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COMPUTE!'s Atari ST DISK & MAGAZINE

June/July 1988

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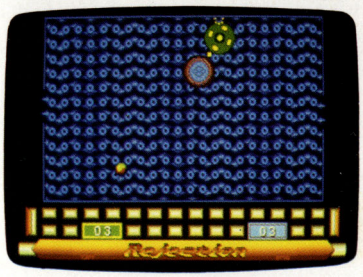

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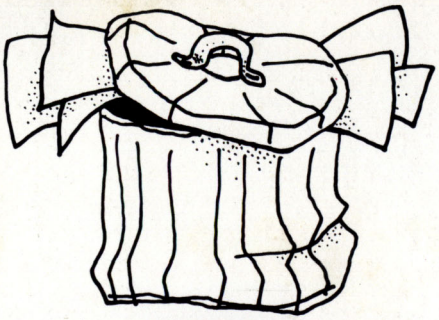

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Keno

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The Editor's View

A game machine? Yes, it is. Never deny it.

The ST excels as a game machine because it has great graphics and sound, a fast processor, and lots of memory.

What does the international-standard business machine do? It prints characters on the screen, often in green or amber only. It beeps. And it has 640K (divided into 64K banks called *segments*) instead of the fully accessible megabyte of my 1040ST. If you want to add better graphics, more color, better sound, joystick support, MIDI interfaces, or extended/expanded memory to the business machine, you have to buy expensive cards for the business machine. The extras aren't extras on the ST; they're standard features.

The business machine can handle serious matters like processing words, manipulating records in a database, and calculating in rows and columns. But, come to think of it, so can the ST.

The next time someone asks, *What, an Atari? Is it a game machine?*, say this: *Of course. It has everything you'd want in a business computer, but it's more than just another boring business computer. It also has the fun stuff you need for playing games.*

If you haven't guessed by now, there are three themes for this issue: games, games, and more games.

The first program you should run from the accompanying disk is "Rejection," which might possibly rank as the best action game ever published in these pages. Another winner is "Keno," an adaptation of the Las Vegas game of chance. Philip Nelson weighs in with the definitive in-depth article about the many great games available commercially. Three reviews round out our coverage of games.

One more game-related topic: If you're a programmer who has wondered how to move sprites (player/missile graphics) around the screen, check out "Blitting Around," a useful tutorial on the subject. Even if you're not a programmer, you're bound to enjoy the "Moon Boink" graphics demo.

We hope you have as much fun reading this issue as we did putting it together.

Todd Heimarck, Editor

The "Desktop Organizer" Bug

As numerous readers have discovered by now, the calendar in the Desktop Organizer program (April 1988) correctly adds the 29th to any February that falls in a leap year, but it doesn't compensate by moving March 1st ahead a day. As a result, every month from March to December is off by one day.

Fortunately, the bug was easy to fix. Unfortunately, the corrected program couldn't be included on this issue's disk because Desktop Organizer takes up 130K, and there isn't that much space available on the disk. If you want the corrected version of the program, send us two things: a freshly formatted single- or double-sided disk and a self-addressed return envelope (preferably a cardboard disk mailer or photo mailer). Send the disk and mailer to Desktop Organizer, COMPUTE! Publications, 324 West Wendover Avenue, Greensboro, North Carolina 27408. We'll copy Desktop Organizer to your disk. We'll pay for the return postage. We'll include the Pascal source code, too.

We regret any inconvenience this bug may have caused our readers.

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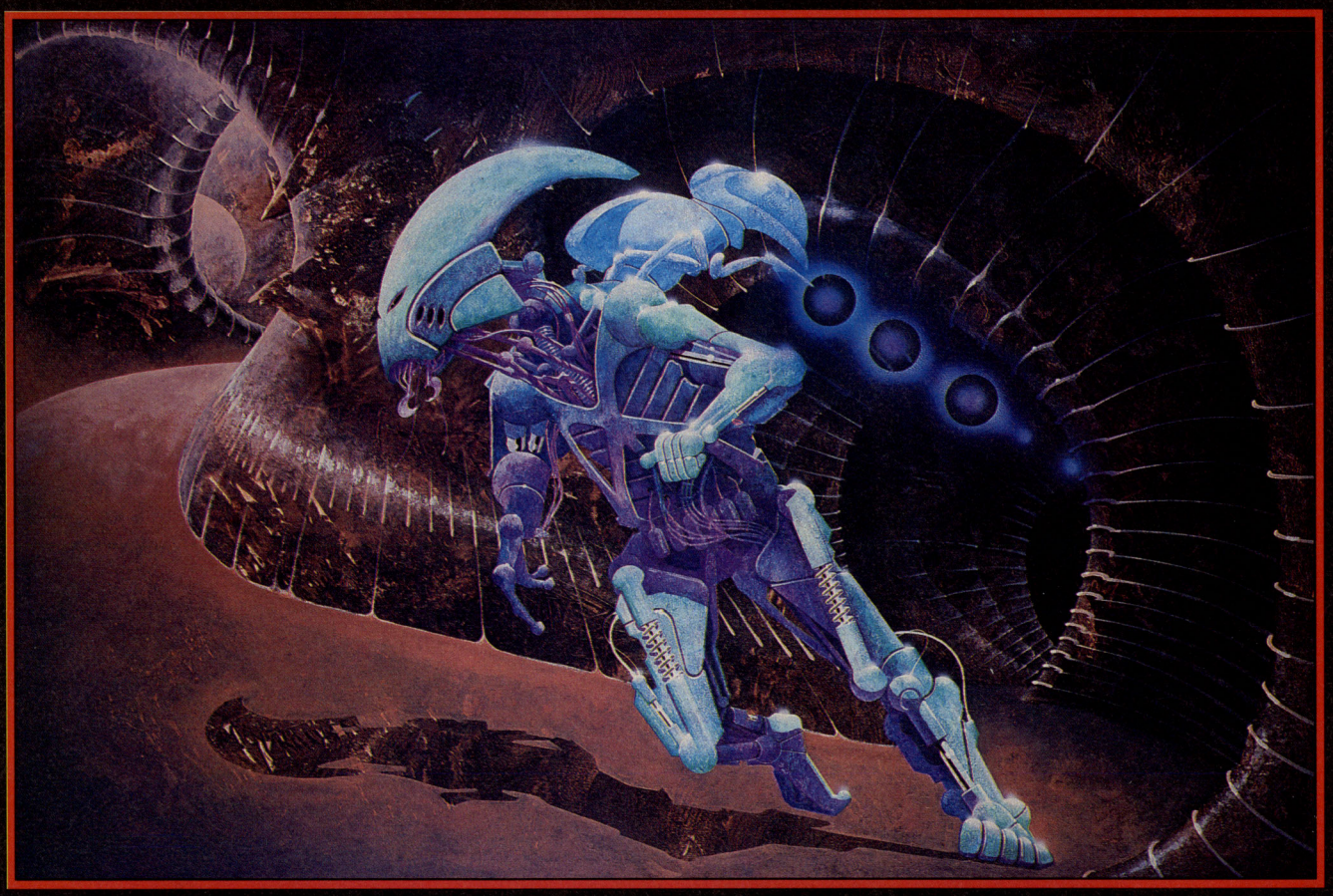

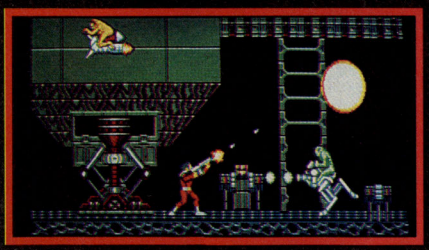

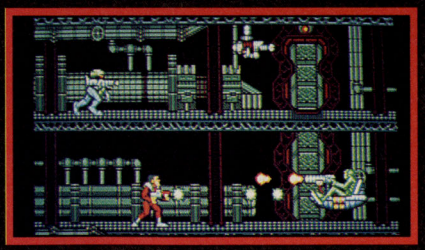

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Taken Aback by Abaq

Atari's announcement of its new Abaq computer has given rise to a lot of confusion. Some people have called the Abaq a *NeXT clone* (referring to Steve Jobs' workstation of the future, which has so far remained in the future). Others have said that it will be a super-emulation machine that will run both MS-DOS and Macintosh software. Still others think of it as a standard UNIX machine. The reason for the confusion is that few people are familiar with the concept of a parallel-processing, RISC design "transputer." All of that is likely to change in the near future, however, as more manufacturers jump on the bandwagon. Recently, a company called Microway has announced the Quadputer, a transputer add-in board for IBM PCs based on the same processor used in the Abaq. Unlike the Abaq, however, this board has an IBM-style price. Equipped with four 20-MHz transputer processors and 4–16 megabytes of memory, the Quadputer is priced in the $8,000–$13,600 range. And that doesn't include the PC or clone in which to put it. Parallel-processing transputer add-ons have also been announced for machines such as the Mac II and Sun workstations. So it looks as though Atari hasn't really chosen a "weird" or "nonstandard" technology for its next generation of computers, but perhaps has anticipated the wave of the future. At a substantially lower price, of course.

Development of the Helios operating system for the Abaq is being spearheaded by Dr. Tim King, formerly of MetaComCo. MetaComCo is chiefly known to ST owners as the company that is responsible for the much-criticized ST BASIC interpreter. Most people forget, however, that the first ST BASIC was produced in a very short period of time under extreme pressure (everybody who bought the ST when *Logo* was the only piece of software available, raise your hand). A new version of ST BASIC should be available by the time you read this (it has already started shipping with the Mega ST computers), and is said to be a much better indicator of the quality of MetaComCo's programmers.

Atari is making the first shipment of Abaqs available to developers, along with an unfinished version of the operating system. Expect the Abaq to be available at your local computer store by the end of the year.

Emulators, Multitasking, and the Monochrome Blues

One of the things people like to do most on the ST is to make it do something it was never designed to do. Some of these attempts have been more popular than others. Emulators such as the Magic Sac, *PC Ditto*, and *ST Transformer*, which make the ST run programs written for the Mac, IBM PC, and eight-bit Atari line, respectively, have met with widespread acceptance. Other software, such as the Idris operating system which turns the ST into a multitasking, mostly text-based Unix system, has not met with great acclaim. Although Atari seemed to embrace Idris at first, it now appears that it will take a more standoffish approach. Without official endorsement, it seems unlikely that such a radical departure from GEM will go anywhere.

Two of the features that ST users have been most interested in adding to the ST are multitasking and multimode operation using only one monitor. Two programs, *K-Switch* and *Juggler*, have already been released in an effort to address the first need. These programs are modeled after *Switcher* on the Mac, a program which lets you load multiple programs into memory and instantly switch between them. Both ST programs, however, have problems working with software that isn't "well-behaved." Well-behaved software follows the rules laid down by the manufacturer for maximum compatibility between operating system versions. Unfortunately, no matter how often manufacturers warn software developers that unless they follow the rules, new revisions of the operating system will "break" their programs, developers are still tempted to take shortcuts that boost performance and give them a competitive edge. Even with well-behaved software, however, programs like *Juggler* are said to slow down performance noticeably.

A new program is being developed which will allow context-switching without slowdown, but there's a catch. Hybrid Arts has been said to have in the works a program called *HybriSwitch* that will allow switching between programs so long as the programs have been written with special

Sheldon Leemon & The Editors

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hooks for *HybriSwitch*. So far, only Hybrid Arts' own programs have been so written, and it seems questionable at best whether many other companies will take the trouble. The best bet for multitasking still seems to be the rumored Atari GEM rewrite, although Atari has so much to keep it busy that we probably won't see that appearing any time soon.

Another item that many ST owners want is a single monitor that will run both monochrome and color software. Although nobody has come up with such a monitor yet, there is a $34.95 program developed by Hypertek Silicon Springs (distributed in the U.S. by X-Press Publishing). It makes an interesting attempt to solve those monitor blues. Called *OmniRes*, it allows people who have only one ST monitor to run programs designed for the other. Although about 90 percent of color programs can be run on a monochrome monitor using *OmniRes*, they do not necessarily run at full speed. *OmniRes* allows you to choose different emulation modes, ranging from a tiny black-and-white screen to full-screen size with 16 gray scales. The larger the screen and the more gray scales, the more *OmniRes* slows down. Since *OmniRes* doesn't allow you to switch emulation modes without rebooting, you may find it somewhat inconvenient to try the different modes with a certain program. Because of its relatively low price, however, a lot of monochrome monitor owners are bound to try it just to see how the other half lives.

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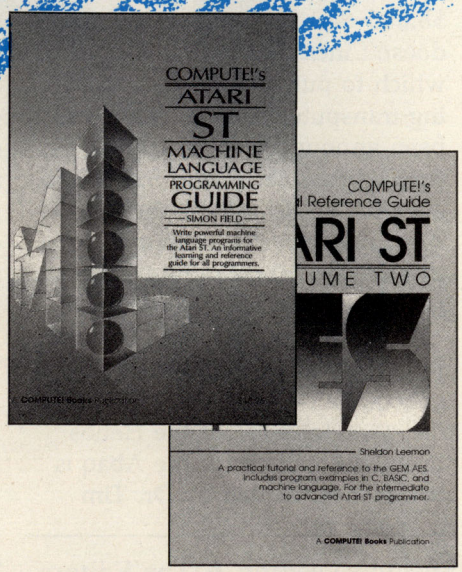

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The Ear

News, rumors, and gossip heard around the ST community.

Advertising the ST

In some local California markets, **ST ads** appeared on television during the **Winter Olympics.** Although these ads were presented by the Federated Stores (which are owned by Atari), they may be a **preview of things to come**. Meanwhile, Atari's promotion of its XE game system continues unabated. Some Atari execs are now calling the computer-turned-videogame the *XE-GS* (GS for *game system*), perhaps a **subtle dig at the Apple IIGS**. Atari has been pretty successful at selling the XE as a game machine, even though this version **costs more** than the computer. This is a complete turn-around from the old days, when the sales pitch was "**why buy a videogame system** when you can get a computer that plays great games for a little more money?" The answer appears to be that retailers such as Toy "R" Us find it **easier to sell videogames** than to sell computers.

Famous ST Users

Sharp-eyed Olympics fans report that a profile of figure skater (and premed student) **Debi Thomas** briefly showed her at the keyboard of an ST. If you looked closely, she seemed to be running *1ST Word*. The built-in MIDI port makes the ST popular among professional musicians. **Peter Gabriel, Natalie Cole, Foreigner, B.B. King, Tangerine Dream,** and **The Pointer Sisters** are reported to be very happy with their ST-based MIDI systems. STs also handle sound at **Disney Studios, Universal Studios,** and **The Cosby Show**.

Before and After

This spring, Atari reported 1987 net sales of **$363.8 million** (compared to $258.1 million in 1986) and an operating income of **$72.0 million** (versus $48.2 million in 1986). Wait, there's more. Those figures cover **just the computer/videogame markets.** When you add in the figures from the Federated Group, a chain of electronics stores acquired by Atari in 1987, the total sales for the company as a whole rise to a healthy **$493.2 million**. Operating income falls to **$65.6 million**, however. Sam Tramiel is quoted in a press release as saying Atari expects the Federated Group to **lose money** through the third quarter of 1988.

Power Without the Price, If You Can Wait

At the recent CD-ROM conference sponsored by Microsoft in Seattle, **Apple** announced a **CD-ROM player** for the Macintosh and Apple II computers. Its price is **under $1200** and it should be on dealer's shelves **by the time you read this**. At the same conference, **Atari** was showing its own CD-ROM player for **under $600**. It might be available this **summer or fall**.

Who Starts These Rumors?

Is Atari working with Apple co-founder Steve Jobs to develop an **inexpensive Macintosh clone?** Is Jobs's company NeXT working on an operating system for Atari's Abaq transputer? An Atari insider **laughed** when asked about the **rumored Tramiel/Jobs collaboration**. "It wasn't true; it isn't true; and it won't be true."

A New Factory?

One of the reasons Atari has cited for its **lackluster promotion** of the ST in the United States has been its inability to meet demand for the machine abroad. The theory: Why create more demand for the machine when we **can't build them fast enough** now? Of course, the **obvious answer** to that problem is to **build them faster**, and it appears that Atari may be doing just that. There has been some recent movement within the company to add **new U.S. manufacturing facilities** to relieve the overworked Taiwan plant. These plans are said to include the purchase of an existing **California** facility, as well as the construction of a new, totally automated plant in **Nevada**. Other sources point to possibilities in the **Lone Star State**. When asked whether Atari plans to build a new U.S. plant, a spokesman said *yes*. Where will it be? "One of the 50 states. We're not ruling anything out."

Was He Dressed Like a Banana?

Marty Herzog, formerly of Batteries Included and now an executive at Atari Canada, made an appearance several months ago on the syndicated game show "Split Second," which is hosted by **Monty Hall.** Herzog explained to us that contestants press a button to ring a buzzer, answer trivia questions, and win money. He took second place and won "a couple of hundred dollars."

Create Your Own Animated Jet Streams on the Weather Map

Lately we've been hearing a lot about *desktop video* on machines like the Macintosh II and Amiga, but although few people realize it, the ST is a pretty hot desktop video machine itself. Although Tom Hudson's *CAD-3D* program started out just as a static 3-D object designer, the addition of the *Cyber Studio* program to *CAD-3D 2.0*, and the *Cyber Control* program, have turned it into a full-fledged 3-D animation package. These 3-D graphics are just the thing for creating animated logos and titles for video production work. Many video houses in the San Francisco Bay Area are using this system to prototype graphic designs. By doing the preliminary work on the ST, they can avoid using the million-dollar graphics computers until it's time to produce the final product.

In the near future, the Catalog's Cyber series will get even more heavily into video, with the *Cyber VCR* program. This assembler/editor program will allow the user to create an electronic edit decision list, as well as to actually control the tape transport on some Sony Super-Beta editing decks. In addition, it will allow scripting of transitions between static images created with one of the many paint packages. This means that you can create elaborate presentations using professional video transitions such as fades, dissolves, and wipes. Expect to see this package sometime in late spring or early summer.

One problem with using the ST for video work has been producing good NTSC composite video output. Only one of the 520 models has a composite output. Practical Solutions, of Tucson, Arizona, has recently come out with (for want of a better term) a practical solution. It's called VideoKey, and it converts the RGB signal from any ST to a composite signal. This $100 unit makes it affordable to get Atari graphics onto videotape. The same company is also rumored to be working on a genlock interface, which would make it possible to overlay ST graphics onto a live video image. In fact, several genlock interfaces are rumored to be in the works. JRI in San Francisco will soon offer an internal genlock interface for about $400. Since this unit requires some modification of the ST, it must be installed by the manufacturer.

A Dinosaur's Extinction

Speaking of BASIC, a while back we mentioned the efforts of a company called DTACK Grounded to establish a new standard for microcomputer BASIC interpreters. The DBASIC interpreter was optimized for speed to the point that it totally disregarded the GEM operating system and the TOS filing system. So while DBASIC programs were fast, they didn't use windows with pull-down menus, or even a mouse, and DBASIC program disks couldn't be read from by the normal ST operating system. Hal Hardenbergh, president of the company and well-known iconoclast, acknowledged that his "dinosaur BASIC" bucked the trend of bloated C programs, but forged ahead anyway with a plan whereby he gave away the software and tried to sell the manuals and support.

Unfortunately for Hal, the conventional wisdom proved to be true in this case—almost nobody seemed to want a totally incompatible BASIC, no matter how fast it was. Recent requests for the DBASIC manual have been met with a form letter stating that DTACK Grounded is no longer in business. The letter goes on to state, however, that this does not mean that the software has entered the public domain. The company has apparently decided to hold on to its rights, just in case mouse-driven windowing systems prove to be a passing fad. After all, you never know when the dinosaur will make a comeback.

Marketing and Support

Atari has also been restructuring its U.S. marketing effort (again) by turning some of its dealer sales effort over to longtime-employee Neil Harris. His territory includes the Northeast, from Maine to Virginia and west to the Dakotas. One of the moves that Harris plans in order to bolster dealer support is to eliminate sales of the ST and the Mega through mail-order discounters. This strategy has been credited with much of Apple's success in attracting and keeping a loyal dealer base. It appears as if the new policy has already had some effect, as many mail-order houses appear to be out of stock as far as the ST is concerned. Domestic production of ST computers, along with a renewed sales effort and a curtailment of mail-order sales, may signal a shot in the arm for U.S. sales of the ST.

What about support after the sale? If you buy an ST in Canada and send in the registration card, Atari Canada mails you 12 pages of information: a list of user groups, recommended books and magazines, prices for Atari hardware and software, a list of third-party software, and a long list of Atari retailers. When asked if the U.S. branch of Atari has anything similar, a spokesman answered, "Yes, but the user has to request the information." ST

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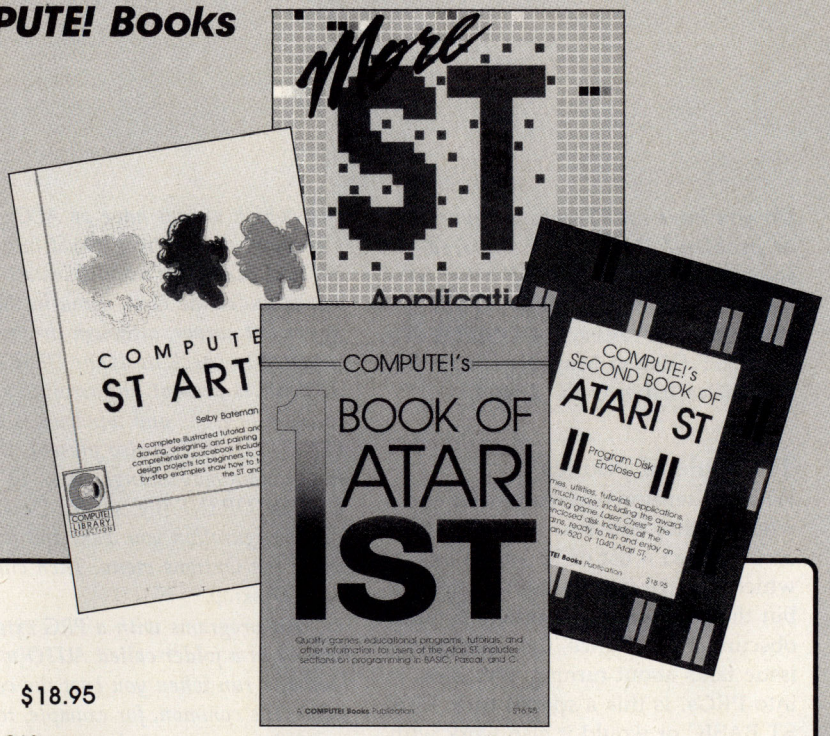

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Readers' Feedback

Do you have an ST-related question or problem? Have you discovered something that could help other ST users? We want to hear from you. Write to ST Feedback,* COMPUTE!'s Atari ST Disk & Magazine, *P.O. Box 5406, Greensboro, NC 27403.

