitized, but it is really just an entertaining gadget, thrown into the package. The third software function adds digital echo and reverberation to the sampled sounds or to real-time input from the digitizer.

In practice, you simply plug in a sound source, set the correct input level, then click the on-screen button marked DIGITIZE and fill a portion of memory—usually several seconds worth—with the sound. The sampling rate can be set at from 1000 samples (yielding the lowest quality sound) to 64,000 samples per second. The quantization is 8-bit, meaning that the sound waveforms are represented as steps between

0 and 255 (or -128 and 127). Up to 40 seconds of sound can be stored in the ST, depending on the amount of free RAM and the sampling rate selected.

In one of the screen windows, a visual representation of the sound can be edited by highlighting portions with the mouse. A tiny segment of a larger recording, perhaps just a single note from a trumpet or piano, can be isolated in this way. Selected segments can be repeated by cutting and pasting, raised or lowered in pitch by squeezing or stretching the waveform. For greater accuracy in editing, a zoom function magnifies the waveform graphic.

Next, an amplitude envelope can be drawn over the edited waveform so that the end result can be made to sound less abrupt in the way it begins or ends, fading to silence, for instance. (A similar function, called DRAW WAVE actually allows completely synthetic waveforms to be entered with the mouse.) And, if a sound is too loud or soft, its volume (amplitude) can be raised or lowered.

An auxiliary window keeps track of the technical data for each sampled sound: the amount of memory used, sampling rate, loudest and softest passages, etc. Two on-screen buttons control playback: PLAY sounds only the selected and highlighted portion of the visual waveform, while PLAY ALL sounds the entire sample.

The real fun starts when you hook up an inexpensive MIDI instrument to the ST and use it to play your digitized samples under keyboard control. Any MIDI instrument or sequencer (even another ST) will do. We used a Casio CZ-101 synthesizer, the least expensive on the market. (The CZ-101 retails for about \$400, but is available by mail order and at discounters for less than \$200.) Another low-cost MIDI keyboard instrument is the Yamaha DX-100. In this configuration, the digitizer functions as part of a real musical instrument—Hippo's software reads the incoming MIDI data and expresses the notes you play using the sampled sound, adjusting its pitch appropriately.

How Good?

We used several criteria in evaluating the Hippo ST Sound Digitizer, not the least of which was the quality of the sound it produced. We also took into

account its functionality and ease of use.

Since this is an 8-bit digitizer, we expected less than we got. The sounds were obviously not of the quality that you would hear from a Kurzweil or Emulator instrument, but were definitely better than those produced by a popular digital sampling toy, the \$99 Casio SK-1 keyboard. The quality heard was fairly good, sounding something like an AM radio. Quiet sounds exhibited the most noise and distortion, notably a kind of buzzing as the sound faded. Even though sampling rates can be set to 64,000 times per second, or 64 KHz, we found that there wasn't much audible improvement beyond about 40 KHz.

This lack of improvement is due to one of the rules of digital sound, involving something called the sub-Nyquist frequency. Basically, this rule says that the highest frequency sound you will be able to reproduce is half the sampling rate. So when sound is sampled 40,000 times per second, the greatest frequency you can sample will be about 20,000 Hz—beyond the upper limit of most human's hearing.

Sampling at 64 KHz eats lots of memory, as well—about 64K per sec-

levels in real time as sound was being digitized, they often sounded very distorted, though the distortion was much less when the digitized sound was played back.

A microphone and "live" sound provide the best source from which to digitize. CDs are next best, followed by conventional recordings. Here, however, we step into a possible legal pitfall, particularly relevant if you plan on distributing samples you have made. Digitizing is treated the same way as recording under the law—it is considered illegal if source material is protected by copyright. At the moment, there even seems to be some dispute as to the legality of sampling individual timbres from commercially-distributed recordings—in other words, Phil Collins's bass drum sound may belong to him alone.

Using the editing functions, we were able to isolate individual sounds from our samples, then use the DRAW ENVELOPE function to make the sounds fade in and out smoothly. In no time, we were playing these instruments (and whole groups of instruments) from the MIDI keyboard. Wow!

We did find that the visual editing function is not always as accurate as it should be, specifically when mousing from one place to another, setting editing points. For some reason, the highlighted area likes to jump back a little from the beginning or end of the sound that is being edited. And we found that clicking on STRETCH (for lowering the frequency of the sound) or SQUEEZE (for raising it) too rapidly would sometimes cause the program to bomb.