The Rule of Names

Which extensions are automatic and what do they cause to happen? I have accumulated a list of 33 extensions, of which 9 or 10 have become familiar, but the purpose of the others is quite obscure. For instance, the February issue talks about turning BAS files into PRGs. Is this a special trick with ST BASIC or would it also work with *GFA BASIC?*

Walpole Davis
Malta

Runnable programs have one of three extensions: PRG, TOS, or TTP. If you double-click on any other type of file, you'll see the form alert that asks you to Show, Print, or Cancel. PRG files can use routines from the Graphics Environment Manager (GEM), which means they may include windows, menus, sliders, dialog boxes, and other features of GEM. Both TOS and TTP programs use the TOS operating system, but not GEM, so they're basically text-only programs. TTP (TOS Takes Parameters) programs such as ARCX.TTP ask you to type something—a filename or other parameters—before they run.

The question about turning BAS files into PRGs didn't involve renaming files or changing extensions—you can do that from the GEM Desktop. The question was really about changing a BASIC program into a stand-alone runnable program that didn't require the user to load BASIC first. This process is called compiling *and, yes, there is a compiler for* GFA BASIC *that will create stand-alone PRG files. Incidentally, the "Keno" game in this issue was written in* GFA BASIC *and then compiled.*

When you boot the computer, various other files come into play. Accessories, which always have an ACC extension, automatically load into memory and run. They usually install themselves under the Desk menu in the upper left corner, although they're not required to check in. If the DESKTOP .INF file is present, the resolution and location of icons and windows is set (if CONTROL.ACC is also present, the default colors may change, also). To create a DESKTOP.INF file, set the Desktop to the configuration you want and pull down the Options menu. Then click on Save Desktop.

All programs with a PRG extension located in a folder called AUTO will load and run when you boot the computer. It's common, for example, to put ramdisk programs or date- and time-setting programs in AUTO.

Other common extensions include the following:

ARC	*Compressed archive file*
ASC	*ASCII text files*
BAK	*Backup files*
BAS	*BASIC source code*
C	*C source code*
DAT	*Data files*
DEF	Resource Construction Set *definition file*
DOC	1ST Word *text files (sometimes also documentation files)*
H	*C header files*
INF	*Information*
LST	GFA BASIC *listing in ASCII*
MOD	*Modula-2 source code*
O	*Intermediate (object) files from C or other languages*
NEO	NEOchrome *picture files*
PAS	*Pascal source code*
PC?	*Compressed* DEGAS *pictures*
PI?	*Uncompressed* DEGAS *pictures*
RSC	*Resource files (menus and dialog boxes for programs)*
S	*Assembly language source code*
STW	ST Writer *text files*
TXT	*ASCII text files*

Tips for Copying Disks and Files

I'm hoping you can help me with a small problem. I upgraded my 520ST to one megabyte. When I use a ramdisk and try to copy an entire disk by dragging the drive A icon over to the ramdisk icon, I get a message that says *The source disk is not the same type as the destination disk.* I've tried changing the size of the ramdisk, but it didn't help. I also tried writing to the company that makes the memory board and supplied the ramdisk software, but they have ignored my letters.

Tom Prossima
Redwood City, CA

There's a simple solution to your problem. Say the ramdisk is installed as drive C, and you want to copy everything from A to C. Don't drag the A icon to the C icon. Instead, open up the ramdisk directory by double-clicking on the C icon. Next, drag the A icon to the directory window. This performs a file-copy operation instead of a diskcopy, but the effects are the same. It doesn't matter how big the ramdisk is, as long as there's enough room for the files you're copying.

If you're making a backup, you can then insert the backup disk in A, open the directory window for A, and drag the C icon into the window for A.

There are a few other copying tricks you may wish to try. You can selectively copy files by clicking in the window, but not on top of a file (in medium- or hi-res, click in the left margin; in low-res, click between the filenames). While holding down the left button, drag the mouse, to create a broken-line box. When you release the button, all files within the box are selected. Then click and drag those files to another directory or to a drive icon (or to the trashcan for a multiple file delete).

To copy files that aren't next to each other, click once on the first file. Then hold down the Shift key on the keyboard and single-click on any other files you want to copy. The first shift-click selects a file, and the second deselects it. This trick also works on lassoed files; you can click and drag to select a block of files, as described above, and then shift-click to turn off the ones you don't want to copy.

One final trick: You may select a file from an inactive window by holding down the right mouse button and then clicking with the left button.

Managing a Classroom, Part 2

In the February issue was an inquiry regarding classroom-management software for teachers. There is help for teachers who use an ST, and it's rather good. It's called *Grade Book ST*, by Robert J. Scott, Micro Electronic Arts, 10 Redwood Rd., Brantford, Ontario, Canada N3R 3M1. I bought it at a local computer store. The software works well. The README file explains everything satisfactorily, guiding the user quickly into the task at hand. While this is a no-frills piece of software, it does work and fills the need.

Will Hickman
Cottonwood, CA

I am writing in response to the letter that appeared in the February issue. There is a program that helps teachers keep track of assignments and grades for their students. It is called *Teacher's Pet* and is available from Iliad Software, 495 W. 920 North, Orem, UT 85047. It tracks grades, graphs the progress of the class, allows for weighting of assignments, and prints out progress reports for the students.

I am a software engineer; my wife is a teacher. Because there was no software available for educators when I bought the ST, I wrote *Teacher's Pet*. Released in November, 1987, it is beginning to appear on dealers' shelves. It can also be ordered directly from the distributor.

Steven D. Olson
Provo, UT

In the February issue, a reader asked about software relating to classroom management. Although I don't know of any commercial software, I do know of two public domain programs. Send $4 plus $2 shipping and handling to Brad Roltgen Enterprises, 6210 N. First St., Suite 130, Fresno, CA 93710. Ask for disk #140. This disk contains a gradebook program with room for 100 students and 100 exams. Or send $3 for a catalog on disk to Accusoft, P.O. Box 02214, Columbus, OH 43202. Disk #270 has a gradebook program and general-purpose quiz program. Disks are $2.95 each with no shipping charge, but there's a $10 minimum order. Both of these public domain suppliers have an unbelievable amount of software.

Doralee C. Fagan
Leesville, LA

Thanks for the information. We contacted the distributors to get prices for the commercial gradebook programs. Grade Book ST *is $29.95 (U.S. dollars), and* Teacher's Pet *is $49.95.*

A Strange Answer?

Your response to the teacher with a classroom-management problem confused me. I don't understand the third solution. Why find software that runs on another computer, since the STs will not run these programs? Please elaborate.

My particular problem is that I can find few titles in educational software for preschool to high school grade levels. I've checked in magazines, visited retailers, and tried to contact user groups in my area. The magazines list only Apple, Mac, and IBM software. The retailers have a very small selection. And there aren't any user groups in my area. Where can I find out what's available in educational software for the ST?

Erma J. Thomas
Fort Bliss, TX

In retrospect, the third suggestion does seem awfully odd. The point about finding software for other computers is valid, however. The "Gradebook" program for the Atari eight-bit computers, previously published in COMPUTE! Magazine, *won't run as is on the ST. But it was written in BASIC and could probably be converted for use on the ST by a reasonably good programmer.*

In addition, there are a wide variety of software and hardware emulators for the ST, including the Atari 400/800/XL/XE, CP/M, IBM, and Macintosh. If you've been reading the reviews in previous issues, you'll understand that some of these emulators are very good, while others are slow and rather inadequate. An educational program for the Mac wouldn't run on a standard ST, but if you bought the Magic Sac emulator, it would.

If you're not interested in converting programs or using an emulator, you could write a letter to the software company that supports other computers. Ask if they plan to release an ST version of the program that interests you. The worst that could happen is that they'd say no.

To answer your second question, Atari has published a book called International ST Software Catalog, *which lists about two dozen titles in the educational software section. Ask your Atari dealer if he or she has a copy of the book. You should also be able to find a variety of programs in the public domain. If there's no Atari user group in your area, you could start your own. Or you could find a user group that will let you order their public domain disks by mail.*

Changing Resolutions in Pascal

I would like to know how to change from medium- to low-resolution in *Personal Pascal*. Programmers who use *GFA BASIC*, Modula-2, and machine language already have the solution from programs published in your magazine ("Slideshow," "Basketball Sam & Ed," and "Atom Smasher").

Alain Dussault
Laval, Quebec

The Setscreen( ) *function controls three screen parameters: the logical screen location, the physical screen location, and the resolution.*

The logical screen is the area of memory where VDI and other system routines go to draw lines, circles, and other graphics. The physical screen is the one that's actually displayed on the monitor. Thus, you can draw on an invisible logical screen and then switch the physical screen to accomplish page-flipping. Both the logical and the physical screen must lie on an even 256-byte boundary.

The resolution can be one of three numbers: 0 for low res, 1 for medium res, and 2 for hi res.

To use Setscreen( ), *call XBIOS routine #5, passing it three values: the location of the logical screen (a 32-bit signed longword), the location of the physical screen (also a longword), and the screen resolution (a 16-bit integer in the range 0–2). If you want to change only the resolution and leave the screen where it is, set the screen locations to −1 (hexadecimal FFFFFFFF).*

You may run into some problems with XBIOS #5, however. It's possible to change resolutions with Setscreen( ), *but GEM doesn't know that the screen has changed. Therefore, any GEM routines you call may give you strange results. For example, in low resolution, the mouse's x coordinates are limited to the range 0–319, since there are only 320 pixels of horizontal resolution. Therefore, if you switch to medium resolution, which is 640 pixels across, GEM won't know and will keep the mouse on the left half of the screen.*

Checking for Numeric Input

I have been working on a C program to generate D & D role-playing characters. But there's a small bug I cannot figure out. I'm trying to get the

program to read numeric input, but it crashes if the user types a letter. Here is the routine:

```
inkey( )
{ int tmp=0;
  scanf( "%d", &tmp );
}
```

I'm also trying to fix it so the Return key doesn't need to be pressed, but that has me stumped, too.

Stuart Welch
Logan, NM

Instead of using scanf( ) *to get a numeric value, we'd suggest sending the input to a string and then converting the string of characters to a numeric value. Most languages offer conversion functions. In BASIC, the* VAL *command changes a string to a numeric value. Modula-2 offers* ConvertToInteger. *In C, you'd use the function* atoi( ), *which means "ASCII to integer."*

To get a single keypress, substitute Bconin(2) *for* scanf( ). *It waits for a key to be pressed and then exits, returning the ASCII value of the key. Since the characters 0–9 have ASCII values of 48–57, you'd need to limit the range and then subtract 48 to convert to an integer value. Here's one way to do it in C:*

```
do
{ tmp = Bconin(2);
  tmp -= 48;
} until( (tmp>-1) && (tmp<10) );
```

GFA Color Manipulation

How can I use the XBIOS #7 (Setcolor) function in *GFA BASIC* to find the individual RGB settings for a color?

Al Tucker
Westbury, NY

Many of the Extended Basic Input/Output System (XBIOS) functions are very handy and they're easily accessible from GFA BASIC.

*XBIOS #7 (*Setcolor*), is one such useful function. Many programmers use* Setcolor *in a loop to read the current palette and save it in an array before changing colors in a program. Then, when the program ends, the original palette may be restored. It tends to annoy users when they exit a program and end up with a garishly colored Desktop.*

The GFA BASIC *syntax for* setcolor *is* ***XBIOS(&H7,W:pal_num,W:color)****. The variable* pal_num *is a word length value which corresponds to the hardware palette number. Valid numbers include 0–3 for medium-resolution screens or 0–15 for low-resolution screens. In high resolution, only 0 and 1 are possible. The variable* color *is also a word which represents a 16-bit value with the code for the color:*

Bits	*Color*
0–2	*Blue Value*
4–6	*Green Value*
8–10	*Red Value*

Only values between 0 and 7 are valid. For instance, the bit pattern for setting a color to white would be 011101110111 (binary) or 777 (hexadecimal).

Setting the color to a negative value ensures that the color is not changed and the value in that hardware register may be assigned to a variable:

```
a%=XBIOS(&H7,W:col_pal,W:-1)
```

To retrieve the individual RGB settings, logically AND the returned value with the appropriate mask to strip off the undesired bits. (Use AND &H700 for red, AND &H70 for green, and AND &H7 for blue.) Some further manipulation is necessary to break it down even further to the individual settings, as shown in the following program.

```
DO
  CLS
  REPEAT
    INPUT "Color Register Number";i%
  UNTIL i%=>0 AND i%<=15
  CLS
  a%=XBIOS(7,i%,-1) AND &H777
  PRINT "Color Register ";i%
  r%=a% AND &H700
  g%=a% AND &H70
  b%=a% AND &H7
  PRINT "Red = $";LEFT$(HEX$(r%),1)
  PRINT "Green = $";LEFT$(HEX$(g%),1)
  PRINT "Blue = $";LEFT$(HEX$(b%),1)
  PRINT "Press any key to continue....."
  a%=INP(2)
LOOP
```

Unfortunately, the XBIOS Setcolor function and the VDI color functions don't use the same palette numbers. Since GFA BASIC *uses VDI to assign colors for DEFFILL and COLOR commands and uses XBIOS 7 for the* SETCOLOR *command, a problem exists if you change a color using the XBIOS function and then attempt to use that color. It won't be the color you expect. The following chart illustrates the two systems for numbering colors:*

XBIOS Color Number (SETCOLOR)	*VDI Color Number (DEFFILL)*
0	0
1	2
2	3
3	6
4	4
5	7
6	5
7	8
8	9
9	10
10	11
11	14
12	12
13	15
14	13
15	1

A second method for obtaining the RGB settings of a color in GFA BASIC *is to use the VDI function* vq_color( ) *as illustrated below. The values for the RGB settings will be in the range of 0–1000 and will correspond to the values used by DEFFILL and COLOR.*

```
DO
  CLS
  REPEAT
    INPUT "Color Register Number";i%
  UNTIL i%=>0 AND i%<=15
  @vq_color(i%)
  CLS
  PRINT "Color Register ";i%
  PRINT "Red = ";r%
  PRINT "Green = ";g%
  PRINT "Blue = ";b%
  DEFFILL i%
  PBOX 100,100,150,150
  PRINT "Press any key to continue..."
  a%=INP(2)
LOOP
'
PROCEDURE vq_color(i%)
  DPOKE CONTRL,26          !Opcode
  DPOKE CONTRL+2,0         !Points in ptsin
                            array
  DPOKE CONTRL+4,0         !Points in ptsout
                            array
  DPOKE CONTRL+6,2         !Length of intin
                            array
  DPOKE CONTRL+8,0         !Length of intout
                            array
  DPOKE INTIN,i%           !Color index
  DPOKE INTIN+2,1          !Get color values
  VDISYS
  r%=DPEEK(INTOUT+2)       !Red Value
  g%=DPEEK(INTOUT+4)       !Green Value
  b%=DPEEK(INTOUT+6)       !Blue Value
RETURN
```

Correction for Desktop Organizer

Despite warnings in "Readers' Feedback," "How to Use the Disk," and the article describing "Desktop Organizer," several readers tried to run Desktop Organizer directly from the April disk. The program tries to create data files when it first runs. There's not enough room on the April disk for the files, so it doesn't work until you copy the program to a disk that has some extra space.

In addition, there's a serious bug in the calendar section. During leap years, the program adds the twenty-ninth to the February display, but does not move March 1 ahead one day. Thus, all leap year months from March through December are incorrect. See "Editor's View" in this issue for details. ST

Directory Search

Philip I. Nelson

Sooner or later, every programmer needs a routine that finds a specific file on a disk. This tutorial explains how to call the GEMDOS functions for locating disk files. It also explains how you systematically search through subdirectories using recursion—the process whereby a function calls itself, like a snake eating its own tail. A sample program is included in the article and on the disk.

Many programs have to access data files, resource files, printer drivers, or other information. However, before you can open up a file, you have to know its name and location. You have to find it on the disk. Two GEMDOS functions allow you to search the current folder for a file, using either actual names or pattern-matching wildcards. But what happens when you venture beyond the current directory to search through other folders?

It's easier than you might imagine. There's no need to poke around the dark caves of file allocation tables and directory structures. You can use the GEMDOS functions to search for files or for subdirectories. Whenever you find a subdirectory, you repeat the process until you've checked every nook and cranny on the disk.

Perhaps the best way to learn about directory searches is to look at an actual program. You'll find a program called FIND.TTP on the accompanying disk. It does exactly what its name implies.

You give it a filename, and FIND tells you exactly where the file is located. That's handy for searching through any disk, especially a hard disk, which may contain dozens of directories and hundreds of files.

FIND can search an entire disk drive or only specified subdirectories. And because it supports wildcards, the program can also locate groups of similarly named files—a very powerful feature.

Building FIND.TTP

The program listing is written in C, and it compiles without modifications under *Megamax C, Alcyon C,* or *Mark Williams C.* The source code contains plenty of comments, so it should not be difficult to convert it to any other language, such as Pascal or *GFA BASIC,* that supports direct GEMDOS calls and recursion. Compile and link the program as a TOS-takes-parameters (TTP) application.

When GEM runs a .TTP program, it presents a dialog box in which you can enter any information that the program might require to run. When the dialog box appears, enter the name of any file you wish to find. If the file is located in a directory at or below the level of the current directory, FIND prints its path and name; otherwise, FIND tells you that the file can't be found. Press any key to return to the desktop.

Climbing the Directory Tree

FIND normally begins its search in the current directory and searches all directories at or below the level of the current directory. If you are in the root, or highest-level, directory of the disk, FIND searches every directory, climbing up and down the directory tree until it determines there are no more directories to search.

There may be times, though, when you want to start the search at some directory other than the current one. For instance, you may be in the root directory, but wish to start the search at a lower directory level. Or, you may be in a lower directory, but want to begin at the root directory and sift through the entire disk.

You can specify a starting directory by entering two names in the .TTP dialog box: the name of the directory where the search should begin, followed by the name of the file to seek. Before it starts the search, FIND checks to make sure that the given directory exists; if it doesn't, FIND prints a message and aborts the search.

When you include a starting directory name, be sure to include a blank space between the directory name and the name of the file you seek. (If you omit the space, FIND will interpret the command as a bogus filename and probably tell you that it can't be found.) To specify the root directory, supply a directory name consisting of a single backslash (\ ) character.

Playing Your Wildcards Right

In addition to a full, literal filename such as SORT.DOC, FIND allows you to search for name patterns using the asterisk (*) and question mark (?) wildcard symbols. Wildcards have the same

FIND Command	Search For:
SAMPLE.C	All files named SAMPLE.C, beginning at the current directory
LANG \C \SRC SAMPLE.*	All files with a base name of SAMPLE and any extension, beginning at the directory LANG \C \SRC
\ *.BAK	All files with the extension .BAK, beginning at the root directory
SA???.*	All files with a five-letter base name that begins with SA, and any file extension, (SASSY.PRG, SANTA.O, SATYR.DOC, and so on), starting at the current directory

meaning here as in the standard GEM file selector. For instance, the name *.TTP matches every filename with the extension .TTP, while the name S??T.P?3 matches names such as SORT.PI3, SNIT .PC3, and SWAT.P33.

The result is a highly flexible searching tool. The table above shows some typical FIND commands and their effects. (The command in the left column is what you type in the GEM dialog box when you run FIND.TTP.)

Next Things Next

To understand how the program works, you'll need to know something about two pairs of GEMDOS functions. The first two, named *Fsfirst( )* and *Fsnext( )*, are designed specifically for directory searching. Both functions can use wildcards. The *Fsfirst( )* function initiates a search, using the file specification and attribute(s) that you supply. The *Fsnext( )* function is simpler: It simply continues a search that you previously began with *Fsfirst( )*.

Like all system functions, *Fsfirst( )* and *Fsnext( )* return a code that indicates success or failure, and they return more specific results in some cases. Both functions also use a special data zone known as the *disk transfer area* (DTA) buffer. When a file is found, the DTA buffer is filled with several pieces of information about the file, including its size, time and date of creation, and full name. This last item is particularly useful in wildcard searches, which may uncover many matching files.

The other two GEMDOS functions are *Fgetdta( )* and *Fsetdta( )*. The first function gets the location of the existing DTA buffer, and the second tells GEMDOS to use the area you specify as the current DTA buffer.

Simple Strategy

Now you know enough to follow FIND's basic search strategy.

- Create a new DTA buffer for the search.
- Begin the search with *Fsfirst( )*.
- Continue the search with *Fsnext( )*, printing the name of each matching file as it appears.

That's the scheme for searching a single directory. Recall, however, that FIND has the intriguing ability to walk up and down the directory structure of a disk, following a particular path as far down as it can, then backing up to the last level where it found more than one directory, and continuing the search where it left off.

At first blush, you might

```
/* FIND.C */
/* Recursive file finder for the Atari ST */

#include <osbind.h> /* Definitions for GEMDOS functions */

#define NORMAL 7 /* File attribute of a normal file */
#define SUBDIRECTORY 0x10 /* File attribute of a subdirectory */
#define EVERYTHING "*.*" /* Pattern that matches every name */
#define BACKUP ".." /* GEMDOS name for "next higher directory" */
#define CR 13 /* Carriage return */
#define LF 10 /* Line feed */

int match;
struct dta
  {
  char reserved[21];
  char attribute;
  int time;
  int date;
  long size;
  char filename[14];
  };

main(argc, argv)
int argc;
char *argv[ ];
{
  int x;
  char path[80];
  match = 0;
  if(argc < 2) /* You didn't type anything to search for */
    { /* Print helpful prompt and exit */
    Cconws("Usage: [path] <file specification>");
    Cconin( );
    return(0);
    }
  if( argc == 2 ) /* You supplied one name */
    Find( argv[1] ); /* Assume it's a filename, and search for it */
  else
    { /* You supplied more than one name */
    Dgetpath( path, 0 ); /* Treat first name as a path spec... */
    if ( (x = Dsetpath( argv[1] )) < 0 ) /* ...and try to go
    there */
      {
      Cconws("Invalid path: "); /* You supplied an invalid path */
      Cconws(argv[1]); Cconout(CR); Cconout(LF);
      Cconws("Usage: [path] <file specification>");
      Cconin(); return(0); /* Terminate */
      }
    else
      { /* We were able to move to the desired directory */
      Find( argv[2] ); /* Find the second name */
```

imagine that directory-walking requires some fancy data-handling. A naive approach would be to map the entire directory structure of the disk, store that information in memory, and then search each directory by hand, as it were.

In fact, there's a much simpler method. If you examine the source code, you'll see that the program's main section performs the entire search with just one call to a function named *Find( )*. If you turn your attention to the *Find( )* function, you'll see that it, too, invokes a function named *Find( )*. This peculiar structure is known as recursion.

The Snake That Swallows Its Tail

In computer programming, the term *recursion* refers to a procedure that has the ability to call itself. Recursion is useful in any case where you need to perform the same task over and over, but you want each new invocation of the procedure to build on the results of the last.

Posed in the abstract, that concept may seem pretty slippery. Let's walk through the *Find( )* function to see how recursion works in practice. The function begins by saving the address of any preexisting DTA buffer and creating a new DTA buffer. It also discovers the current directory path so we can print the names of any files that we find during the current invocation.

At this point, *Find( )* invokes the *Fsfirst( )* function, passing the file specification that it was provided, and specifying a file attribute of 7 to signal that we're looking for normal GEMDOS files. If *Fsfirst( )* turns up a match, we enter a loop that prints every matching filename in the current directory, using *Fsnext( )* to continue the search until no more matches appear.

Once the current directory has been exhausted, we invoke *Fsfirst( )* again, this time supplying a filename of "*.*" to match anything at all and an attribute of 16 (0x10) to signal that we're seeking a directory. The effect is to search for any directory at or below the current directory.

If the *Fsfirst( )* call reveals another directory, we move into that directory to continue the search there. This is done by calling the GEMDOS function named *Dsetpath( )*, supplying the directory name that we uncovered with *Fsfirst( )* a moment earlier.

Here's where snake swallows its own tail—or, to be more precise, where the actual recursion takes place. Having moved into a new directory, we call the *Find( )* function again, passing along the same name that we originally got from the .TTP command line. At this point, the program's flow of execution returns to the beginning of the *Find( )* function. Again, we save the address of the existing DTA buffer, create a new one, record the current path, and search for the named file.

Moving Back Up

We continue this process over and over—*Find( )* calls *Find( )*, which calls *Find( )*, and so on—until we have moved as far as possible down the directory tree. Once we hit bottom, we begin to move back up, reversing the chain of invocations and exiting the *Find( )*

```
        Dsetpath( path ); /* Restore previous path when finished */
        }
      }
    if(match == 0) /* Then we didn't find any files matching 'name' */
      {
      Cconws("Can't find: "); Cconws(argv[1]);
      }
    Cconws("---- Press any key ----"); /* The pause that refreshes */
    Cconin();
  }
  /* Find function */
  Find(name)
  char *name; /* The filespec we're searching for (may include wildcards) */
  {
    int x;
    struct dta *olddta, newdta; /* We need two dta buffers */
    char path[80]; /* And a place to store the existing pathname */

    olddta = (struct dta *) Fgetdta();
    /* Save the existing dta buffer */
    Fsetdta(&newdta); /* Make a new dta buffer */
    Dgetpath(path, 0); /* Save the existing path */
    if( strlen(path) != 0 && path[strlen(path) - 1] != '\\')
      strcat(path, "\\"); /* Paste a '\' onto path if needed */

    x = Fsfirst(name, NORMAL); /* Begin searching for 'name' */
    while(x == 0) /* Continue as long as we find matches */
      {
      match++; /* We found a match */
      Cconws(path); /* Display this file's path... */
      Cconws(newdta.filename); /* ...and its name */
      Cconout(CR); Cconout(LF);      x=Fsnext();
      /* Continue the search... */
      } /* No more files to find here */

    x = Fsfirst(EVERYTHING, SUBDIRECTORY);
    /* Search for any directory */
    while(x == 0) /* Continue as long as we find matches */
      {
      if( (newdta.attribute & SUBDIRECTORY) && newdta.filename[0] !=
       '.')
        { /* We found a valid lower directory */
        Dsetpath(newdta.filename); /* Go down to subdirectory */
        Find(name); /* Search for name there */
        Dsetpath("..."); /* Move back up */
        }
      x = Fsnext(); /* Continue the search... */
      } /* No more directories to find here */

    Fsetdta(olddta); /* Restore previous DTA buffer as we exit */
  }
```

function as many times as we invoked it.

Look at the spot where the *Find( )* function invokes itself. Immediately after we return from the call to *Find( )*, we call the *Dsetpath( )* function, supplying the ".." filename to move back up one level in the directory tree. Then we call *Fsnext( )* to search any directories that are still accessible at this level. A complete search must include directories at the same level as the starting directory, as well as those lower in the tree.

When no more directories can be found, we exit the loop and call the *Fsetdta( )* function to restore the DTA buffer that was in use when we entered the *Find( )* function. This important step allows us to continue any previous, uncompleted search. If we omitted it, the program would climb down the first available directory path until it hit the bottom, then terminate without searching any other paths.

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Stop Me Before I Program Again!

There are many ways that you might enhance this simple demonstration program. An easy improvement would be to get a filename from within the program rather than through the .TTP command dialog. On a single-drive system, this little addition would let you search a disk other than the one that contains the FIND program itself (that is, you could change disks before entering the target name).

With only a little more effort, you could add the ability to search a drive other than the current drive. You could run FIND from drive A, for example, and tell it to search drive C.

On a larger scale, you might decide to make FIND into a general-purpose "sweep" utility that has the same searching capability but that does more than simply print the name of each found file. When it finds a match, the program might give you the option to delete the file, rename it, copy it elsewhere, or perform other DOS functions.

To afford maximum flexibility, you might then give the program two modes: an interactive mode in which it asks you what to do with each file (and lets you treat individual files differently), and a noninteractive mode which charges ahead and performs the same operation on every match it can lay its hands on.

After you finish adding those enhancements, you could go all the way and make the program a full-fledged GEM application that takes advantage of the mouse, menus, dialogs, or other GEM features. For instance, I can imagine a nifty sweep utility that lives in a GEM desk accessory and offers a whole array of FIND-based functions, perhaps in a nicely designed GEM dialog. That might provide grist for a future column, in fact—provided that one of you doesn't finish the program first. Once you start programming this machine, it's hard to stop. **ST**

Stashcan

David Archibald

If you've ever accidentally deleted an important file (and who hasn't?), you'll find this utility essential. It creates a new trashcan from which you may recover any file you've deleted. It runs from the Desktop or from the AUTO folder. For all STs, all resolutions.

A couple of weeks ago, I did something stupid.

I was cleaning up one of my disks by lassoing groups of old files and dragging them to the trashcan. What's so stupid about that? Nothing is, except I accidentally grabbed a couple of files I meant to keep. Just one little slip of the mouse, and I was watching two extra files disappear into the trashcan. Once they enter the black hole of the trashcan, they're gone for good. What goes in, never comes out. I did have backups, but they were a few days old.

If I owned an Amiga or a Macintosh, I'd be able to open up the trashcan and retrieve the deleted file. But I don't and I can't.

I won't be making that mistake again; I've taught my ST a new trick. My files no longer disappear for good after entering the black hole—not after I've run "Stashcan."

A New Folder Called TRASH

The instructions for using Stashcan are very simple. The program is named STASHCAN.PRG on the accompanying disk. You may run it from the GEM Desktop or place it in the AUTO folder on your boot disk if you'd like it to be installed automatically when you turn on your ST. It's very short, so it doesn't take very much memory away from the system.

What does it do? If you (or a program you're running) delete a file, the file is automatically moved to a folder named TRASH.

The program is transparent to other programs and the operating system; they don't notice it's there. It is also invisible to the user (you and me), and it requires no further input after initial start up.

Stashcan works with all types of drives: hard disk, ramdisk, single-sided, and double-sided. Regardless of which drive you're using, deleted files are copied to the TRASH folder. If you delete an entire folder, Stashcan saves only the files in the folder, not the folder itself.

The TRASH folder is always found in the root directory. If it doesn't already exist, Stashcan creates it.

If the program encounters any sort of problem which prevents it from saving the deleted file, it rings the console bell three times in rapid succession. This tells you that the file is gone forever—that it was not saved. Fortunately, this happens very rarely. When it does, it generally means Stashcan could not find the file being deleted, so it couldn't put the filename into the TRASH folder. (And the reason for that is usually a typing error in the filename or a program trying to delete a backup file before saving a new copy, but no backup copy exists.)

Emptying the Trash

But how do you get rid of a file, when the program insists on copying every deleted file to the trash folder? There's one exception to the rule. Stashcan copies every file except when the file is located in the trash folder itself. When you really want to delete a file, just drag the file from the trash folder to the trashcan icon. It's gone for good. If you're in a hurry, you can drag the entire trash folder to the trashcan, and delete all of the files in the folder at once. Remember, though, these deletions are permanent.

You may wonder what happens when you delete a file and there's already one in the trash folder with the same name. The thought of opening the trash folder on my Megamax disk and finding 20 copies of ERRORS.OUT didn't appeal to me at all (do I really make that many mistakes?). So, simply said: Newest replaces oldest. The file in the trash folder is deleted forever, and the newly deleted file replaces it. By the way, this is the only time Stashcan automatically scratches a file from the trash folder without your doing it.

You should periodically clean up the trash folders on your disks, weeding out the files you're sure you no longer want. Although these files are out of sight, they do continue to take up disk space. Why waste space on a file you deleted six months ago and then never thought about again? I usually open the folder and if I don't see anything interesting, I'll just drag the whole folder to the trashcan. If you're saving something to a disk and you get an error message telling you the disk is full, check the trash folder. You can probably find a least a few files that you can delete to free some disk space.

There is one drawback to this program—speed. Stashcan slows down the delete process by about 30%, which isn't as bad as it sounds. On the aver-

age, it takes about a second or two to delete a file on a floppy disk. Stashcan adds perhaps half a second to that time.

How It Works

Stashcan is a terminate-and-stay-resident program written in assembly language. It redirects the GEMDOS TRAP #1 vector to itself (saving the original address, of course), then lies dormant waiting for the GEMDOS File Delete (Fdelete) command to be sent.

When Fdelete appears, Stashcan searches each folder in the pathname for a match to the next name in the pathname, and it continues doing so until it matches the last name in the pathname (which is the name of the file being deleted).

Say, for example, you delete a file with the pathname A: \DEVELOP \C_PRG \OLDFILE.C. Stashcan first searches the main directory for DEVELOP. After getting the starting sector for the DEVELOP folder, it then searches the DEVELOP folder for C_PRG. Once it has C_PRG's starting sector, it searches the C_PRG folder for OLDFILE.C. When Stashcan realizes that OLDFILE.C is the final name in the pathname, the name of the file being deleted, it saves OLDFILE.C's directory entry. Next, the TRASH folder is created if it doesn't already exist, and a file named OLDFILE.C is created in it. The new directory entry is replaced with the one saved from OLDFILE.C so that they now point to the same file. Finally, OLDFILE.C's previous directory entry is marked as deleted, and Stashcan is finished.

What Stashcan does, in a nutshell, is find the directory entry for OLDFILE.C and move it to the trash folder.

Program Flow

First, the get_dev_name routine is called. This routine gets the drive letter and pathname of the file being deleted. If there's no drive or pathname, the default drive and path are used.

Next, the program checks if TRASH is the first name to appear in the pathname. If so, the file being deleted is in the trash folder, and since we want to be able to delete these files, the program exits to the system routine for deleting files.

The program calls the look_for_name routine, which searches the disk's directory or a folder for a filename. This routine in turn calls four other routines: format_name, read_sector, find_name, and next_sector.

Format_name extracts a name from the pathname and then formats it in the style used by the disk's directory as follows: The filename always contains eight characters; the extension has three. If the filename and extension do not fill their entire field, they are padded with spaces. The filename starts at position 1, and the extension always starts at position 9.

Read_sector reads two disk sectors (one cluster).

Find_name searches a directory cluster for a match to the name from format_name. When a match is found, the file's attribute byte and its starting sector and cluster are saved. The starting sector is used when the filename being matched is actually a folder's name from the pathname.

Next_sector calculates a file's next sector number from its File Allocation Table (FAT) entry. This routine is used when the program is searching a folder for a filename, because, unlike the main directory, a folder is treated as if it is a file, and its next sector can be anyplace on the disk.

When the look_for_name routine is done, it will have set up a variable that points to the start of the filename's directory entry in the sector input buffer. This assumes of course, that the file was found. Otherwise, the bell rings and the program exits. A copy of the file's 32-byte directory entry is then saved.

Using standard GEMDOS routines, the program creates the trash folder if it doesn't exist, deletes a duplicate file in the trash folder if it already exists, and then creates a file in the trash folder with the same name as the soon-to-be-deleted file. (If an error occurs during any of these GEMDOS calls, the program terminates and you'll hear the three dings.)

For a split second, two files with the same name exist on the disk. One is in the trash folder, and the other is the original file about to be deleted.

The program now deletes the original file, by replacing the first character of its filename in its directory entry (which is still in the buffer), with $E5. The directory's cluster, with the modified filename, is then written back to disk using the program's write_sector routine. As far as the computer is concerned, the file is now deleted, because any file name that begins with $E5 is a deleted file. But it hasn't really been deleted, because the clusters assigned to it in the FAT have not been freed for other files to use. In other words, the file is still there, but it no longer has a directory entry to lead the computer to it. The program will fix that next.

Once again, look_for_name is called to find the file's name. This time though, we know it will be found in the trash folder, so we start the search there. Using the pointer set up by look_for_name, the program replaces the filename's 32-byte directory entry with the original file's entry that was saved earlier. And once again, it uses the write_sector routine to write the cluster back to disk. The file exists again, but now it's in the trash folder.

The program's last act is to return to the caller with the d0 register zeroed, which means no error occurred.

The source code, named STASHCAN.S, is found on this month's disk in a special compressed format within the compressed file SOURCE.ARC. See "Uncompressing Source Files" elsewhere in this issue for instructions on reading the source code. **ST**

Blitting Around

Robert M. Birmingham

The ST doesn't have sprites, but GEM's built-in raster operations make it easy to move sprite-like objects around the screen. This tutorial explains how to use raster operations in your own C and assembly language programs. Three sample programs are included on the disk.

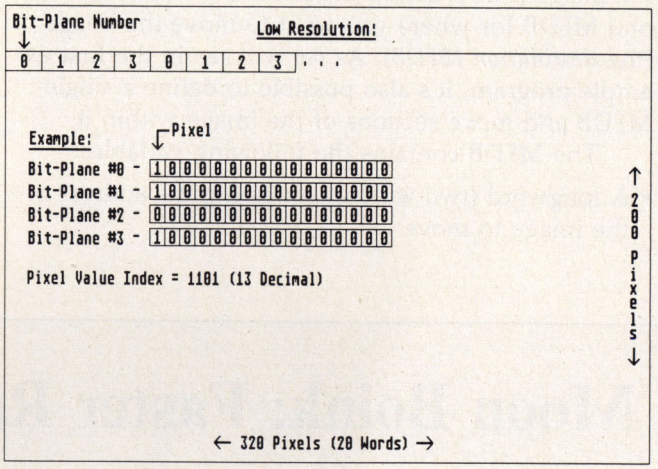
A raster operation, commonly called a *bit-block transfer* or *bitblit*, is a convenient and flexible way of moving a block of memory from one location to another. For example, you might use a bitblit to move a rectangular shape around in screen memory to produce animation for games. Bitblits are also useful for scrolling graphics and text. Mega STs have their own blitter chip that's dedicated to handling bitblits. On the 520 and 1040, bitblits are handled in software, so they're somewhat slower (see the accompanying article "Moon Boink" for more information).

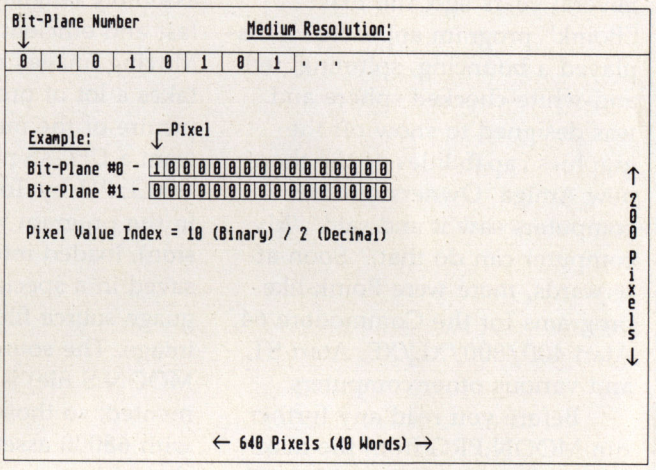
Before digging into the details of blitting, we should review how screen memory works on the Atari ST and how the different resolutions are handled.

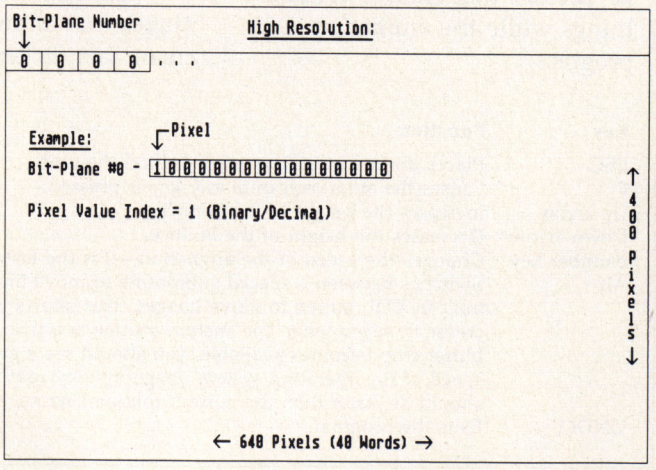
The Atari ST divides screen memory into sections called bit planes. The resolution currently in effect dictates how many bit planes are available. Additionally, the number of bit planes determines how many colors can be displayed on the screen at one time:

Resolution	Bit Planes	Number of Colors
Low	4	16
Medium	2	4
High	1	2

The ST uses an interleaved bit-plane system. In the 16-color low-resolution mode, the four bit planes are numbered 0–3. The first word (a *word* is two bytes—16 bits) in screen memory represents the first word of bit plane 0. This is followed by words for bit planes 1, 2, and 3. Together, these four words (64 bits) determine the color of the first 16 picture elements *(pixels)* in the upper left corner of the screen. This pattern continues for all of screen memory, with consecutive words of each bit plane controlling 16 bits on the screen. To determine the color of a pixel, a bit is taken from the same position in each of these bit planes and is combined to be used as a color index for that pixel. This interleaved system is similar in the medium-resolution mode except for the fact that only two bit planes are available. Since the high-resolution mode has only one bit plane, the interleaved system doesn't apply.







Getting Ready to Blit

The first step in performing a bitblit is to define the characteristics of the image that you want to manipulate. You do this by creating a *Memory Form Definition Block* (MFDB). The MFDB contains parameters that define the memory address of the image to move, the width and height of the image, and other important information. In most cases, you define an MFDB for the area from which you want to move the image (this is called the *source MFDB*) and a second MFDB for where you want to move the image (the *destination MFDB*). As we will see in the first example program, it's also possible to define a single MFDB and move sections of the image within it.

The MFDB contains the following variables:

- A longword (two words) containing the address of the image to move
- A word containing the width of the image in pixels
- A word containing the height of the image in pixels
- A word containing the width of the image in words
- A word containing the bit-plane format flag
- A word containing the number of bit planes in the image
- Three words initialized to 0 (reserved for future use)

To make things clearer, let's go through an example which moves an area of a medium-resolution screen from one position to another. Assume that a graphics workstation has been opened and that there is already an image being displayed on the screen. The first step is to set up our MFDB so it reflects the

Moon Boink: Faster Raster Operations

Robert M. Birmingham

Several years ago, the first "Boink" program appeared. It displayed a bouncing, spinning, red-and-white-checked sphere and was designed to show off the graphics capabilities of the then-new Amiga. Owners of other computers saw it and said, "My computer can do that." Soon afterwards, there were Boink-like programs for the Commodore 64, Atari 400/800/XL/XE, Atari ST, and various other computers.

Before you read any further, run MOON.PRG from the disk. "Moon Boink" begins with a title screen which shows you a list of keypresses that change certain things while the animation is in progress:

Key	Function
ESC	Places the moon in front of or behind the grid.
P	Pauses the animation until any key is pressed.
Up arrow	Increases the height of the bounce.
Down arrow	Decreases the height of the bounce.
Number key	Changes the speed of the animation—0 is the fastest, 9 is the slowest.
Alt	Switches between a special subroutine to move images quickly and the built-in VDI routine to move images. This allows you to compare the increase in speed when the custom routine is active. Additionally, when the blitter chip becomes available, you should see a great improvement in the speed of the operating system image-moving routine. Theoretically, it should be faster than the custom routine I wrote.
UNDO	Exits the program.

How It Works

Moon Boink was written in 68000 assembly language to make it as fast and efficient as possible. Moving images around the screen takes a lot of processor time. The picture of the moon was taken from a *DEGAS* picture called WALL.PI1 by Tom Hudson (used in the program with his permission), loaded into *NEOchrome,* and saved in a special assembly language source file containing the image. The source code (in the MOON.S file) is thoroughly commented, so those of you familiar with 68000 assembly language should have no problem following the program.

Basically, there are two techniques that allow this program to create fast flicker-free animation: preshifted graphics and frame buffering.

Preshifting for Speed

Moon Boink originally used the operating system function that moves images from an area in memory to the screen (the Line-A Blit function described in the accompanying article). The major problem with Line-A Blits is that they can handle images of different sizes and shapes. The image may fall not just on a word boundary, but on any pixel contained horizontally within a word. Because of this, the computer has to shift the image to be displayed, to put it in the proper position. This shifting takes a lot of time and ties up the microprocessor, dramatically affecting the speed of the animation. For a large image such as the moon, a Line-A Blit is flexible, but it's also slow.

To see exactly how slow a Line-A Blit is, press the Alternate key while the program is running (press the 0 key to set it to the highest possible speed). If you happen to own a Mega ST with a blitter chip, try running the program with the blitter turned off.

characteristics of a medium-resolution display.

In C, we can define a structure for an MFDB. A structure is simply a way to handle several different types of information as a single unit. This is how a structure for an MFDB is defined:

```
typedef struct fdbstr
{   long fd_addr;
    int fd_w;
    int fd_h;
    int fd_wdwidth;
    int fd_stand;
    int fd_nplanes;
    int fd_r1, fd_r2, fd_r3;
} FDB;
```

The Memory Form Definition Block structure is already defined in the GEMDEFS.H header file. It is duplicated here for the sake of clarity.

Next, you declare an MFDB structure called *screen:*

```
FDB screen;
```

We can now access the individual fields in the structure called *screen* and initialize its parameters as a medium-resolution display:

```
screen.fd_addr = Physbase( );   /* Physbase( ) returns the screen address */
screen.fd_w = 640;              /* image width in pixels          */
screen.fd_h = 200;              /* image height in pixels         */
screen.fd_wdwidth = 40;         /* image width in WORDS           */
screen.fd_stand = 0;            /* bit plane format               */
screen.fd_nplanes = 2;          /* # of bit planes                */
screen.fd_r1 = 0;               /* reserved argument              */
screen.fd_r2 = 0;               /* reserved argument              */
screen.fd_r3 = 0;               /* reserved argument              */
```

Note the period in the middle of the variable names. Recall that *screen* was declared as an *FDB* type of variable and that *FDB* was previously defined as a structure. To access the *fd_addr* variable within the *screen* structure, you call it *screen.fd_addr,*

I bypassed the shifting problem by writing a routine which would do all of the calculations for shifting in advance—before any animation was actually done. Since the screen memory on the Atari ST is made up of 16-bit words this meant that I had to have 16 copies of the same image in memory—each one corresponding to one of the bit positions within a word. Add to this a special routine to move one of these preshifted images from memory to the screen quickly, and the result is some very fast animation.