When we connected the Atari to our CZ-101 MIDI keyboard, we learned that, like the Emulator and most other samplers, the software adjusts the pitch of notes by simply lifting or dropping the sampling rate. While this is quite sufficient, it also means that an entire sound sample will be longer when played lower, shorter when played higher than originally recorded. It's a good bet, then, not to include drums, tambourines, or other rhythm sounds when recording a sound sample. These will be inconsistent with any rhythm when played at different frequencies. This doesn't mean, though, that a single percussion sound won't work well all by itself, and this is a great way to simulate digital drums.

System and Price: Atari ST;
\$139

Summary: Versatile tool for learning the basics of digital recording and sound sampling.

Manufacturer:

Hippopotamus Software, Inc.,
985 University Ave., Ste. 12
Los Gatos, CA 95030
(408) 395-3190

ond. This also makes it impractical to store long sounds on the floppy disk, since as few as two different sounds can eat up all the space on a single-sided ST disk.

We did have some trouble matching the output levels of microphones, tape recorders, and a compact disk player to the input of the digitizer. While Hippo claims that the input will accept a wide range of levels, we found that only the lowest levels from the earphone jack worked at all. When we monitored the

The promise of a real orchestra inside your computer is irresistible.

Practically speaking, samples do not sound very good when their pitch is adjusted more than about a half-octave above or below the original recording. This is a limitation shared by most sampling instruments, and the Hippo digitizer is no exception. When connected to a MIDI keyboard, the system works monophonically. That is, only one key can be pressed, and one note played, at a time.

What Else Can It Do?

As noted briefly above, although the documentation doesn't mention it, the Atari ST equipped with a Hippo Digitizer can also function as a MIDI "slave" instrument. (For those familiar with MIDI, the software locks the Atari system to MIDI channel #1, and this cannot be changed.) In this configuration, another computer running a sequencer—or MIDI event recorder/player—can control the ST in addition to any number of synthesizers, drum machines, etc. We tried this with a commercial sequencer, the ST, and our Casio CZ-101. With this setup, we managed to generate four voices from the Casio keyboard and a fifth voice from the ST with digitizer, simultaneously.

We were also able to digitize the synthesized sounds generated by the Casio and reproduce them nicely, albeit with an increase in noise for quiet sounds. To capture these synthetic sounds, we fed the audio output of the synthesizer to the input of the digitizer, clicked on the DIGITIZE button on the Atari screen, and pressed middle C on the Casio keyboard. When we played the sounds back, we were scarcely able to tell the difference between sounds generated by the digitizer and those produced by the synthesizer itself.

One disappointment with the system, however, was its inability to store and play more than a single sound from the keyboard. Most digital sampling instruments allow several sounds to occupy

memory and be played from different locations on the keyboard. For example, the territory below middle C might sound like a plucked guitar, while notes played above the center would sound like a xylophone. This is called keyboard *splitting*, and it really shouldn't have posed a major problem for Hippo's software designers, given certain limitations. This should definitely be included in a future software upgrade.

Of course, the Hippo ST Sound Digitizer is not meant to be a professional performance instrument, but more of a sound "lab" with which users can acquaint themselves with the principles of sound sampling.

Then again, Wendell Brown, creator of the Digitizer, has bigger things on his mind. He has created another company, Nilford Laboratories, to develop a stereo (two channel), 16-bit version of the digitizer that he says will rival the most serious digital musical instruments available today—instruments like the Emulator, Kurzweil, and the fabled Fairlight music computer which sells for hundreds of thousands of dollars.

Brown says the 16-bit version will retail for considerably more than the 8-bit model (\$1995), and will be marketed through Hybrid Arts (11920 Olympic Boulevard, Los Angeles, CA 90064, (213) 826-3777), a well-known developer and marketer of MIDI software and products for ST computers.

Sound from the 16-bit version, claims Brown, will exceed the quality of a compact disc and be highly manipulatable, both via provided software and through four programmable digital filters. It will be polyphonic, capable of playing 12 simultaneous notes, and keyboard splits are already part of its design. The device has already been causing tremors in the professional music world where, Brown says, the Pointer Sisters band has been using a beta-test unit in on-stage performances.