Frame Buffering

Although the animation routines were efficient, they weren't fast enough to create flicker-free animation. If the program happens to be drawing or erasing the image while the raster beam of the monitor is updating the portion of the screen containing the image, the result is visible flicker. To alleviate this problem, I used a technique called *frame buffering* (also known as *page flipping*).

Instead of drawing the image on the screen and having the electron beam mess things up, Moon Boink puts the image on an alternate screen and then (when the new screen is ready) it changes the pointer to the screen. While the current screen is being displayed, we can erase and redraw on the other invisible screen, changing the image's position to create movement, and then flip back to this screen. With this method, no flickering occurs.

To allow the image to move above the grid, I had to resort to cheating. If you place an image on top of a background image (in this case a grid made up of lines) by exclusive ORing it with the background image data, you will get a third color whenever there is a nonzero pixel in the image and a nonzero pixel in the background. Normally, to solve this problem, you have to clear a hole in the grid the exact same size and shape as the image that you want to place on the screen. This can get pretty complicated and can slow down the animation.

It turned out that in the case of moving the moon, there was an easier way to do this. Since this program runs in low resolution, I had 16 colors available. Color 0 is set to black (for the background) and color 15 is set to blue (for the grid lines). The moon image uses colors 1–7 as various shades of gray. Does this mean we're not using colors 8–14? No. The trick is to imagine what would happen if we simply EORed the moon on top of the grid.

For example, if one of the pixels in the moon image is color 1 and is EORed with the grid which is color 15, it results in a pixel of color 14. If the palette value of color 14 is identical to the palette value of color 1 you will see no difference when color 1 is EORed with the grid lines. Therefore, the color palette is arranged like this:

Color	RGB Value
0	000
1	111
2	222
3	333
4	444
5	555
6	666
7	777
8	color 7
9	color 6
10	color 5
11	color 4
12	color 3
13	color 2
14	color 1
15	007

Now whenever a color 1–7 is EORed with color 15, it will result in a color index where its palette value is the same as the original color's palette value. The above works fine for placing the image on top of the grid lines, but see if you can figure out how I place the moon *behind* the grid when you press the Esc key.

where the period separates the name of the structure from the element inside.

Since the image we are going to be moving is already in screen memory, we don't have to define the image by hand. When defining the image by hand, the image must be manually converted from picture form to a series of numbers. Fortunately, there are several paint programs and utilities available that will take a screen image and convert it to its numeric form for you. When you understand the basics of raster operations, you'll be able to use these programs to create your own custom images.

Before we can move a section of the MFDB we have set up, we first need to define the coordinates of the upper left corner and the lower right corner of the area to be moved. These coordinates are stored as the first four entries in an integer array.

```
/* Top left corner - source rectangle */
xycoord[0] = 0;
xycoord[1] = 0;

/* Bottom right corner - source rectangle */
xycoord[2] = 31;
xycoord[3] = 31;
```

We have now defined a 32 × 32–pixel square located in the upper left corner of our MFDB, which in this case is in screen memory.

The next four entries of the array contain the coordinates of the destination rectangle. Note that this rectangle has the same width and height as the one above.

```
/* Upper left corner - destination rectangle */
xycoord[4] = 100;
xycoord[5] = 100;

/* Lower right corner - destination rectangle */
xycoord[6] = 131;
xycoord[7] = 131;
```

With the MFDB initialized and the source and destination rectangles defined, we can do the actual transfer using the VDI function *vro_cpyfm( )*. (This function is called *Copy Raster Opaque*. Its name comes from the fact that this function copies the same number of bit planes from the source memory area as there are in the destination area, so that the former can be copied pixel by pixel to the latter).

```
vro_cpyfm( handle, 3, xycoord, &screen, &screen );
```

The rectangular area which is at *xycoord[0–3]* will be copied to the screen area defined in *xycoord[4–7]*.

The variable *handle* was returned from the *graf_handle( )* function when the graphics workstation was opened.

Sixteen Ways to Blit

The second argument (the number 3) selects the logic operation to be used by *vro_cpyfm( )*. The logic operation controls how the two rectangles will be combined into the final rectangle. The number 3 tells the function to replace whatever is in the destination rectangle (*xycoord[4–7]*) with what is in the source rectangle (*xycoord[0–3]*), without any fancy AND's, OR's, and so on. There are 16 different logic operations available, which are listed in C reference books as follows:

Mode	Definition
0	DEST = 0
1	DEST = SOURCE AND DEST
2	DEST = SOURCE AND (NOT DEST)
3	DEST = SOURCE
4	DEST = (NOT SOURCE) AND DEST
5	DEST = DEST
6	DEST = SOURCE EOR DEST
7	DEST = SOURCE OR DEST
8	DEST = NOT (SOURCE OR DEST)
9	DEST = NOT (SOURCE EOR DEST)
10	DEST = NOT DEST
11	DEST = SOURCE OR (NOT DEST)
12	DEST = NOT SOURCE
13	DEST = (NOT SOURCE) OR DEST
14	DEST = NOT (SOURCE AND DEST)
15	DEST = 1

If that seems rather confusing, there's another way of looking at it. In any raster operation, there are only four possible combinations of bits. The source bit may be 0 and the destination bit also 0, or the combinations of source/destination bits might be 0/1, 1/0, or 1/1. The sixteen modes of raster operations break down like this:

Mode	Source/Destination:			
	0/0	0/1	1/0	1/1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

The two tables indicate how the logic operation combines a pixel in the source rectangle and the corresponding pixel in the destination rectangle. This produces the new destination pixel. The specified operation is performed on every pixel in each bit plane. As you can see there are quite a few combinations. The best way to understand them is to try them in your own program.

The last two arguments in the *vro_cpyfm( )* function (*&screen* and *&screen*) are the addresses of our MFDBs. The first is the address of the source MFDB and the second is the address of the destination MFDB, which in this case are the same.

Vro_cpyfm( ) is generally used to copy a multiple bit-plane image to a multiple bit-plane destination. GEM also supports a function which copies a single bit-plane image to a multiple bit-plane destination. This can be useful if the image that you want to ma-

nipulate was created on a monochrome screen. In fact, GEM uses a similar method to display icons. This VDI function is called *vrt_cpyfm( )* (Copy Raster Transparent). Using *vrt_cpyfm( )* is similar to *vro_cpyfm( )* except for a few minor details. As an example, let's copy a single bit-plane image from a predefined image array to an area of a medium-resolution display.

The first step is to define the monochrome image. This will simply be a filled box 16 pixels wide and 16 pixels high.

```
int image[16] =
{
   65535,  65535,  65535,  65535,
   65535,  65535,  65535,  65535,
   65535,  65535,  65535,  65535,
   65535,  65535,  65535,  65535
};
```

In the previous example using *vro_cpyfm( )*, we were able to move an image within the same MFDB. This was possible because the source and destination MFDBs had the same number of bit planes. Since we now want to move a single bit-plane image to a multiple bit-plane destination we need to declare and initialize two distinct MFDBs:

```
FDB mono_plane, multi_plane;

mono_plane.fd_addr = image;
mono_plane.fd_w = 16;
mono_plane.fd_h = 16;
mono_plane.fd_wdwidth = 1;
mono_plane.fd_stand = 0;
mono_plane.fd_nplanes = 1;
mono_plane.fd_r1 = 0;
mono_plane.fd_r2 = 0;
mono_plane.fd_r3 = 0;

multi_plane.fd_addr = Physbase( );
multi_plane.fd_w = 640;
multi_plane.fd_h = 200;
multi_plane.fd_wdwidth = 40;
multi_plane.fd_stand = 0;
multi_plane.fd_nplanes = 2;
multi_plane.fd_r1 = 0;
multi_plane.fd_r2 = 0;
multi_plane.fd_r3 = 0;
```

With our image defined and our MFDB structures initialized, all we have to do is define the source and destination rectangles and a couple of other items, and then we're ready to perform the copy.

```
/* upper left corner - source rectangle */
xycoord[0] = 0;
xycoord[1] = 0;
/* lower right corner - source rectangle */
xycoord[2] = 15;
xycoord[3] = 15;

/* upper left corner - destination rectangle */
xycoord[4] = 100;
xycoord[5] = 100;

/* lower right corner - destination rectangle */
xycoord[6] = 115;
xycoord[7] = 115;
```

Finally, we must set up a two-element array which is used to draw the foreground (1 bits) and the background (0 bits). This array and the logic mode used dictate how the image data appears when copied to the screen.

```
color[0] = 3;
color[1] = 0;
```

The following function call can now be used to do the copy.

```
vrt_cpyfm( handle, 1, xycoord, &mono_plane, &multi_plane,
   color );
```

The logic modes for *vrt_cpyfm( )* are different from the ones for *vro_cpyfm( )*. The *vrt_cpyfm( )* function only allows you to use four different logic modes to dictate how the source and destination rectangles will be combined to produce the final rectangle. These are

1 Replace
2 Transparent
3 Exclusive Or
4 Reverse Transparent

The number 1 in the function call above specifies that the Replace mode will be used. Replace mode means that the part of the image that consists of 1 bits will be drawn with whatever color is in the relevant drawing pen. The part of the image that consists of 0 bits will be drawn with the background color, found in pen 0.

The variables *&mono_plane* and *&multi_plane* are the addresses of the MFDBs we set up.

Finally, *color* is the address of the array which holds two numbers. The first, *color[0]*, contains the pen number of the foreground color which will be drawn wherever there is a 1 bit in the source image. The other, *color[1]*, contains the pen number of the background color which is drawn wherever there is a 0 bit in the source image. Note that these are pen numbers, not actual hardware registers.

Two Examples of Raster Operations

VROCOPY.PRG on the accompanying disk demonstrates the use of *vro_cpyfm( )*. It first initializes two MFDBs—one for the image we want to move, and the other for the screen display (adjusted to the current resolution). Next, an image is drawn and copied from the screen into a holding area. After this, the program executes a loop which gets the current mouse pointer position and copies the image from the holding area to the screen. This loop continues until a mouse button is pressed.

The second program, VRTCOPY.PRG, illustrates the use of vrt_cpyfm( ). As in the first program, we simply copy the image (which was defined at the beginning of the program) to wherever the mouse pointer is moved. Each program adjusts itself to the current resolution.

The source code files contained in the SOURCE.ARC file. Their names are VROCOPY.C and VRTCOPY.C. See "Uncompressing Source Files" elsewhere in this issue for instructions on reading the source code. ST

Rejection

Tim Midkiff and Rhett Anderson

Supercharged forces hurl a metallic ball at high speed in this exciting 32-color arcade variation of hockey. Realistic movement and collisions and superb sound effects make this one of the best arcade-style action games we've ever published. Match wits with a friend or take on a computer opponent that adjusts its level of play to suit your abilities. If you want to just sit back and enjoy the graphics, you can even let the computer play against itself. One joystick is required when you play the computer; two when you play a friend. For color systems only.

In a gargantuan stadium, riding a cushion of air, two players face off in the high-speed game of "Rejection." The two opponents, seated in saucer-shaped pods equipped with pulsating magnetic fields, play a high-tech version of hockey. It's a brutal game, mastered only by those with the quickest minds and the truest reflexes. If you feel up to the challenge, strap on a helmet and load Rejection.

At the Controls

Although your pod's controls are rudimentary, the pods themselves are capable of an infinite variety of maneuvers under the guidance of a practiced player. A pod has four rocket thrusters, each designed to propel the pod in a different cardinal direction. Thus, eight different directions can be chosen, depending on the direction in which the joystick is pressed. Since the pods are massive and the game is played on a nearly frictionless surface, the pods continue in their paths long after the thruster controls have been released. By carefully firing the correct thrusters in sequence, movement in any arbitrary direction is possible.

Because of the momentum factor, it may take you some time to become accustomed to the game. Although friction will eventually bring your craft to a crawl if you leave all thrusters off, you'll want to practice stopping at a given location. To brake, thrust in the direction opposite your motion.

Your pod continues traveling in the same direction until you use the thrusters, hit the other player, or hit a wall. It's not possible to hit the metal ball because your pods are floating on a cushion of air and the ball is rolling on the floor. This means the ball can pass underneath your pod.

As if getting around the playing field wasn't difficult enough, you must also keep your mind on the objective of the game: scoring enough goals to be declared the victor. Your ship emits a pseudomagnetic field which affects a ball-shaped puck. Normally, the ball is repelled by this field, but if you press your joystick button, the ball will be attracted instead. Remember, while you're trying to score, your opponent is, too. Both players' fields affect the ball similarly. The forces in this game follow the inverse square law that applies to forces like gravity and magnetism: The closer you are to the ball, the more the field pushes or pulls it.

Your First Game

Rejection is on this issue's disk under the name REJECT.PRG. You may run the game from the disk menu or from the GEM Desktop like any other program. The two-player game requires two joysticks (you need just one if you plan to play the computer). You must also have a color monitor, but it doesn't matter whether you run it from low or medium resolution; the program automatically adjusts the screen.

When making a backup copy of Rejection on another disk, be sure to copy the data file REJECT .DAT, too. The game won't run without the data file. If you store REJECT.PRG in a folder, put REJECT .DAT in the same folder. It takes a few moments for the data file to be loaded and the graphics to be created.

When the first menu appears, you'll be asked to choose whether you want a human or a computer to play the green player. The joystick in port 0 (the mouse port) controls the green player. Use the cursor keys to make your selection and then press RETURN. Next, you'll be asked to choose whether you want a human or a computer player to take the controls of the red pod (joystick in port 1). Finally, you'll be asked if you want to play to 7, 11, or 15 goals. If you want to see a demonstration game before you begin playing, let the computer play both sides.

When playing the game, press RETURN to take a timeout and any other key to continue. Press ESC to start a new game. If you decide that you want to continue the game you were playing, select SAME GAME. Selecting NEW GAME returns you to the selection menus to choose a new game. If you choose QUIT, you'll go back to the GEM Desktop.

At the end of the game, you'll be asked to choose between SAME GAME, NEW GAME, and QUIT. After a game ends, SAME GAME lets you play the same setup as the game before.

Tricks of the Trade

Experienced Rejection players all have their favorite ways of scoring, but to help you get your bearings, here are a few tricks that the top few players have grudgingly given up:

- The simplest way to score is to drag the ball to your opponent's goal and release it. To do this, you must first learn how to carry the ball. Hold down your joystick and approach the ball. As long as you keep the button pressed and keep your speed down, you should be able to carry the ball with you as you move.
- If your opponent is headed toward the goal to score, slam into him as fast as you can. He'll fly away and you'll be left holding the ball.
- Remember to allow for momentum. If you get going too fast, you probably won't be able to slow down in time to counter your opponent's offensive moves.

Tools of the Trade

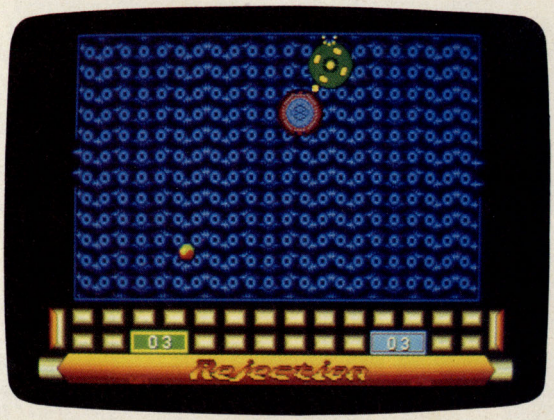
The bulk of Rejection was programmed in Modula-2, a powerful, structured language similar to Pascal. The graphics were designed with the help of *NEOchrome* and *Degas Elite* and captured with the aid of "Snapshot *NEO/DEGAS*," published in the February 1987 issue of *COMPUTE!'s Atari ST Disk & Magazine*. To create the sound effects used in the game, we used "Sound Editor," published in December 1987 (our thanks to Troy Tucker, who helped design the booming, electric sound heard when you first load the game).

The Atari ST is a powerful graphics machine. Unfortunately, since the computer lacks sprite hardware, it's difficult to achieve smooth animation. For Rejection, we used the high-speed machine language sprite-simulation routines originally developed for December 1987's "Basketball Sam and Ed."

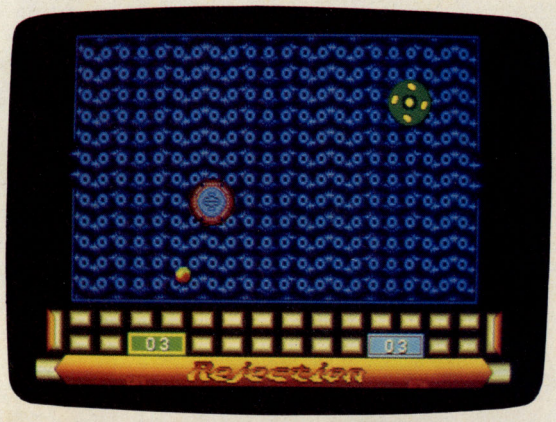
Notes for Programmers

The program requires a larger stack than the 8192-byte default. The stack size should be 10,000 bytes or more. It can be set before linking by using the Modula-2 desk accessory or after linking with the StackSiz utility. The optimization button on the Modula-2 desk accessory should be clicked on before linking.

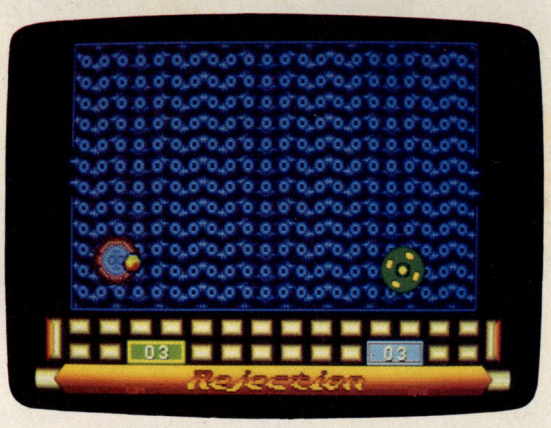
If you're interested in studying how the program works, the Rejection source code is included on the magazine disk in a special compressed format. The main source code file is named REJECT.MOD and is contained within the compressed file SOURCE.ARC. See "Uncompressing Source Files" elsewhere in this issue for instructions on reading the source code. There are four additional modules which must be linked to the main program. Their names are GRAPHICS.MOD, INPUT.MOD, PUFF.MOD, and SCANLINE.MOD. Each of these files also has a corresponding .DEF file.



Sparks fly as the players collide . . .



. . . but Red exploits momentum . . .



. . . to maneuver into scoring position.

Two possible errors you may encounter at the beginning of the program are File Not Found and Out Of Memory. File Not Found occurs if the main program cannot find the data file REJECT.DAT. If this happens, make sure both programs are in the same folder. Out Of Memory occurs if there isn't enough room to load the data file or for the graphics routines to expand the images. Normally, you will only see this error if you have too many desk accessories installed. If you see this error, reboot and make sure there are no desk accessories or ramdisks installed. **ST**

Super ST Games!

Philip I. Nelson

Close-Up Views of Some of the Best

Facing Page: *Defender of the Crown*

Top-to-Bottom: *Leaderboard, Trailblazer, Flight Simulator, Sinbad and the Throne of the Falcon*

The ST is a superlative game machine, no doubt about it.

You can tell because in the three years since its introduction, publishers have released a multitude of games that are intriguing, challenging, and just plain exciting. In this article we'll take a look at a collection of great games for the Atari ST, with an eye toward some past and future trends.

For the sake of organization, I've divided the games into four basic categories:

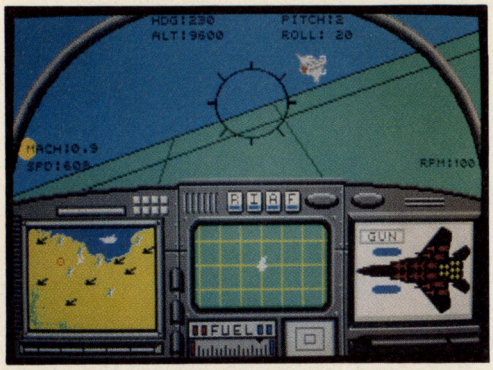
- **Arcade Shoot-Em-Ups**
- **Sport Simulations**
- **Flight Simulators and Flying Games**
- **Adventures**

Enough preamble. Let's plug in our joysticks and look at some games.

Arcade Shoot-Em-Ups

This category is not only one of the oldest, but also one of the most familiar computer game groups. Ask the average person to visualize a computer game, and chances are good that what comes to mind is something with bright, simple shapes whizzing about the screen, accompanied by frequent, noisy laser sounds and explosions. The shoot-em-up dynasty began with games like the seemingly immortal *Asteroids*, which can still be found in arcades. It's spawned a legion of descendants.

But fast, furious action is only one component of a successful shoot-em-up. Constantly increasing difficulty is another key feature. The longer you survive, the more difficult the game becomes. The more often you play the game, the more your skill increases, and the longer you are able to survive. This opens the door to new, even more difficult challenges, and so forth. Some of the newer arcade-style games offer literally hundreds of different screens for you to conquer.



F-15: Strike Eagle

One of the best shoot-em-ups for the ST—or any other micro, for that matter—is *Starglider*, marketed by Firebird and written by Englishman Jez San. In this game you pilot a futuristic sky fighter through the nighttime sky, destroying various dangerous objects and seeking others of value. It's a basic theme that you see repeated over and over: *Blast the bad stuff and grab the good.* (The original *Pac Man* game, in which you literally eat the good stuff, distills this basic theme to its essence.)

What sets *Starglider* apart from the average shoot-em-up is, first of all, the quality of its animation. Playing off the popularity of conventional flight simulators (about which there'll be more later), the game puts you at the helm of a spaceship whose power and maneuverability put our armed forces' latest fighters to shame. Streaming past you in the dark are a wide variety of objects, some on the ground and others in the sky. Depicted in realistic, "wire-frame" 3-D graphics, these objects are fascinating to watch, whether or not you accomplish your ultimate mission.

Another of *Starglider*'s standout features is the quality of its sound. Digitized music and speech give this game an aural quality that will surprise some of those who pooh-pooh the ST's sound chip, as well as exciting the envy of those who, like myself, find sound generation an interesting programming challenge. The game begins with a dazzling musical soundtrack that is entirely digitized. In many similar games, damage to your craft is signaled by a blinking red light or some such. In *Starglider*, a digitized voice with a distinctly English accent shouts "Damage alert!" It's all great fun.

If you're not familiar with flight simulator programs, you might not notice a canny piece of stagecraft that *Starglider* uses to minimize the effort needed to simulate the view from a moving aircraft. Conventional flight simulators spend considerable effort and processor time depicting the shifting horizon as you would view it from the pilot's seat. This normally is done by painting the ground in one color and the sky in another, a process that requires time-consuming area fills.

By setting its action at night, when both ground and sky are a uniform black, *Starglider* can dispense with direct depictions of the horizon and rely instead on indirect, less time-consuming means. There are always a sufficient number of "ground" objects on the screen to suggest an approximate horizon. And as you move through the sky, tilting, accelerating, or whatever, those objects change in attitude and perspective just as you would expect. As a result, the game spends less time depicting the ground and sky, and more time animating moving objects.

Leisure Suit Larry in the Land of the Lounge Lizards

Lose Your Marbles

Arcade action doesn't always involve shooting and dodging. If we accept action and agility as the basic features of this genre, then *Marble Madness* (Electronic Arts) has to rate as one of the better examples to be released in the last year or two. Here the basic goal is to pilot a marble or ball through a peculiar, particolored universe that seems to have been engineered by Rube Goldberg and molded from neon Play-Doh by Salvador Dali.

As you roll up and down ramps, jump waterfalls, skirt chasms, and skitter around corners, you must avoid a wide and amusing variety of animate and inanimate objects. Folks who have spent significant time with the original arcade version or the Amiga version of this game might be greatly disappointed by the quality of graphics in the ST version, but the game's playability is equal on both machines.

Trailblazer (Mindscape) is another game where you direct the course of a ball through a fantastic landscape. But in this case the landscape is a wild, onrushing road. After the advent of the movie *Star Wars*, with its climactic chase through tunnels in the surface of a planet, a multitude of games have taken advantage of this basic visual concept. As the pilot, you direct an object (a spacecraft, an Indy racer, or whatever) along a road that begins at a narrowed point on the horizon and rushes, furious and unceasing, directly toward you.

Tunneling and road-racing games usually have an extremely simple premise: keep moving as long as possible. Often, it's a journey to nowhere; you're traveling for the sake of traveling. You must stay on the course (not easy, in most cases) while avoiding collisions with fellow travelers. Along the way, you may also have a chance to scoop up assorted treasures, vaporize the occa-

sional roadhog, and stay alert for other vicissitudes.

Trailblazer offers a different, lighthearted variation on this basic theme. You control a rolling, bouncing ball as it careens down an oncoming checkerboard trail. Each rectangle in the checker-trail can be a different color, and the color determines what happens when the ball touches it. You can roll normally over one shade of green, but magenta squares make the ball reverse direction, bouncing straight back at you. Black squares are holes in the trail—if you can't bounce over them, you'll lose a ball. Each new color means something different: White colors are good for bouncing, others introduce unwanted hops and slow you down, and so forth.

It takes some time to master *Trailblazer*'s basic course, which includes three main sections with oddball names such as *Green Bits*. If you tire of bouncing a ball, you can change the shape of your play object to one of several different animated sprites ranging from a winged, sprinting gargoyle to rolling heads or a little fellow pushing a vehicle that looks like a cross between a twenty-first-century wheelchair and a chariot from the movie *Ben Hur*.

Action games all share the same disadvantage—that a determined gamester always becomes skilled enough to master the course. Some games capitalize on this fact by marketing sequels to the original game that contain additional, more difficult challenges along the same lines. Others, and *Trailblazer* is one of these, provide a game-editing facility that allows you to "roll your own." In *Trailblazer*'s case, though, the editor program seems to have been added as an afterthought. *Trailblazer*'s editor is kludgy, nonintuitive, and entirely keyboard-driven, the sort of thing you might crank out in *GFA BASIC* in an hour or two.

That's doubly unfortunate because, when you think about it, the ST is supremely suited to perform this sort of editing task, and—given GEM—this sort of program almost designs itself. On one side of the screen you might have a "supplies" area containing all the possible trail-square colors. On the other side—perhaps in a window, so that it could be scrolled up and down—would be the trail you were constructing. To place a square of a given color in your trail, you would simply pick it up from the supplies grid with the mouse pointer and carry it over to the trail window, putting it down in the desired spot. Nothing could be simpler from a user's point of view.

No review of games would be complete without mentioning at least one pure, straight-ahead, blast-or-die game in the grand shoot-em-up tradition. My pick is *Xevious*, from Mindscape. You pilot a spacecraft, seen from above, through a varied landscape that scrolls from the top to the bottom of the screen. Your mission, as far as I can make out, is to vaporize everything in sight until you either finish the course or go down in flames (the latter course usually being more interesting).

So far, so dull. There have been, and will be, hundreds of games that fit this description. What interests me about *Xevious* is a feature that I've noticed in a few other nearly identical games on the ST. The scrolling playfield occupies only the left two-thirds of the screen, while the right third is taken up with a useless, largely empty, status and score display.

This sort of arrangement—action in the left two-thirds, stasis in the right—used to be very common in games for the Commodore 64, whose sprite graphics caused some programmers to confine all movement to easily managed areas to the left of the infamous sprite seam, the first 256 pixels of the 320-pixel screen. The ST has no such limitation (in fact, it doesn't have sprites at all), so it's difficult to imagine why so many shoot-em-ups share this characteristic. Perhaps they're cloning games originally written for the 64, or that configuration just seems more natural to right-handers.

Sport Simulations

This category includes computerized versions of familiar sports such as baseball, golf, and football. Of these, a golf game named *Leader Board* (Access) still ranks as one of the most realistic, satisfying sport simulations available, in my book. Although it lacks some of the extra features found in other golf games, *Leader Board* provides such lovely, detailed animation of the golfer and the ball that you'll readily forgive the omissions. It's the sort of game that elicits a "Wow!" from just about everyone who watches the player drive the ball down the course for the first time.

Leader Board lets you play several different courses, all at various skill levels. One feature that I found very attractive is the speed at which the game redraws the scenery for each new hole. Each scene is drawn in a second or two, without the slow disk reads that characterize the process in so many other programs.

The animation is truly something to write home about. The player swings the clubs very realistically, in part because the graphics were copied directly from an actual video of a golfer in action. And the game is capable of some amazing bits of realism. In one hole, for instance, my drive actually hit the pin on the green; much to my amazement, the ball bounced off the stick to the accompaniment of a realistic *pok* sound.

One *Leader Board* feature that I found highly annoying, however, is its use of a dongle as a security device. A dongle, as you may know, is an electronic whatzit that you have to plug into your computer (typically, into a joystick port) when you start the game. In the case of *Leader Board*, the dongle is a sealed unit smaller than

the end of my little finger. Anything that small is very easy to lose, or, in the case of our household, easy for scavenging toddlers to find and choke on. What's more, the dongle plugs into the ST's joystick port, which, in the case of a 1040ST, is located in a hopelessly inconvenient spot under the front of the keyboard.

My idea of fun does not involve spending five sweaty minutes trying to snicker a minuscule widget into a cranny underneath my computer every time I want to limber up the old clubs. The creators of *Leader Board* aren't to blame for a design inconvenience of the ST. But there are many other means of security protection; perhaps they'll see the light and ditch the widget in future releases.

Another golf simulation worth mentioning is *Mean 18* (Accolade). Although it doesn't match *Leader Board* in animation quality, this game does offer a greater variety of courses, including some famous ones such as Pebble Beach and Augusta National. What's more, *Mean 18* includes a Course Architect feature that you can use to create your own, custom-built courses. That sort of customization greatly extends the lifespan of any game.

Lamentably, *Mean 18* bears many of the marks of an unthinking, too-hasty translation. Everything about it, from its manual cover and onscreen character set to the way that it handles dialog boxes, shouts "IBM PC." It's ironic that on the ST, whose operating system provides convenient, standard routines for creating and handling GEM dialog boxes, a program would create a non-GEM dialog box entirely by hand, as it were. That sort of decision may simplify the translator's task and let the company bring a product to market sooner. But the differences are aesthetically jarring, and they tend to denigrate the machine, as if to say that it's not worth the extra effort to make an ST version behave like a genuine ST program.

Flight Simulators and Flying Games

You don't "play" a flight simulator as you do most computer games. These programs, patterned after the real simulators used to train pilots and test aircraft prototypes, are serious, complicated tools for simulating, as closely as possible on a microcomputer, the actual experience of piloting a vehicle through the air. Like other grown-up software, a flight simulator typically takes a long time to master, but has the ability to challenge you over a much longer period than the average game does.

You're given a detailed artificial universe and an invitation to explore.

The realism of a first-class flight simulator extends to every aspect of the program, from reading charts and making visual observations to setting navigational instruments and dialing in for the latest weather update. Among these programs, the venerable *Flight Simulator II* (SubLOGIC) has to rank near the top of anyone's list. Whereas many entertainment programs come with documentation you might mistake for junk mail, *Flight Simulator II* gives you a book. That's a testament to not only the quality (and price) of the program, but also its complexity.

Flight Simulator II isn't the sort of program that can easily be described in a paragraph or two. If you're interested in flight simulators, try to get a demonstration of this program before you purchase anything. Unlike most other games, flight simulators have no canned goal. There's no way to win or lose at this pastime, just as there's no way to win or lose at flying a real airplane. You're simply given a detailed artificial universe, complete with navigational charts and a choice of aircraft, and an invitation to explore. If you become hooked on it, you can easily spend months in the cockpit.

If you like the notion of flying your computer, but your heart doesn't skip a beat at the prospect of trying to find Snohomish County Municipal Airport on the chart on a stormy night, you might want to look at one of the many flying games that have appeared in the last couple of years. These programs share the same basic appeal of true flight simulators, but they don't take as long to learn, and many of them throw in some shoot-em-up action for extra excitement.

One such game is *F15 Strike Eagle* (MicroProse), which puts you in the cockpit of a jet fighter flying a combat mission in one of several international hot spots. The basic drill is the stuff of which good shoot-em-ups are made: blitz or be blitzed. Your mission, regardless of locale, is to destroy all primary targets in the area and then return to base. The makers of this game have put a decent amount of effort into historical accuracy. The missions that you can choose range from Egypt or Hanoi in the early 1970s to Libya in 1981 or the Persian Gulf in 1984. Besides describing the various aircraft and missiles that attack you, the manual has information on combat maneuvers such as jinking, yoyos (low and high speed), and the time-honored Immelman.

Adventures

This category of games used to include a very few, well-defined programs. The first, *Adventure*, was written for a mainframe back in the infancy of what we now call personal computing. When affordable home computers became available in the late 1970s and early 1980s, it wasn't long before adventures made their way onto the new machines. Now, more than a decade later, we are witnessing an explosion of adventures and adventurelike games.

The classic adventure game has two basic characteristics: it is entirely text-based, and it is a directionless simulation. *Text-based* means that you play the game by typing English commands rather than whipping a mouse pointer around the screen or abusing your joystick or cursor keys. And *directionless* means that you decide what path to take at all times. These games nearly always have a goal of some sort, but they don't force you down exactly the same path every time the way the classic shoot-em-up game almost always does. Instead, much like good flight simulators, they just plop you down in an interesting universe and let you take it from there.

The universe of the original *Adventure*, and of its earliest imitators, was typically a magical, underground place containing a myriad of interconnected caverns, tunnels, and chambers, populated with a host of extrahumans—good and bad—and littered with useful, dangerous, life-sustaining, useless, or just plain interesting objects. As in real life, you could wander around and look at your surroundings, take and manipulate objects, and interact with whomever you met.

The earliest text adventures used primitive parsers (command interpreters) to interface between you and the simulated universe. The parser could understand simple commands such as *Take gold* or *Go north*, for instance, but it would choke on a more realistic English sentence such as *Pick up the gold bar, examine it, and then leave the room.*

This limitation created a dichotomy of sorts. While the game itself spewed out elaborate descriptions of your surroundings, you could reply only with the literary equivalent of grunts, using primitive verb-object commands such as *Get sword* or *Fight dwarf.*

The first major innovation in adventure gaming was the introduction of more sophisticated parsers, which let the player communicate with more natural English sentences. New England–based Infocom, now a division of Activision, was an early leader in this market, beginning with the *Zork* series of adventures and adding many others since then. In addition to improving the games' playability, Infocom expanded the subject matter of the genre beyond its wizards and warlocks origins, setting some adventures in the gritty modern world. Thankfully (from the perspective of dedicated adventure players), some of Infocom's adventures are still available for the Atari ST, although recent rumors indicate that Infocom may not introduce any new ST programs.

Text-based adventures were well-suited to the computers that bore them. Older mainframes and early microcomputers had few graphics capabilities and limited memory. But the advent of machines like the Atari ST has changed all that. These machines have faster processors, flashy graphics features, and enough memory to hold many graphic images at the same time. Not surprisingly, it wasn't long before adventure gamers started to clamor for pictures to augment the textual descriptions in their imaginary worlds.

Borrowed Time (Activision) is what the creators call an *illustrated text adventure.* You can play this game exactly as you would a conventional adventure—by typing sentences on the keyboard. But in addition to the usual text, the game provides a detailed visual image of each "room" that you enter. The screen is divided into several windows. The left portion of the screen contains a large picture portraying the room that you're in at the moment. At the bottom is a text window where you can enter commands and read descriptions and information, just as in an old-style text adventure.

Perhaps the deepest attraction of the traditional adventure is that it leaves so much to the player's imagination.

The presence of graphics immediately changes the dynamic of the game. The first room, for instance, is your office (you are a Sam Spade–type private detective). The picture for that room shows your legs propped on a desk, a file cabinet in the corner, and windows next to the file cabinet. You can grasp the information in this picture many times faster than you can read a textual description of the picture. Moreover, the image typically occupies much less screen space than the amount of text it would take to describe it. (The amount of screen

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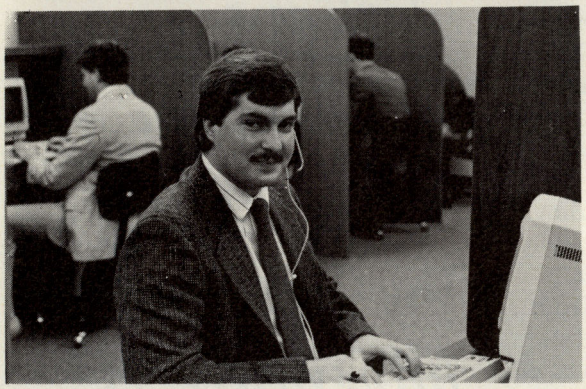

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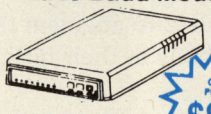

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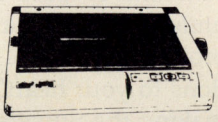

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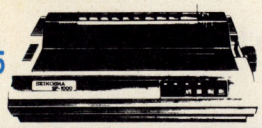

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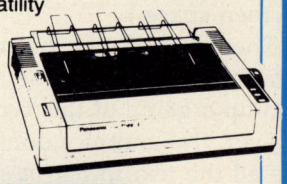

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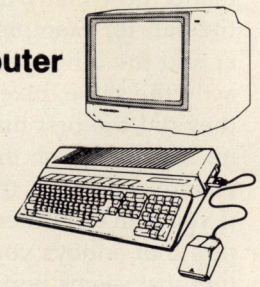

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space required for text is accentuated by the fact that most ST games use the more colorful low-resolution graphics mode. Lo-res characters are much bigger than medium-res characters, so you can fit much less information in a given screen space.)

There's no doubt that the use of graphics can streamline and speed up a game of this type. However, the graphics don't replace all the text in *Borrowed Time*. The game still provides textual descriptions, and these often offer information that is not available in the small, rather static pictures. For instance, if you give the command *Open the drawer*, followed by *Examine the drawer*, the picture doesn't change in any way, but the text window provides a description of the drawer's contents.

The designers of this game have included several features that take advantage of the ST's special capabilities and reduce the time you spend pounding the keyboard. One useful innovation is a compasslike icon containing the four cardinal directions: North, South, East, and West. If you enjoy typing, you can always move by typing a command such as *Go north*, but in many cases it's more convenient to move the pointer onto the direction you want and simply click the mouse button.

In another portion of the screen, *Borrowed Time* provides two columns of commonly used verbs and objects. Clicking on a word with the mouse pointer is the same as typing it from the keyboard, so you can enter a command such as *Search desk* with only two button clicks rather than 12 keystrokes (ten letters, a space, and a Return). Another handy feature is the RETURN icon, which compensates for the smallness of the text window. When you click on this icon, the text window expands to the full size of the screen. This is very handy for rechecking a description that you read two or three turns ago, to make sure that you haven't overlooked some vital detail. When you're ready to resume play, the picture and other game aids pop back into place.

Interactive graphic adventures retain the basic mechanics and appeal of a traditional text adventure, but eliminate the keyboard interface almost completely.

Another welcome feature is the graphic inventory. In a text-only adventure, you type *inventory* to find out what objects you are carrying. In *Borrowed Time*, these objects are displayed right on the screen, in a box immediately under the main picture. After you've typed a command such as *Take the gun*, a little revolver appears in the inventory box.

Innovations of this sort are attractive to many people, but they may not be as popular with dyed-in-the-wool text-adventure players. The most obvious objection is that a picture, no matter how skillfully drawn, can't have the richness of a mental image. Perhaps the deepest attraction of the traditional adventure is that it leaves so much to the player's imagination. Your vision of the Colossal Cave, or whatever place you are exploring, is not exactly like the vision of any other person. And because so much is left undescribed, you are free to embroider the game's basic descriptions to your heart's content, making the universe slightly different each time you play.

It's very much like the difference between reading a book and watching a movie. No matter how colorful and realistic the animation of a movie might be, it often can't compare in richness to the mental images evoked by a good book.

Some people will find the images in an illustrated adventure rather flat and uninteresting. The issue isn't the quality of the graphics. They are nicely drawn, with as much detail as you could expect, given the ST's graphic capabilities and constraints such as memory limitations. It's simply that having a finished, fully realized image before your eyes may stifle, rather than stimulate, the imagination for some players. No matter how many times you enter the bar, for example, the bartender and the other patrons look exactly the same, pixel for pixel, as they did the first time you came in. If you happen to find a given picture satisfying, that's great. But if you don't—if there's some feature that annoys you, or the picture just seems boring—then you just have to put up with it. Since they have to fit in such a small window, the textual descriptions in *Borrowed Time* are typically quite terse, so there's little hope that the game might fill out a sparse graphic with some additional verbal imagery.

Paradoxically, the very immediacy of the graphic images led me to another sort of frustration. There were many places in this game where I found myself wishing for a way to expand the image

of a room—or "pan the camera," so to speak—so that I could look for some additional details. The more lifelike the graphic, the more it invites the reader to jump in and manipulate the scene graphically. As a small example, if you stay long enough in the first room of *Borrowed Time*, the game prints a message such as *The phone is ringing* and illustrates that event with a brief animation that makes the phone on your desk jiggle up and down. Seeing that phone come to life immediately made me want to point the mouse at it and do something, rather than typing in a mundane command such as *Answer the telephone.*

Text-only adventures have already demonstrated an amazing longevity. In light of the differences between the two types of adventures, it will be interesting to see how well illustrated text adventures hold up over time.

On the whole, an illustrated text adventure such as *Borrowed Time* is really a conventional adventure game with some graphic embroidery. There are similar games that go much further in integrating an adventurelike experience with a graphic operating environment such as GEM on the ST. Mindscape, for example, has marketed several new games which it styles *interactive graphic adventures.* I looked at their *Deja Vu.*

Interactive graphic adventures such as this retain the basic mechanics and appeal of a traditional text adventure, but eliminate the keyboard interface almost completely. The screen still contains a text window, but is a one-way communications pipeline. The game displays messages in the window, but you can't type anything in response. Typing simply isn't part of the experience.

Instead, you play the game by manipulating visual objects on the screen, using the mouse pointer. Like other graphic adventures, *Deja Vu* devotes part of the screen to a view of the room that you're in at the time. The rest of the screen contains an Inventory Window, where you store objects, a Text Window, where the game prints text messages for you, a few menus for basic operations such as saving or exiting the game, and some miscellaneous icons that I'll mention later.

What sets apart the graphic imagery in *Deja Vu* is that the game contains "live" objects that you can pick up and handle with the mouse. In the opening sequence, for example, you find yourself in the stall of a dingy lavatory. Hanging on the door is a man's trench coat. If you click on the coat, it lights up and the game prints a description in the text window. If you decide that the coat is something you want, you simply pick it up and move it over to the inventory window, using the same click-and-drag maneuver that's familiar to anyone who's used the GEM Desktop. Once you take the coat, you notice a gun hanging in a shoulder holster from the same hook. If you didn't take the coat, you'd never know the gun was there.

You can examine its contents in the same intuitive way. If you double-click on the coat, the game opens up a secondary inventory window (entitled *Coat*) and displays the coat's contents in the new window. These include some loose change, a handkerchief, cigarettes and a lighter, a monogrammed handkerchief, and a wallet. Each of the objects in this window can be moved around, examined, or opened up in turn to see if it contains still more objects (a good bet, in the case of the wallet).

This scheme is notable for its economy and naturalness. If you see something interesting in the main picture, you just grab it and go, exactly as you would in real life. Not only is this much faster and more convenient than in a text-only adventure, but the proliferation of "live" objects gives this simulated universe a feeling of greater depth and richness than can be created by one which is depicted through static, unchanging pictures.

The same interactivity extends to the way that you move from one room to another. To open a door, for instance, you double-click on it with a mouse. To move through the open door, you simply double-click on the opening.

The Exits window offers an alternative way to move around. This window contains colored squares that represent the exits leading out of the room you are in at the time. To move through a given exit, you click on the corresponding square. Apart from the convenience it offers, this device makes it possible to leave a room by moving back through the exit by which you entered. That's an important factor in this game, which doesn't provide a way to type something such as *Exit* or even *Go north.*

What we're witnessing now is the creation of an entirely new category of computer games.

The only means of giving something like a verbal command, in fact, is by clicking one of the eight commands located in a box over the main view window. These include *Examine, Operate, Open, Close, Go, Hit, Speak,* and *Consume.* The commands, as the vocabulary list suggests, are mostly used in conjunction with an object that you have highlighted on the screen. To open your wallet, for instance, you could select it

with the mouse pointer (the object would then be visually highlighted), then click on the *Open* command. Other commands are slightly less intuitive. Since there's no *Shoot* command, for example, you might think at first that there's no way to shoot your revolver. But it's not difficult to puzzle out after you notice the presence of *Operate*, a very general command. To shoot a hole in a window, for example, you highlight the revolver, click on *Operate*, then click on the window to indicate the target.