Enthusiasts and experimenters whose aspirations are somewhat lower will probably be more than satisfied, however, with the basic 8-bit Hippo Digitizer system. In either case, the promise of a real orchestra inside your computer—a dream unattainable, until now—is irresistible. The sound of personal computer music has changed forever. ■

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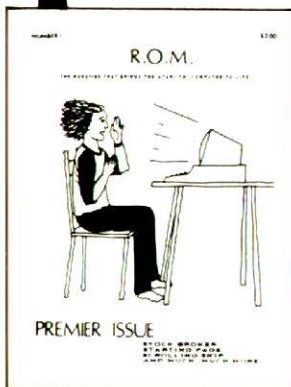
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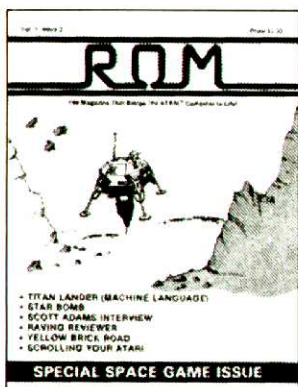
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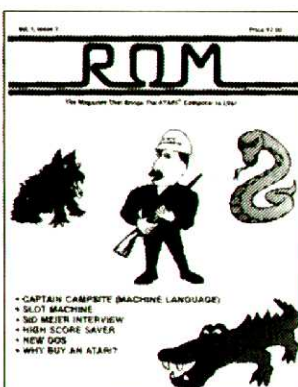
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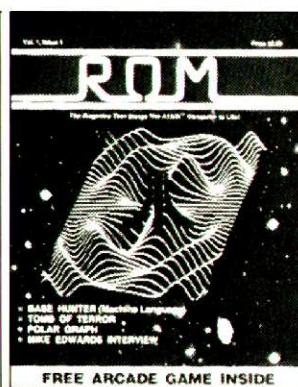
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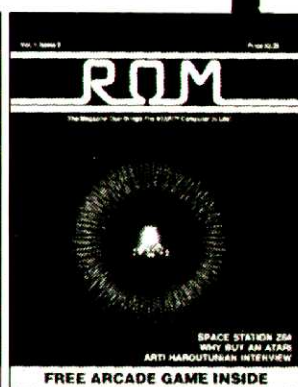
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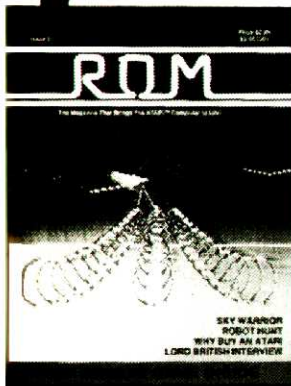
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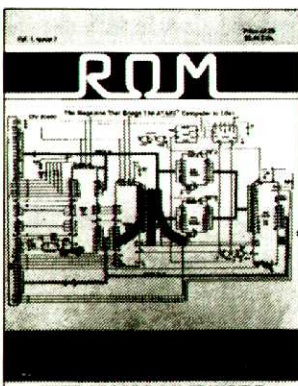
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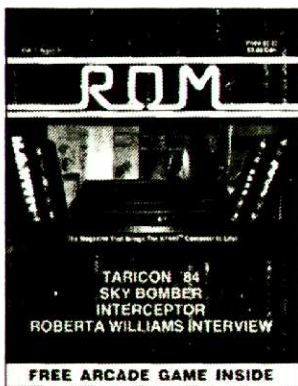
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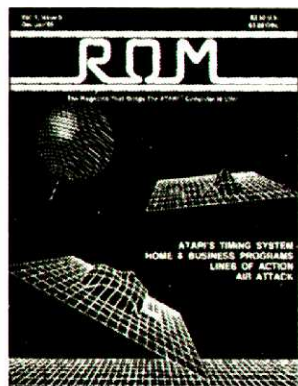
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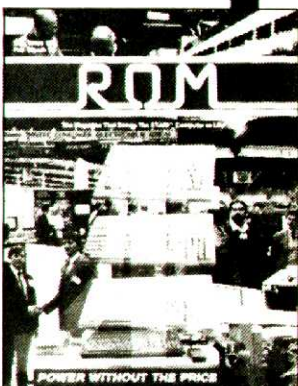
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