Another handy little device is the icon labeled *Self*, which represents you, the player. Used as the object of an *Examine* or *Open* command, it can be used to reopen the inventory window after it has been closed.

If you appreciate games that take advantage of your computer's special features, then *Deja Vu* and similar Mindscape adventures are definitely worth considering. Unlike many ST games, which ignore or actively subvert GEM, these make the most of GEM's mouse and windows. In most ways, for most players, these innovations are a definite improvement, and I think they mark a significant new direction in computer gaming.

First prize for originality in this category has to go to a game called *Leisure Suit Larry in the Land of the Lounge Lizards* (Sierra On-Line). If you're old enough to vote, and you appreciate offbeat, occasionally sleazy (although not seriously offensive) humor, this is a program not to be missed. As Larry, a good-natured, leisure-suited loser, you begin in one of the seedier districts of Las Vegas, armed with a white suit and some gold chains, a small amount of cash, and even less in the way of charm. The object of the game is—well, it's about what you'd expect from a fortyish guy who suddenly finds himself sprung loose in Hot-Tub Land.

The player interface for *Leisure Suit Larry* falls somewhere between an illustrated text adventure such as *Borrowed Time* and an interactive graphics adventure such as *Deja Vu*. You still have a text window, in which you can type commands such as *Order a drink* or *Wash hands*. However, the graphic scene that you inhabit occupies nearly the entire screen, not a small, constricted window. And your character, as well as many other objects, is animated like a figure in an arcade game. To move from one area to another, you simply lead the animated Larry with the mouse pointer. When Larry walks close enough to an open door, the scene switches automatically to the room where that door leads.

In fact, *Leisure Suit Larry* contains so much animation, and relies so heavily on graphics, that you might wonder whether to call it an adventure at all. Certainly it has many things in common with the traditional, text-based adventure—you explore a strange universe through a computerized alter ego—but if you boot the game next to a conventional adventure such as *Zork* and ask a passerby how much the two games have in common, the initial answer will probably be "Not much."

What we're witnessing is the creation of an entirely new category of computer games, which are *simulations* in the general sense of the word, but use graphics and other interactive features to a much greater degree than ever before.

Nowhere is this trend seen more clearly than in the Cinemaware series of *interactive movies* for the ST. One of the newer Cinemaware offerings is *S.D.I.*, a futuristic war game that puts you in control of a space-based missile-defense facility. Other Cinemaware games include *Defender of the Crown*, set in medieval times, and *Sinbad and the Throne of the Falcon*, a buccaneer fantasy set in the mythical past.

The Cinemaware games are entirely graphics-based. Like Leisure Suit Larry, your character is animated, as are the scenes you inhabit. And the only way to accomplish anything is through the use of a joystick or mouse pointer.

Some people might view an interactive movie as the ultimate adventure game—one which completely dispenses with the text/keyboard interface and lets you interact directly with a graphically portrayed universe. Others might look on this sort of game as the ultimate shoot-em-up, since in the course of exploring the simulated universe, you engage in several different contests that are actually small, encapsulated shoot-em-up games.

In terms of playability, I found *S.D.I.* somewhat dull in comparison to the other Cinemaware games I've played, perhaps because I found its basic premise less intriguing than, say, *Sinbad and the Throne of the Falcon*. Global thermonuclear war is not the sort of thing that I want to mess with when I sit down to play a game. The graphics in *S.D.I.*, however, are certainly up to the usual high Cinemaware standard.

In a way, we've come full circle. We began, as computer games themselves began, with the basic shoot-em-up. Computer games have grown in many ways, but the most recent trend seems to be that they are moving back to their original strength, which is graphics.

Whether you consider interactive movies to be adventures or shoot-em-ups, and whether or not you enjoy playing them, there seems to be little question that the future of computer gaming includes many more games of this type. The pressure to include more realistic graphics is unrelenting, and it will only increase as each new season brings computers with more memory and greater graphics-processing power. If you couple a microcomputer with something like a CD-ROM player, which can store hundreds of graphic images on a single disk and recall them almost instantaneously, you have the basic ingredients for a truly cinematic experience. **ST**

Plutos

Tony Roberts

Requirements: Any ST, a color monitor, and at least one joystick are required.

Plutos is an engaging, lean-hard-on-the-fire-button-and-fly-like-crazy game. There's not much to it, but there doesn't have to be.

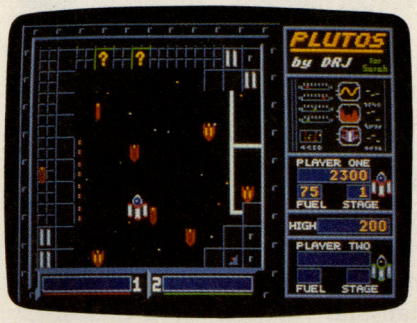
You've probably flown at least one incarnation of this basic scenario on some other computer or game machine: It's your job to fend off waves of fighters as you attempt to destroy the hulking enemy fortress.

The magic in this version, however, shows in the presentation of the alien's defenses. There are some predictably bomb-shaped bombs to dodge, but there are also streams of colorful soccer balls to kick out, and columns of flipping flapjacks to pick off with the ship's dual guns. To progress from level to level, you must disable the cybernetic sentries that stand in your way.

Blast Away

Points are scored by blasting away these swarming troublemakers and by shooting out stationary objects on the surface of the fortress. Position your ship correctly and you can take advantage of your double-barreled weapons configuration to kill two birds with one stone. One gun can knock out surface elements as the other takes out a whole enemy squadron—one by one.

As you might expect, colliding with an enemy fighter or flying into a tall structure on the surface will cost you a ship. Interestingly, however, there's no pause in play when you lose a ship. Taking a hit activates your shields for a few seconds, allowing you to absorb more punishment without further damage. If you're smart, you'll use those seconds to fly out of trouble.



Plutos *puts you in command of a speedy spacecraft—and in the line of fire of implacable enemies!*

By successfully navigating the game's scrolling screens, you advance a stage to a similar but more difficult board. As you progress, the gunners on the fortress and aboard the alien ships take note of your approach and begin firing at you.

Screen View

Plutos is an attractive looking game and is a pleasure to play for that reason. Most of the action, however, takes place in the left two-thirds of the screen. The scoreboard and a pseudo control panel are on the right. This control panel looks interesting but doesn't seem to do anything.

The scoreboard section includes your ship's fuel gauge, which constantly drains toward empty. Throughout your flight, you'll seek out fuel storage areas on the fortress. Though it seems an odd way to gas up, you must shoot out the fuel storage areas to fill your tanks.

Should you run out of fuel, you're not necessarily out of the game, but then again, don't celebrate. You'll no longer be able to fly, but you'll still be able to shoot. If you're lucky enough to coast to a stop with your gunsights on a fuel dump, you're in luck. You're much more likely, however, to end up sitting and waiting until the relentless enemy finishes you off.

Flying Together

One of *Plutos'* nicest points is its two-player option. (You'll need two joysticks for this. The mouse will get you nowhere.)

The two-player game uses the same screens as the single-player, but both ships fly at the same time. It's both cooperative and combative. By working together to keep the enemy at bay, you can advance to harder levels more easily, but you won't be so altruistic when one of the scarce fuel dumps appears on the screen.

The program won't allow you to shoot down the other player's ship, so you can't hope to gain an advantage by gunning him down.

While *Plutos* is visually appealing, the game is dull as far as sound effects go. A small handful of sounds associated with shooting the ship's guns and hitting a target repeat themselves. The sounds become as relentless an enemy as the alien defenders themselves. The monitor's volume control is your best weapon here.

Plutos
Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
$29.95

Dungeon Master

George Miller

Requirements: ST with a color monitor.

Prepare for a unique experience. *Dungeon Master* may well be recognized as the first of a new generation in computer adventure games, a standard by which others will be judged. Three-dimensional views of the passageways and rooms within the dungeon, effective use of graphics, and digitized sound all contribute to its overall excellence.

The plot is similar to other games of the *Dungeons and Dragons* genre: Select a party of adventurers, explore the dungeon, and ultimately defeat the forces of evil. What makes *Dungeon Master* unique are the creative efforts that went into making it different.

Recruiting a Band of Explorers

You control the actions of the group of up to four adventurers selected to represent you in the dungeon. Each adventurer from the Hall of Champions has unique powers and will quickly become a real personality to you.

Many adventurers are represented in the Hall of Champions, and each game will be slightly different, depending on the characteristics of the champions you select. Some characters are relatively weak and must be protected from injury, while others are fierce fighters, able to inflict serious damage upon their enemies and to survive wounds which might prove fatal to other party members.

The champions you select may be Fighters, Wizards, Ninjas, or Priests. Each champion also has secondary skill levels; for instance, a Fighter also may have some abilities as a Priest. A character may even have a combination of limited skills in all areas. Effective use of these skills will contribute to the character's survival during the game.

Magic and mayhem mingle in the world of the Dungeon Master.

Secondary attributes include strength, dexterity, wisdom, vitality, antimagic, and antifire. All are vital to accomplish your mission in the dungeon—to find the Firestaff and vanquish Lord Chaos.

A short story in the manual accompanying *Dungeon Master* adequately explains the story line, but it leaves much to your imagination and discovery. There isn't a step-by-step guide to what you must do.

Spelling Symbols

There's also no guide to the use of magic. The manual explains the meanings of the symbols needed to cast a spell, and scrolls found in the dungeon show some of the actual spells that may be cast. Thinking logically about a desired effect will often lead you to the symbols used to conjure the required spell, without finding a scroll. For instance, UM, a symbol that controls and directs the forces of stupidity and lethargy, combined with FUL, the symbol for fire, creates a magical light. Add IR, the symbol for the arc of a wing, and a wizard of sufficient experience can hurl the light in the form of a fireball at an opponent. I won't tell you more; the joy of the game is in the discovery.

However, casting spells isn't always quite that easy. Your chosen spellcaster may not have the experience or magical power, referred to as *Manna*, necessary to use a particular spell.

Experience in all skill areas is gained by surviving and practicing. Your warriors gain strength and experience by fighting. Wizards and priests gain magical strength by casting spells.

The champion you have selected as leader of the party will perform such tasks as picking up the objects you'll find during your quest, using keys, pressing buttons, and performing other actions as you descend deeper and deeper into the twisted maze of the dungeon.

Many Levels

Dungeon Master has many levels, each more complex and featuring more formidable opponents than the previous level. Mapping your route through the maze is necessary to avoid retracing your steps. Don't be lulled into a false sense of security: Monsters, some with supernatural powers, inhabit these regions. All may be defeated in battle, but at some cost to your party.

You won't just be mindlessly wandering through the maze, slashing and bashing monsters. Many puzzles must be solved in order to proceed. Occasionally, a door will refuse to open until you complete a puzzle.

As with most games of this level of complexity and danger, it's possible to save a game in progress. It's a good idea to save often, to avoid having to repeat earlier levels just to reach the point where you met your match.

The variety of items you can use is one of the game's strong points.

Although I have found most objects in the same locations during each game I've played, the monsters seem to roam the halls

in a somewhat random manner, occasionally appearing in areas where I least expected them. On occasion, I've become so engrossed in the game that I actually have been startled when a monster appeared.

Plan on spending a lot of time with *Dungeon Master*. This is one of the most captivating and entertaining fantasy-adventure games I've ever played—one I'll return to often.

Dungeon Master
FTL Games
P.O. Box 112489
San Diego, CA 92111
$39.95

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Spectrum 512

Rhett Anderson

Requirements: ST with a color monitor.

Spectrum 512 is one of the biggest surprises the Atari ST community has received. With this single piece of software, your Atari ST can display all 512 of its colors onscreen at once. That's 32 times the number of colors that you normally can see on your ST.

Do those extra colors make a difference? They do. Pictures drawn with *Degas* and *NEOchrome* look cartoonlike compared to the *Spectrum* pictures. All those colors make possible new tools—ones that allow for smooth shading and antialiasing (a technique that removes computer "jaggies").

It's Done with Software

Before *Spectrum 512*, it looked like the ST was basically limited to 16-color screens with the exception of some clever programs which allowed more by using *interrupts* to change colors as the screen was displayed. For example, a single interrupt would allow up to 32 colors, two interrupts would allow up to 48 colors, and so on. The colorful *NEOchrome* palette is one example of this technique; "Rejection," a game found elsewhere in this issue, is another.

The interrupt technique is limited, though. Programmers still get only 16 colors per horizontal line. When you consider that a line is made up of 320 pixels, 16 colors is clearly not enough for realistic pictures.

What the authors of *Spectrum 512* did was constantly stuff the colors into the Atari's MMU chip, achieving 48 colors per line. This operation is highly time-critical. Atari STs made before December 1985 require a new MMU chip, which can be purchased from an authorized service center for about $30.

That's the technical side of *Spectrum*. The programmer in me is impressed.

Painting with *Spectrum 512*

The artist in me is disappointed. Sure, the colors are great, but *Spectrum 512* is downright difficult to use. When you get started, you'll probably want to begin with a picture that was drawn with another paint program and add colors to it.

The palette is available when you right-click on the bottom of the screen. *Spectrum*'s palette is very easy to use. It displays all 512 colors on the screen at once. The colors are grouped into honeycomb structures by intensity, creating the best palette I've seen in a paint program. You can move colors from this palette into your own personal palette, which is always available on the left and right edges of the screen.

If you right-click near the top of the screen, you'll see *Spectrum*'s tools. There's a lot here. An airbrush, circle and line tools, an eraser, block-mode tools. The exciting things are the tools that take advantage of the extra colors. These include the antialiaser and the nearly-impossible-to-use gradient filler, which fills an area with gently changing colors.

Better News

The most fun I've had with *Spectrum 512* has been importing pictures from the Amiga. The Amiga doesn't have to strain so hard to produce 32 or even 4096 colors. As a result, the Amiga's paint programs are generally easier to use than *Spectrum 512*. *Spectrum* does a beautiful job of importing virtually any Amiga screen, regardless of the number of colors.

Of course, most people don't have both an Amiga and an ST, so you might try to download some Amiga pictures from CompuServe or a local bulletin board. Once the picture has been loaded into *Spectrum*, you can modify it any way you please.

Better news is that the creators of *Spectrum 512* have an-

nounced *Digispec*, software which allows the popular ComputerEyes digitizer to capture 512-color images for use in *Spectrum 512*. Since I find that *Spectrum* is more useful for touch-up jobs than original artwork, I find this an exciting development. You could draw or paint your artwork on paper, digitize it, and then touch it up with *Spectrum*. (*Digispec*, $39.95, Trio Engineering, P.O. Box 332, Swampscott, MA 01907).

Showing Off

Once you've finished your 512-color artwork, there's not much you can do with it. To show your pictures, you can load them into the paint program or the included slide show program.

But if you want to use these pictures in your own programs, you're on your own. Forget about using these screens as backgrounds for your programs—the processor is so busy showing the extra colors that it has almost no time to do anything else. Animation on one of these screens would be more difficult than it's worth.

If you're not a programmer but just want to make art for art's sake, *Spectrum 512* is an interesting program. I would advise trying this program out before buying it. For many people, the awkwardness of the user interface outweighs the advantages of the extra colors. But if you simply must have the extra color capabilities, *Spectrum 512* is the only way to go.

Spectrum 512
The Catalog
544 Second St.
San Francisco, CA 94107
$69.95

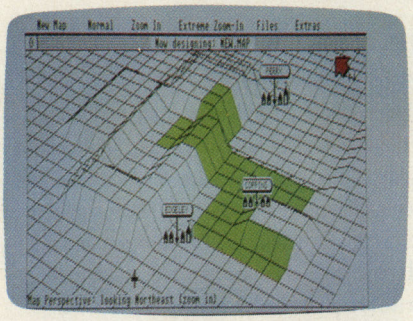
Universal Military Simulator

Neil Randall

System requirements: Any Atari ST with a color or monochrome monitor.

This is an ambitious program. What it attempts to do is allow the player to simulate the entire history of warfare with one basic system. Nothing more, nothing less.

It's been tried before, but rarely on computers. SSI's *Wargame Construction Set* successfully manages to recreate battles from several historical and fictional eras, and like the *Universal Military Simulator*, it lets players design their own scenarios. A greater number of attempts in the arena of board games have been made, but except for SPI's old *Strategy I*, none have done very well.



Perhaps the most sophisticated simulator of its kind, UMS reinvents the wargame.

The Evolution of Warfare

The problem is that warfare has changed a great deal since the siege of Troy. Weapons have evolved from swords and pikes through siege engines, muskets, rifles, machine guns, and so on up to tactical nukes. How can one game, with one system, simulate the difference between a crossbow, an 88, and any of the modern, super-long-range weapons at the military's disposal? Most games tend to concentrate on a specific era, or even on a specific battle or portion of a battle.

Like the *Wargame Construction Set*, *U.M.S.* throws caution to the wind and makes the attempt. Scarcely for beginners, the game rewards the player's knowledge of history to a very high degree. The documentation provides detailed commentary on each of the five simulated battles it includes on the disk, and it gives a general idea of how best to fight the battle. As you learn to play this complex game, the information is extremely valuable.

What makes the game complex? Mostly, its difference from other war games. For the first time in computer war-game design, a program makes solid use of the arrows that we see on military maps. Plotting a unit's movement means drawing an arrow from its starting location to its desired ending location, and the arrow will also show the route it will take. Of course, it may not get there, because the enemy is drawing arrows at the same time, but the plotting is both sophisticated and effective.

Once the arrows are drawn (the moves are plotted), the game moves to the actual simulation stage. Here, the computer moves the units according to the plots, interrupting movement when two units are close enough to fight. Here, too, ranged fire takes place, which is accomplished by simply pointing to the target unit and clicking the mouse button. After the individual battles are finished, the game proceeds to the next time increment. After several increments, it allows you to enter new commands for your units.

Flexible Perspective

By itself, the movement system is quite straightforward, much more so, in fact, than the movement system of most other war games. In the early part of the game, though, the sheer number of units (at least in the included scenarios) makes plotting time-consuming and somewhat tricky. Later, when your lines have been largely obliterated by withering artillery fire, things get much easier.

One of *U.M.S.*'s key features

is its flexibility in map perspective. When the scenario opens, you're looking at the map from a perspective high above the battlefield, facing north. Three menus let you change this, however. The first, Normal, lets you see the map at the same height from any of the eight principal directions. The second menu, Zoom In, is identical, except that you are much lower, and the details of the field are more complete. The Extreme Zoom-In gives you a huge cursor, which you may place anywhere on the field. It takes this portion and zooms in, much like the magnify feature in many paint programs. The result is that your ability to analyze the battlefield is enhanced considerably.

The map itself is also unique. Divided into squares, the map shows elevation extremely well, by simply altering the shape of the squares. The map features are somewhat limited—landmarks, towns, cities, woods, ridges, and flat terrain—but they adequately fulfill their purpose. The best terrain design on the predesigned scenarios is the ditch at the Battle of Marston Moor, a true obstacle for the attacking army to surmount.

The scenario design package, which is really the heart of *U.M.S.*, is involved but not overly difficult. Designing a map means placing terrain features where you want them (or where your historical source dictates), while creating armies means selecting unit types and entering their relative strengths and characteristics. The entire procedure is menu-driven and well-designed, and you can create a mid-sized scenario from scratch in less than an evening.

Operational Control

U.M.S. can be played by one or two players, or you can watch the computer battle itself. In fact, you can change the play mode with every new turn, a feature that by itself makes this game worth looking into. Even if you instruct the computer to command both armies, for instance, you can still guide the course of the battle. You can force either side to defend, or you can force an attack on either flank, in the center, or on both flanks simultaneously (a double envelopment). The computer will then conduct that battle according to your dictates. In other words, it isn't necessary to give full control of either army to the computer, nor is it necessary to move all your units individually. This mode allows for speedy games and lets you test historical options easily.

There are some clumsy areas, though. First, the units appear on the map as flags, and these tend to overwhelm the screen. Often, in fact, finding a particular flag is extremely difficult. Second, there is no way to change a unit's orders in midturn. There should be, even if a penalty results. Third, the game has no provisions for limited intelligence, or what's called *the fog of war.* The zoom-in features are very workable, but they destroy the sense of the commander's true perspective from the battlefield itself. Fourth, there seems to be no way to stop a victorious unit from advancing, even if it was ordered to defend. Finally, the only victory conditions are enemy destruction; you cannot design a scenario to emphasize the importance of defending or of taking a specific geographical objective.

Even with these problems, though, *U.M.S.* is a very strong product. By definition it is unlimited in its playing potential, and, once the unique system is mastered, playability is high. War gamers with some experience will want to take a look at it.

Universal Military Simulator
Firebird
Distributed by Activision
2350 Bayshore Pkwy.
Mountain View, CA 94039
$44.95

Superbase Personal

David Plotkin

Requirements: ST with color monitor

Superbase Personal is a relational database with an easily-mastered control system, multiple open-file capabilities, and powerful reporting functions. It's fully GEM-driven with scroll bars, menus, and the mouse. All the features are accessed through dialog boxes, which makes selecting and using the various powerful functions relatively easy and error-free.

There are three ways to display the information from the database. The first is the Record view, which allows you to see one record at a time. (If you're unfamiliar with the terminology, a *field* is the smallest piece of data, such as a ZIP code or a shoe size; a *record* is a complete entry, such as name, address, phone number, and birthday; and a *database* is a collection of records.) The Form View is similar, but you can click and drag the fields around on the screen to provide a custom form for data entry. You cannot use graphics to customize this view, however. The last is the Table view, which features field names across the top of the screen, with the data from each record arranged in columns. Each record takes up one line in the table. The widths of columns can be adjusted by clicking and dragging the column borders, although columns cannot be rearranged in the table. You can use the arrows and scroll bars to move through data which is too wide to appear on the screen or to move to the next batch of records. For all three views, you can use the Open Fields function to select the fields that appear in the display.

The Control panel has 12 buttons simulating a videocassette recorder. You can move through the records by clicking on a button. Clicking on the Fast Forward or Rewind buttons takes you

through the records a screen at a time in Table view.

Superbase Personal supports four basic types of fields: Text, Numeric, Date, and External. Any of these fields except external can also have a validation formula or be the result of a calculation. Calculations can include field names, constants, string operators, and mathematical operators. They are built in a dialog box and are easy to set up. The length of a text field; format of a date field; or length, format, and number of decimal places of a numeric field can all be set easily using dialog boxes. A field can be marked as required, which means that you must enter data or the program won't let you save the record. Any other fields, of course, are optional.

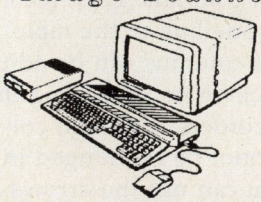
The fourth type, the external field, provides access to external files such as pictures and text files. This means you could create a database of employee records and include a digitized picture of each person. Or you could create maps or graphs and link them together in a single database. The external field contains the path and the filename of the file tied to the field. Calling up the external file can either display the picture or text in split-screen or full-screen mode. Any resolution picture can be shown when you are working in any other resolution. However, if you are in medium resolution and show a low-resolution picture, it must be displayed in full-screen mode.

There's no limit on the number of fields per record. You can have up to 999 different index fields (with only one active at a time), which are used for looking up or finding a record in the database. You can change indexes at any time; a list of available indexes appears for you to click on the one you want. Indexes can be specified to only allow unique values. You can create new fields or edit the existing field names or types at any time, even after data has been entered into the database.

An important concept in using *Superbase Personal* is a filter. Once a filter has been set up, you will see only records which meet the filter conditions. Filter conditions can include matching ranges of values in any field and relational, logical, and mathematical operators. The filter condition is built using a dialog box so that the condition is specified by just pointing and clicking on field names and operators. You can also type in values on the command line. All fields are available, regardless of whether they are open or not. The filter can be turned off and on from the main screen (control buttons). The filter can be used to remove a range of records, filter records you are importing, filter records you are exporting, print reports, and make labels. You can also use a similar function to link records in multiple files to establish relations between

IMG™ Scan

Image Scanner



What Is IMG Scan?

IMG Scan is a simple, inexpensive device which turns your dot matrix printer into an image scanner allowing you to scan any page that can be put into your printer! Keeping in line with Atari's power without the price philosophy, IMG Scan finally makes image scanning simple and affordable. This brings powerful graphic capabilities to desktop publishing, image processing, and graphic art applications on the Atari ST! At $99.95, the IMG Scan opens doors that were closed by expensive and inferior video digitizers.

This entire brochure was created on an Atari ST using a desktop publishing program and IMG Scan. All images and line drawings were reproduced with IMG Scan, imported into the desktop publishing program, and printed on an Apple Laserwriter. This is how easy IMG Scan is to use.

SEYMOR-RADIX
P.O. Box 166055 Irving Tx 75016 (214)255-7490

fig 2. This image was scanned from an original cover removed from *Vanity Fair* magazine with IMG Scan and printed on an Apple LaserWriter.

How It Works

The operation of IMG Scan is very straight forward. A small cartridge (approx: 1.6" X 1.9") plugs into the Atari St's cartridge port and is connected to the printer's head via a thin, flexible image cable. This image cable can be attached most anywhere on the print head using nothing more than a piece of adhesive tape. The user is at option to use any method he may come up with to mount the cable, but is not encumbered by an inflexible mounting bracket. This is one reason that IMG Scan can be made to work on most any printer. With the image cable attached to the print head, the printer is controlled by the IMG Scan driver software. The software can be set for sizing the scanned image among 20 different levels of magnification or reduction. Since 256 gray levels are recorded, and the ST is capable of displaying only 16 colors at a time, the contrast of individual gray level ranges can easily be adjusted and assigned to color palette positions. The image may then be colorized or saved to disk etc.

Applications

IMG Scan is an indispensible tool in desktop publishing. It is very useful in things like adding photographs, charts, clip art, line art, or anything that can be scanned, to newsletters, business cards, letter heads, etc. You could for example, put your own picture on your own letterhead! Also it can be used to create a computerized photo album. Send pictures of family and friends over the phone lines. And of course, IMG Scan is perfect for use with art programs to enhance your art creations.

fig 1. This image was scanned from a photocopy of a *National Geographic* cover with IMG Scan and printed on an Apple LaserWriter.

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files for multiple file reporting.

For example, if you had a database covering retail stores, you could create a filter to ignore all records except stores with a Kansas address. You could then create another filter to focus on stores that had a certain level of sales.

Adding new information to a *Superbase Personal* database is simply a matter of choosing either Form or Record view, moving to a new record and typing in the information in each field. You can also move through the existing records using the VCR button controls and then edit the information that is already there. You must, however, remember to save each record when you are done with it. You can create a record which is a duplicate of an existing record so that you can make editing changes to create a new record. You can also view external picture files while editing records to determine which one to use with a particular record.

The Update option allows you to make mass changes to fields in your files, even to changing the contents of one field based on the contents of a field in another file. This function uses a filter to determine which fields are to be affected (and to link fields in one file with fields in another file). It also uses a fields dialog box that specifies the updating actions to perform. Typical uses for this function are: setting a field to a constant, doing a calculation (typically involving the contents of a field), and setting a status field to a new value.

The heart of the *Superbase Personal* reporting function is the Query dialog box. It allows you to produce formatted output from one or more files with finely tuned control over both the output content and the presentation of the output. You can specify headings for the report and each field, which fields to include, their position and length on the page, the link between multiple related files, calculated fields, groupings of fields, and whether you want fields summed, averaged, counted or totaled. The sort order that records will appear in can also be specified, and you can send the report results to disk, printer or another *Superbase* file. All of these options are selected using simple dialog boxes.

There is a function available for laying out and printing mailing labels up to four across.

Superbase Personal packs a lot of power, but the manual presents the features very well. It's clearly written and contains multiple tutorials. The subject of relational files is glossed over somewhat, which is too bad, because it is the hardest concept for a beginner to understand, and *Superbase*'s handling of relational databases is quite elegant. Overall, however, the manual is well written and should be sufficient with a little experimentation. The manual is written for the GEM version of *Superbase* on the IBM PC. There is a section in the front which explains the differences between the PC version and the ST version. Fortunately, these differences are very minor.

The power of *Superbase Personal* makes it ideal for heavy-duty applications, while it is simple enough for most beginners to set up and begin using immediately. There are some bugs still in it, such as the string functions not working properly. The ability to use picture files and ASCII text files make *Superbase Personal* an ideal tool for some specialized uses, such as a real estate database. I like *Superbase Personal* well enough to have switched to it for my own purposes. I don't think you will be disappointed in it.

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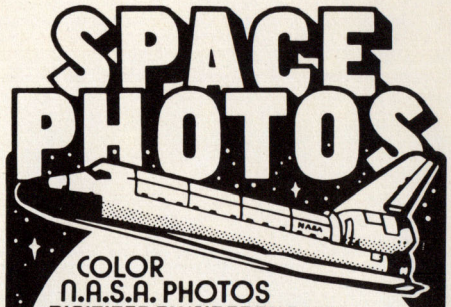
$149.95

ST

SPACE PHOTOS



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Front & Back Hardcopy

Patrick Dell'Era

Everyone has text files: letters, reports, documentation for programs, source code. If you need hardcopy, you want a quick and easy way to format and print these files. Here's a program that does the job with aplomb. You can even print on both sides of the paper to make a convenient, readable, two-sided document for binding into folders and notebooks. This accessory works in all screen resolutions.

Perhaps you'd like a hardcopy of the README file that came with your latest software purchase. Or maybe you need a quick listing of the source code for the latest program you're writing. Or how about an extra copy of that report for the boss?

The GEM Desktop allows you to print out text files, but in a rather unremarkable way. You get a plain-Jane printout that doesn't skip page perforations, has fixed margins and page lengths, and omits headers and page numbers. Furthermore, you can't manually feed single sheets of paper into the printer.

One way to get a better printout is to use a word processor to load and print the text file—but this can be a bother. It's time-consuming, and you have to add word processor commands to the text to achieve the desired formatting.

"Front & Back Hardcopy" is an easy solution to the problem. You can quickly call it, specify how you want your printout to look, and get a neatly formatted printout in minutes. You can specify the left, top, and bottom margins, set the number of lines per page, start each page with a header, include page numbers in headers, specify a starting page number, and print either continuous forms or single sheets. You can also print every page, a few pages, or just one page in the text file. The latter two options allow you to fix mistakes without having to reprint the whole file.

Perhaps the most innovative feature in Front & Back Hardcopy is that you can print on both sides of the paper if you want. This makes it possible to generate documents suitable for binding into a folder or loose-leaf notebook.

Getting Started

You'll find Front & Back Hardcopy on the magazine disk in the files named FRNTBACK.AC and FRNTBACK.RSC. Because the program is an accessory, it can't be run from the disk menu program or from the GEM Desktop. Copy both files to another disk, and change the name of FRNTBACK.AC to FRNTBACK.ACC. To install the accessory, reboot your ST, press Reset, or change resolutions.

(*Note:* If you have a hard disk or a ramdisk installed as drive C on your system, you must copy FRNTBACK.ACC and FRNTBACK.RSC to the root directory of drive C. The ST always looks for desk accessories on drive C if that drive is present. Also, keep in mind that current versions of the ST's operating system restrict you to a maximum of six desk accessories installed at one time.)

After you've installed the accessory, drop down the desk menu and select Front & Back Hardcopy.

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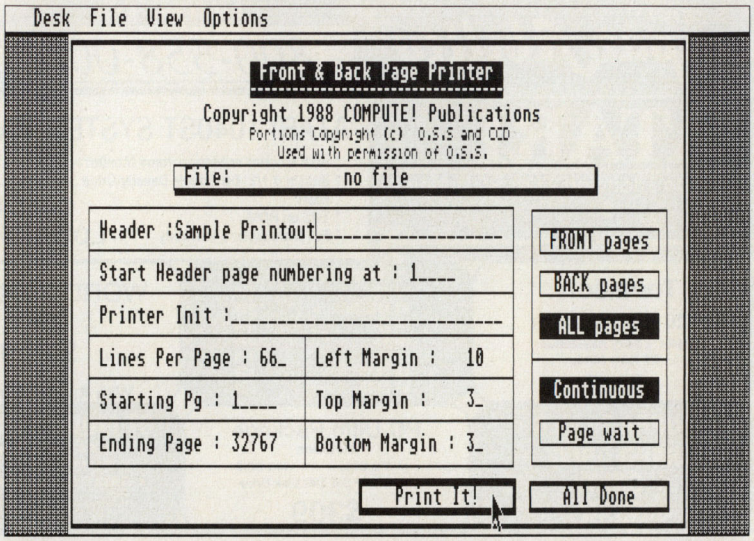

Figure 1: *The medium- and high-resolution version of* Front & Back Hardcopy *allows you to enter data on the main screen.*

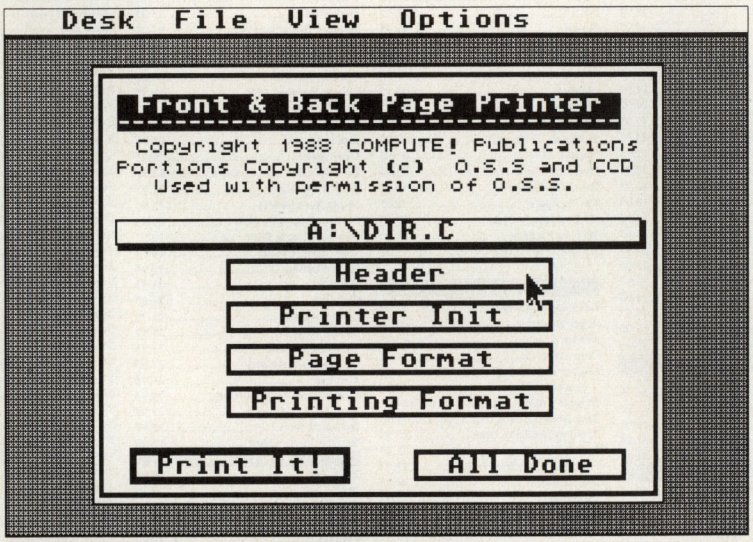

Figure 2: *In low resolution, you make selections on the main screen, then fill in the data on a secondary screen.*

Preparing the Printout

The first box (labeled File) is where you select the file you want to print. Move the mouse cursor to this box, click, and then select a file with the file selector box. You are alerted if there is a problem opening the file you have chosen.

The second box (Header) is where you enter the optional page header. Anything entered here is printed at the top of every page. If you want a page number included in the header, type the commercial *at* symbol (@) anywhere on the line; Front & Back Hardcopy prints the page number at that position in the header. For example, the entry *Budget Report/Smith/Page @* would generate the following header at the top of every page: *Budget Report/Smith/Page 1*. (Of course, the page numbers are incremented automatically.)

If you don't want a header, leave this box blank.

The third box (Start Header Page Numbering) lets you indicate at what number you want page numbering to begin—assuming, of course, that you've used the @ symbol somewhere in the header. You'll notice that the page number is already set for page 1, which is where you'll usually begin, but you can start numbering at any other number, if you like. Some people prefer to omit the page number on the first page.

The Printer Init box allows you to specify a printer-setup string. This string should be typed in decimal numbers separated by commas. For example, to set the printer to its default startup condition, you might type *27,64* in this box. You can use this box to activate printer features such as condensed mode or double-strike. The Printer Init string is sent to the printer once each time you begin printing.

The next box (Lines Per Page) is where you indicate how many lines will fit on a page. Most printers fit 66 lines on an 8½ × 11 inch page, so this setting is the default. If your printer prints more than 66 lines per page (European or legal size, for instance), adjust this figure accordingly.

The next two boxes (Starting Pg and Ending Page) determine which pages of the file you want to print. Usually, you'll start at page 1 and print to the end, which is what the default settings do. But you can start printing on page 6 and end on page 8, for example. If you want to print just one page, use the same page number for both entries. This option allows you to reprint any page or pages you've changed without reprinting the whole document.

Setting Margins

The purpose of the next three boxes (Left Margin, Top Margin, and Bottom Margin) is pretty obvious: They allow you to set margins. They require a bit of care, however. If you've entered a header, be sure to specify a top margin of at least 3 to leave room for it; otherwise, the header won't print.

Be careful with the left margin setting, too. If there are long lines in your text file that, when

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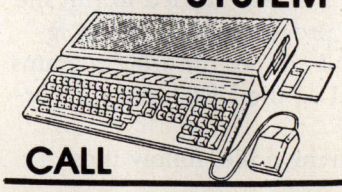

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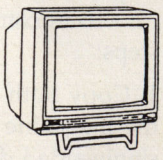

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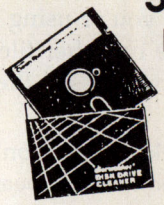

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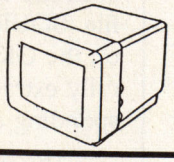

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added to the left margin, are wider than your printer carriage, a mess will ensue. For example, if a left margin of 10 is added to a 75-character line, the total is 85 characters wide. That's wider than the 80-character-wide capacity of most printers, so the extra five characters will wrap around to the next line. If you can't avoid this kind of overflow problem, set your printer for condensed type.

If you plan to bind the finished pages into a folder or loose-leaf notebook, use an extra-wide left margin to leave room for the punched holes and rings.

Ready to Print

In the top box on the right side of the screen, you can choose whether to print on only one side of the page or on both. Note that to use the front-and-back feature, a sheet-fed printer is desirable so you can insert the sheets backward after one side is printed. A printer that has tractor feed only is a little clumsier to handle because you're dealing with a long strip of continuous forms.

If you want to print a standard one-sided document, select the All Pages option. If you want to print on both sides of the paper, first choose the Front Pages option. Then select either Continuous or Page Wait, and click on Print It to begin printing. When the printout is done, select the Back Pages option, and feed the paper into the printer backward. Be sure the first page you feed backward is the first page in the document, because the next page to be printed will be the second page in the document. This method works by first printing all the odd-numbered pages, and then, when you've turned the paper over, the even-numbered pages.

When you've finished your printouts, select All Done to close the desk accessory.

Note: Be sure the file you print is a plain ASCII text file. If the file contains special control codes from your word processor—such as codes for underlining, italics, centering, and so forth—you should remove them before printing the file with Front & Back Hardcopy. Most word processors allow you to save a file in plain ASCII format, which strips away all of these codes. Sometimes this is called "printing to disk" or "saving as text." If you're using *1ST Word*, turn off WP mode before saving the file. Consult your word processor manual if you aren't sure.

Front & Back Hardcopy is written in OSS *Personal Pascal*. For those interested in programming, a source file called FRNTBACK.PAS is included on the magazine disk in a special condensed format. This file isn't needed to use Front & Back Hardcopy—it's provided for those who wish to study or modify the program. For more information on uncompressing this file, see "Uncompressing Source Files" elsewhere in the issue. **ST**

Portions of this program (the linked libraries) are copyright 1986 by OSS and CCD. Used by permission of OSS.

Uncompressing Source Files

Todd Heimarck, Editor

The source code files for the programs on the magazine disk have been compressed and combined into a single archive file called SOURCE.ARC. To extract and uncompress them, you must use the program called ARCX.TTP, also included on the disk.

Note that *only the source code files* have been archived. Source files are mainly for the benefit of programmers who wish to study how the programs work; none of the source files are needed to run the programs. If you're not a programmer, you can ignore these instructions and simply run the programs as explained in "How to Use the Disk" and the corresponding articles.

To uncompress the archive file, follow these steps:

1. Copy both ARCX.TTP and SOURCE.ARC from the magazine disk to a second disk. If you're using a single-sided drive, make sure there are no other files on the other disk. Otherwise, the uncompressed files may not fit.
2. From the GEM desktop, double-click on the icon or filename for ARCX.TTP. A dialog box will appear.
3. In the dialog box, type the name of the archived file (SOURCE.ARC) and either press Return or click on the OK button. All source files are then automatically extracted and uncompressed. See the corresponding articles for explanations of the files.

The original ARC program for the IBM PC was developed by System Enhancement Associates and is covered by their copyright. The ST version was written by Harvey Johnson. ARCX.TTP appears on our disk with their permission. The full-featured shareware program ARC.TTP, which allows you to compress files, is widely available from bulletin board systems and user groups. **ST**

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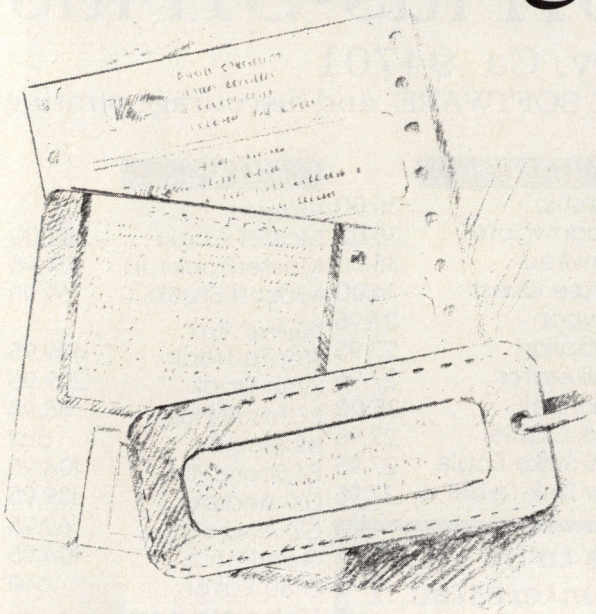

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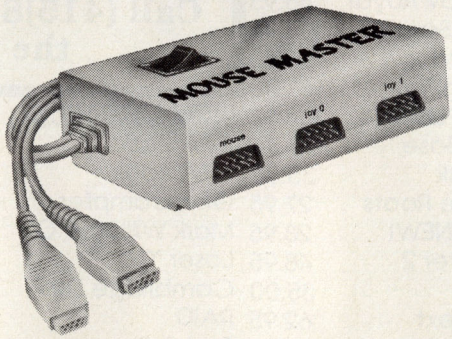

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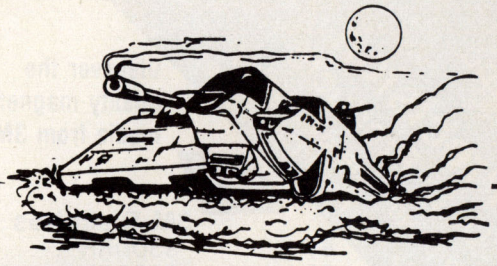

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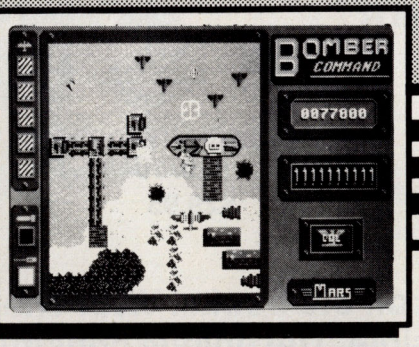

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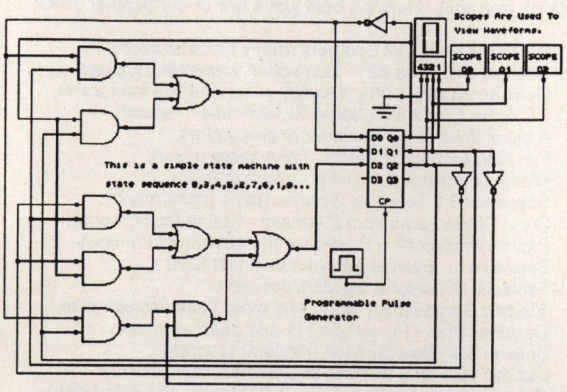

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How To Use The Disk

Every issue of *COMPUTE!'s Atari ST Disk & Magazine* includes a 3½-inch microfloppy disk as part of the package. If you experience a problem with the disk, please contact us at (919) 275-9809 from 8:30 a.m. to 4:30 p.m. (Eastern time), Monday through Friday.

To use the disk, simply insert it in a drive and click on the appropriate file-drawer icon to display the directory window. If you wish, you may boot up your ST with this disk by inserting it in drive A and then switching on the computer, but normally it contains no active desk accessories.

There are two ways to access programs and files on the disk. You can simply run or examine the files from the GEM desktop as usual. Or you can use the custom disk menu program on the disk that contains descriptions of each file as well as special instructions. To run the menu program, double-click on the file named DISKMENU.PRG. It works in all screen modes, color or monochrome.

One screen at a time, DISKMENU.PRG displays a directory of files on the disk. Click on the lower buttons labeled *Prev* or *Next* to display the previous or next screen.

At the top of the disk menu are three buttons labeled *Description, QUIT,* and *Run program.*

The *Description* button calls up a screen which describes the program or file. At the bottom of this screen are the filename and two buttons labeled *MENU* and *RUN*. Clicking on the *MENU* button returns you to the disk menu. Clicking on the *RUN* button loads and runs the program. However, if this particular file is not a runnable program (for example, a source code or data file), the *RUN* button is dimmed and disabled.

You can also run a program directly from the disk menu by clicking on the *Run program* button at the upper right. However, if this particular file is not a runnable program, you'll be alerted to this fact.

Note that many files on the disk require special instructions or explanations; please refer to the corresponding article before attempting to run a program or access a file.

Clicking on the *QUIT* button on the disk menu returns you to the GEM desktop.

There are four files on the disk which are required for the disk menu program: DISKMENU.PRG, DISKMENU.RSC, MONOMENU .RSC, and CONTENTS.JUN. These files do not appear on the disk menu itself. Do not delete them if you intend to use the disk menu. If you plan to use the disk menu, be sure these files are copied when you back up the disk.

Our disk is not copy-protected. You are encouraged to make a backup of the disk as soon as possible. However, the contents of the disk are copyrighted and may not be used by anyone other than the owner of the magazine. Since the writers and programmers whose work appears on this disk are paid, in part, with royalties according to the volume of sales, we ask that you respect the copyright. **ST**

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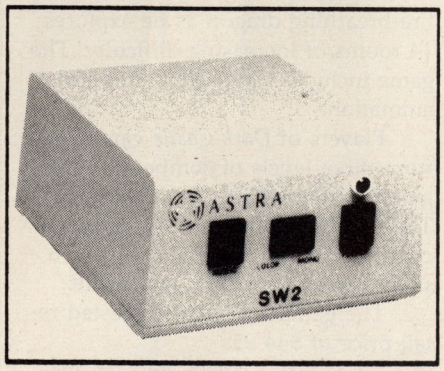
Astra News

So. Calif. Astra Systems Inc. 2500 L. So. Fairview Santa Ana, CA. 92704 (714) 549-2141

Santa Ana, CA. Astra systems announced the release of it's new monitor switch box today. Unlike other switch boxes on the market, Astra's unit switches both the signal and power lines. This means **true one button operation.** No longer is it necessary to turn the monitors on and off manually.

An important side effect of this is it protects the monitor from burnout due to accidently leaving it on for long periods without a signal from the computer. Several mono monitors have been ruined because they were left on and the computer was turned off.



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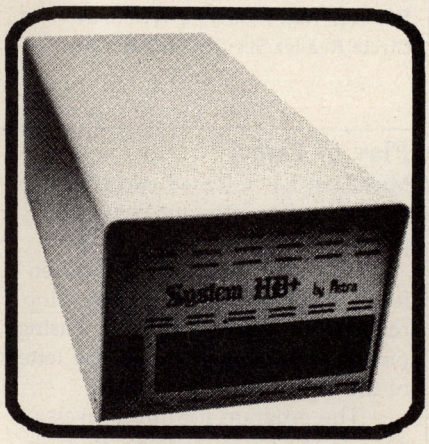

In a recent letter to Astra Systems, Greg Welchel of the Pointer Sisters group praised the **System HD+** hard disk system. "We recently returned from a tour of Europe and both of the System HD+ units performed flawlessyl Thanks for making such a great unit." This is not surprising as the System HD+ is affectionately known as **"The Tank"** in pro MIDI circles. The additional DD/DS 3.5" floppy has become even more convenient since Atari drives no longer format 82 tracks. The additional storage per disk is really nice.

The System HD+ is not limited to use by the musicians. Many letters to Astra attest to the fine quality and resistance to accidental damage. Aside from it's sturdiness, it is a fast, quiet, and cool way to store valuable data.

Quiz Wizard is fun!

Astra System's new trivia game "Quiz Wizard Elite" is a ball! With great sound and graphics "little Wiz" leads all ages through the world in quest of knowledge. Up to four may play at one time. Test your knowledge of sports, geography, TV, or make your own tests to help you and your children learn a specific subject. Hard copy printout for classroom use.

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Celebrity Chefs

Merrill Ward & Associates has released an Atari ST version of *The Celebrity Cookbook, Volume 1*. This professional catering program was written especially for the home market and features a personal recipe filer.

The personal recipe filer is designed to work like a word processor, while the cookbook combines word processing with recipe storage and catering features. The cookbook also features a wine and bar guide, party tips, and a collection of the favorite recipes of celebrities such as Bob Hope, Frank Sinatra, Sophia Loren, Ronald Reagan, and others. It also includes celebrity diet hints.

The program retails for $34.99.

Merrill Ward & Associates, 255 N. El Cielo Rd., Suite 222, Palm Springs, CA 92262

Circle Reader Service Number 200.

New *Data Dumpster*

Music Service Software has announced a new version of the *Data Dumpster* for the Atari 520ST and 1040ST called *The Data Dumpster ST*. The original program has been rewritten to take advantage of the mouse and the ST's GEM Desktop. The program is compatible with over 30 different MIDI instruments and keyboards. System-exclusive information from a compatible instrument can be stored, including synthesizer patches, drum machine patterns and sounds, sequences, sample waveforms, and synthesizer waveform data.

Features include a total buffer area over 310K on 520STs and over 835K on 1040STs and expanded 520STs. Twenty different data files can be in memory at one time, and any file can be sent via MIDI with a couple of mouse clicks.

The Mini-Dumpster, a desktop accessory, is included with the program, allowing users to load and send MIDI data files from within other GEM programs.

Suggested retail price is $89.95.

Music Service Software, 801 Wheeler Rd., Madison, WI 53704

Circle Reader Service Number 201.

Play to Learn

MichTron has released two new educational games, one for young computer users, the other for all ages.

ABZOO teaches young children letter recognition and helps develop reading and typing abilities by using pictures of animals to teach the letters of the alphabet.

The program has three levels of play. In the beginner level, students press letters, and an animal whose name begins with that letter appears on the screen with its name spelled above it. The intermediate level requires students to type the animal's name while the name is displayed on the screen. In the advanced level, the student must type the name of the animal after it disappears from the screen. With each correct letter typed, a portion of the animal returns to the screen until the name and animal are completed.

The program rewards correct answers by playing music and by changing colors, and there's never a penalty for an incorrect answer.

The suggested retail price for *ABZOO* is $39.95.

MichTron has also released *Invasion*, which is designed to help users improve their basic typing, spelling, and math skills. Players must destroy invading strings of characters as they drop from the sky and hit the city. The player's only defense is to type in sequence the characters falling from above. If any invader penetrates the defense, it will destroy part of a building. Missed words or math problems weaken the defense foundation. Sirens sound if the defense becomes inadequate.

Players can add or modify the contents of the game by using the programming feature. There are three levels of difficulty from which to choose.

Suggested retail price is $39.95

MichTron, 576 S. Telegraph, Pontiac, MI 48053

Circle Reader Service Number 202.

FractalMagic

Sintar has released an Atari ST version of *FractalMagic*, which generates and displays fractal images. The ST version takes advantage of the ST's graphics capabilities. Users may select fractal images from four different fractal equations, including the Mandelbrot set.

The program has a suggested retail price of $25.00.

Sintar, P.O. Box 3746, Bellevue, WA 98009

Circle Reader Service Number 203.

Defeat the Lord of the Castle

Three-Sixty has recently released an Atari ST version of *Dark Castle*.

The game features a hero who must battle against rats, bats, and a fire-breathing dragon as he explores 14 rooms of increasing difficulty. The game includes digitized sound and animation.

Players of *Dark Castle* can choose from three levels of competition: Beginner, Intermediate, or Advanced. The hero's on-screen movements are controlled through the use of seven single-stroke keyboard commands.

The game carries a suggested retail price of $44.95.

Three-Sixty, 2105 S. Bascom Ave., Suite 290, Campbell, CA 95008

Circle Reader Service Number 204.

ST Speed Enhancer

Softrek has announced the release of *Turbo ST*, a speed-enhancing "software blitter" for the ST. Users click on the desk accessory to give the computer speeds in excess of the hardware blitter.

Turbo ST does not interfere with

other programs including word processors, program editors, and databases. The program works by intercepting calls to GEM routines and replacing them with optimized assembly language equivalents. It concentrates on the most frequently used and most time-consuming routines to speed up screen graphics.

Suggested retail price is $49.95.

Softrek, P.O. Box 5257, Winter Park, FL 32793

Circle Reader Service Number 205.

Capture a Roland

MIDImouse has announced the release of new editor/programmer/librarian programs for the Roland MT-32, D-50, and D-550 synthesizers.

MT-32 CAPTURE! and *D-50 CAPTURE!* take advantage of the GEM interface of the Atari ST, including pull-down menus and sizable, multiple, movable windows, and access to all MIDI and system-exclusive functions. Desk accessories can be used with both programs.

Features include full librarian functions, including bank and patch copy. Three banks each of tones and system setups may be copied and loaded. The icon-oriented control windows are available for global librarian, MIDI, disk, print, and edit functions. The programs also feature full on-line help functions. The suggested retail price of each program is $99.95.

MIDImouse Music, Box 877, Welches, OR 97067

Circle Reader Service Number 206.

New MIDI Software

Electronic Courseware Systems has released 16 MIDI instructional programs that help develop performance skills, keyboard skills, ear-training skills, and chord analysis recognition.

The software line has been divided into a beginner series and an intermediate series. The beginner series includes *Keyboard Note Drill, Keyboard Blues, Twelve-Bar Blues, Super Challenger, Keyboard Kapers, Early Music Skills, Musical Stairs, Keyboard Namegame,* and *Keyboard Tutor.* The intermediate series consists of *Keyboard Jazz Harmonies, Keyboard Chords, Keyboard Intervals, Keyboard Fingerings, Keyboard Arpeggios, Keyboard Speed Reading, Keyboard Extended Jazz Harmonies,* and *Functional Harmony: Basic Chords.*

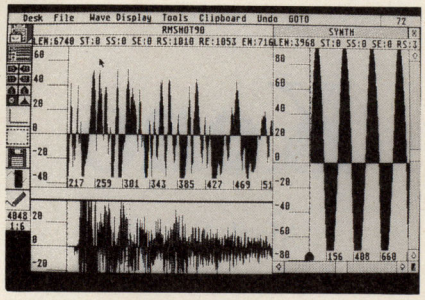
All 16 programs are available for the Atari 520 and 1040ST and may be used with either a monochrome or a color monitor.

Electronic Courseware Systems, 1210 Lancaster Dr., Champaign, IL 61821

Circle Reader Service Number 207.

Additions to *Soundworks* Series

Steinberg/Jones has announced the release of two new sampler editors from the Soundworks series. The two new programs that work with the Atari 1040ST are for the Emu EMAX and the Prophet 2000/2002.



With Soundworks, *users can draw their own wave shapes.*

Soundworks can be used with any disk drive configuration. The programs require at least 1 megabyte of RAM.

Features include cut, copy, mix, swap, record, and delete. Users can also add three different samples of unlimited length or add parts of them simultaneously. Samples are included with the software.

The programs carry a suggested retail price of $350.

Steinberg Jones, 17700 Raymer St., Suite 1001, Northridge, CA 91325

Circle Reader Service Number 208.

New Cable and Utility

E. Arthur Brown Company has announced the availability of a new composite cable that allows any Atari ST computer to use composite video devices. The cable connects to the standard ST monitor port and converts the RGB signal to gray-scaled low- and medium-resolution composite output. The gray-scaled display can be used on color and monochrome composite monitors.

The cable also works on VCRs for recording and displaying on TV. The monitor end of the cable has both audio and video RCA-type connectors. The suggested retail price is $24.95.

Brown is also distributing *OmniRes,* a utility that allows monochrome monitors to run programs designed for low and medium resolutions, The package also includes a utility for displaying high resolution on color monitors. *ST OmniRes* retails for $34.95.

E. Arthur Brown Company, 3404 Pawnee Dr., Alexandria, MN 56308

Circle Reader Service Number 209.

Autos Amok

Titus has released a three-dimensional action game called *Crazy Cars* that features 72 skill levels and four different cars.

The players attempt to travel across the country in the fastest possible time. Players must beat the clock as they drive from Florida to California in a Mercedes 560 SEC and then back to Florida in a Porsche 911 Turbo. The best time can then be challenged by a Lamborghini Countach 5000 S and a Ferrari GTO.

The game retails for $39.95.

Titus Software, 20432 Corisco St., Chatsworth, CA 91311

Circle Reader Service Number 210.

Three Resolutions on One Monitor

X-Press Publishing is now distributing *OmniRES,* which allows users to run color-only programs on monochrome monitors and mono-only programs on color monitors.

Users can now run programs such as *Spectrum 512 Slide Show, Mean 18,* and *Temple of Apshai* on a monochrome monitor. Color users can now run high-resolution programs, including *ST Writer*'s hi-res mode, *Flash*'s hi-res mode, *1st Word Plus*'s hi-res mode, and *VIP Professional*'s extra display modes.

The program retails for $34.95.

X-Press Publishing, P.O. Box 2383, La Habra, CA 90632

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Keno

Mark Siegel

Modeled after the casino game, "Keno" challenges you to predict the future. How many numbers can you catch? The odds are against you, but given a little luck, supernatural prescience, or a savvy gambling system, you might win up to $50,000. Separate versions are included for color and monochrome systems.

In Las Vegas, you don't have to stop gambling just to eat lunch. If you ever visit a casino restaurant, you're bound to see several large Keno boards on the walls. Each table has an ample supply of Keno cards, on which you mark the numbers you think might be lucky. Hand the card (and your bet, of course) to a Keno runner, and you can lose money while you eat your hamburger.

Keno is very easy to play. The board contains the numbers 1–80. In each game, 20 numbers are randomly selected. Casinos generally use numbered ping-pong balls; the computer version uses the random number generator. The object of the game is to predict the numbers that will be selected. The payoffs are based on how many matches come up.

You'll find the programs on the disk under the filenames KENOCOL.PRG and KENOMON.PRG. No additional resource or data files are required. The game runs in low-resolution color mode or high-resolution monochrome. You may run it from the GEM Desktop or from the menu program.

At the start of the game, you see the Keno board, the game control buttons, and your bankroll—$1,000 in computer cash. The Keno board consists of numbers ranging from 1 to 80. Using the mouse, click on the numbers you wish to play. If you change your mind, click a second time to erase the check mark.

The player has caught 7 of 15 spots, winning $80 on a $10 bet. A click on Play Same will replay the lucky number.

In Keno jargon, your choices are referred to as *spots*. You may play only 1 spot or as many as 15. If you decide to play the maximum of 15 spots, the game starts automatically after your last pick. Anytime you play less then 15 numbers, begin the game by clicking on the Keno button. The computer then selects 20 random numbers. Each time the computer matches one of your choices, you have *caught* a number. Depending on how many spots you pick, and how many you catch, you win or lose.

The Odds Are Against You

Casinos make money by calculating the odds in a game and adjusting the payouts to allow for a profit. Keno is no exception to this rule. Let's say you select your lucky number 22 as the only spot. Since 20 of the 80 numbers come up, you'd expect to hit 22 once every four times on the average. But the payout on one number is only $3 for each dollar wagered. If you played 400 times at a dollar each, you'd win about 100 games. You'd get back $300 of the $400 you bet. The odds for multiple numbers are a bit more difficult to calculate, but one thing is certain: The odds favor the house.

To see what you might win, click on the Payoffs button. A small chart appears, listing the payoffs for the number of spots you've picked. The winning totals take into account the current size of your wager. For instance, let's say you've selected five spots and you're betting $20. To see how many numbers you have to catch to win, and how much you could win, click on the Payoffs button. According to the chart, catching zero, one, or two numbers means you're a $20 loser. But if you catch three out of five with a $20 bet, you win $40. Catch four out of five and win $400. All five nets you a whopping $9,600. You may view the payoff window anytime before or after a game, but not if the board is empty. To view the payoffs for 15 numbers, you'll have to wait until after you've played them once since a Keno game begins immediately after you mark a 15th spot. As in Las Vegas, the maximum payoff is $50,000. In the Special mode (explained below) you could win more, but it's very unlikely.

At the start of the game, the bet defaults to the minimum of $1. As they say in Vegas, "The more you bet, the more you win." If you're feeling lucky, you may wish to increase your wager. Click on the Bet button to open the Bet window. By clicking on the arrows above and below the numbers in the Bet window, you can change your wager to whatever you wish (up to $9,999), providing you have enough money. And for all you high rollers, just click on All and your whole bankroll can be sacrificed in one grand gesture. If you have second thoughts, a second click on All will restore the previous amount, but this must be done before you exit the Bet window. Click on the OK button to return to the game.

You don't have to place a bet before each Keno game. Whatever amount is currently showing is carried over to the next game. If your bet ever becomes larger than your Keno bank account, the Bet window automatically opens.

Better Luck Next Time

To clear the board after each game, just click on Play New and you can pick new numbers. However, if you would prefer to replay your previous picks, use the Play Same button. Note that Play Same starts the next game immediately, so if you want to change your bet, do it before clicking on Play Same. The Play Same button will not work after choosing Play New and vice versa.

Wildcards

Keno offers two different modes: Normal and Special. Either mode may be chosen by clicking the appropriate button. The letters on the selected button will light up; the other will turn dark. (The selected button is underlined in the monochrome version.) Normal—standard Las Vegas Keno—is the default mode. The odds of standard Keno greatly favor the house; don't count on winning much money.

The Special mode provides some additional chances to win—and to lose. In Special Keno, one hidden number is randomly selected before each game. If one of your spots matches the hidden number, one of five different symbols appears. Depending on what pops up, you could win up to seven times the amount you've bet. Plus (yes, there's more), if the symbol itself is caught during the game, you get a bonus of $100.

Unfortunately, one of the symbols which may appear is a bomb, and we all know that a bomb on the monitor means trouble. Every time you catch a spot after the bomb has popped up, you'll lose the amount of your bet. And, to make matters worse, if you catch the bomb during the game, your computer bank account will shrink by $200.

Double or Nothing?

Another feature of Keno that you won't find in Vegas is the double or nothing option. Every time you win, you'll be given the opportunity to double your winnings. To look at it another way, you'll be given the chance to lose what you've just won. If you choose to gamble with your winnings, one of two short games of chance will follow. In one, a highlighted square randomly moves about the game board, slow downs, and stops. You must guess if it will stop on an odd or even number. This gives you a 50/50 chance to win, better odds than you'll find anywhere in Las Vegas. The other possibility is also a 50/50 proposition. A dollar sign randomly pops up here and there on the Keno board. You must decide if it will stop on the top half of the board (numbers 1–40), or in the bottom section (41–80).

Quit While You're Behind

Keno ends when you run out of money, when you get tired of losing and click the quit button, or when you win too much money and get booted out of the casino.

The program was written in compiled GFA BASIC. Because the accompanying disk is nearly full, there was not enough room to include the Keno source code. ST

Welders

Eugene Borg

Each issue, COMPUTE!'s Atari ST Disk & Magazine *features computer artwork contributed by an ST artist. You'll find the* NEOchrome-*format file on the magazine disk under the filename ART.NEO. It can be loaded into any graphics-design program compatible with* NEOchrome *files.*

To contribute a screen, send the disk to COMPUTE!'s Atari ST Disk & Magazine, *P.O. Box 5406, Greensboro, North Carolina 27403. All artwork must be completely original and previously unpublished in any form. Screens should be drawn in the low-resolution color mode in either* NEOchrome *or* DEGAS *format. You may include some text describing the artwork and any special techniques employed. We pay $100 for artwork accepted for publication. Accepted artwork becomes the property of COMPUTE! Publications, Inc. Only those disks accompanied by a self-addressed, stamped mailer will be returned.*

Artist's Notes

With their metallic appearance in tones of gray, helmeted heads, and bright red eyes, this otherwise ordinary grouping of welders takes on an eerie, science-fiction feel.

When creating my drawings, I try to remember the adage "If you want to create great art, you have to start with great art." I try to keep a lot of artistic and photographic source books around for inspiration and ideas, sometimes adapting a drawing or a photo to the ST's screen. In this case, inspiration came from a 1930s photo from the book "The Restless Decade" by John Gutmann.

The original is black-and-white. I added color, transforming it from a snapshot of the Depression era to a glimpse of the robotic future. Although it's loosely based on a previous work, I did draw it freehand using *DEGAS Elite.* I tried to retain the spirit of the original, while altering and readapting it to the computer environment. **ST**

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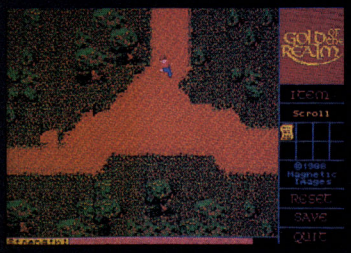

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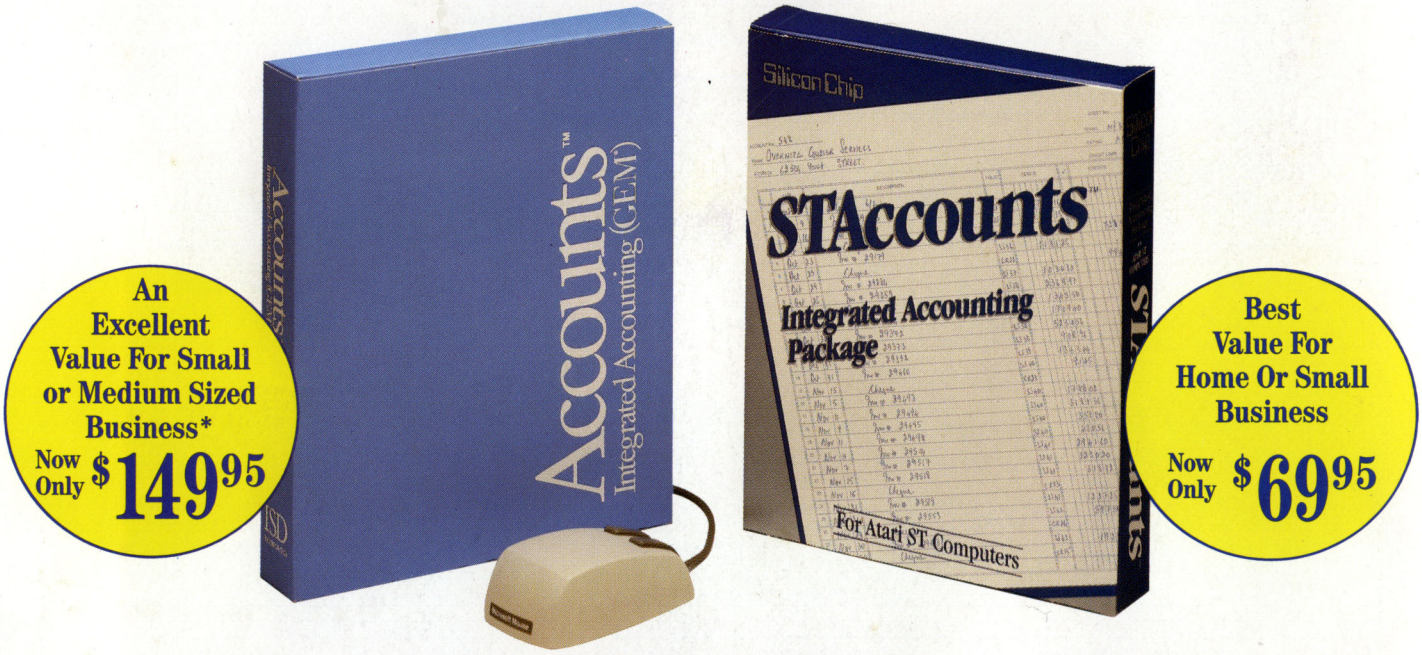

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