Macintosh Emulator: In-Depth Review

DISK INSIDE

COMPUTE!'s Atari ST DISK & MAGAZINE

April 1988

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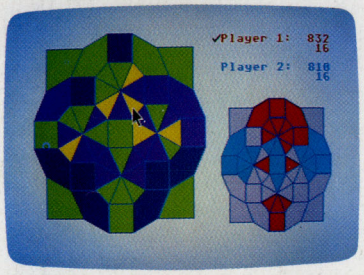

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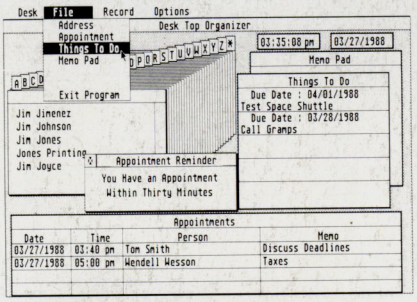

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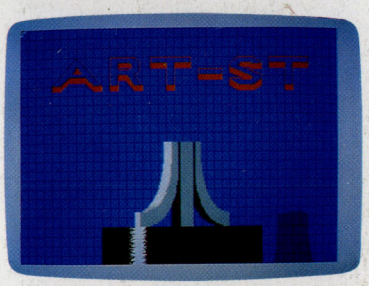

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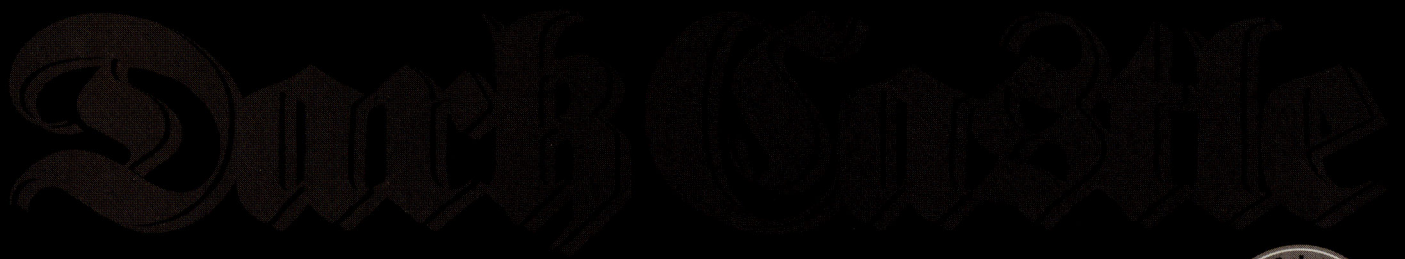

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The Editor's View

Crossroads For The ST

When this issue appears, the Atari ST will have been on the market for three years. That's a long time in the personal computer industry. In fact, it's more than one-fourth of the time this fledgling industry has existed. So this is an opportune moment to stop and reflect on the ST's current status in the world of personal computing—and to ponder its future.

To be frank, things are not looking so hot for the Atari ST. This isn't a pleasant realization for those of us who like the ST and wish to see it succeed, but it's a realization we have to face nevertheless.

Atari is tight with sales figures, so we don't know the total installed base of STs in the U.S. However, we have talked to numerous ST software developers and industry observers, and their estimates range from a low of 125,000 to a high of 200,000.

That's a minuscule total for a computer that's been available for three years. Even if we accept the high figure, it indicates Atari is selling less than 6000 machines per month in the U.S.—a mere trickle.

By comparison, several million IBM PC–compatible computers have been sold in the same period, and they are rapidly attaining dominance in the home market as well as in their traditional business market. As a result, software developers are rolling out tons of consumer-oriented programs for PCs.

On the other hand, almost every ST software developer we've talked to recently has complained of flat sales. Many of them, just to survive, are branching into different areas. Others are dropping out altogether. Four well-known companies have confided to us that they won't produce any more ST software in 1988.

Meanwhile, the industry has been changing in other ways, too. Although the ST is practically the same machine it was in 1985, today even the Apple IIGS and the low-end IBM PS/2 Model 25 and Model 30 have better graphics and sound than the ST. Fast, powerful AT-class computers with hard disk drives and laser printers cost little more than similar ST systems, and their software is superior. Even if a comparison shopper considers an ST—and in vast areas of the country, Atari dealers are virtually nonexistent—there is no compelling reason to buy one.

Due to its built-in MIDI ports, the ST has attained some success as a peripheral for electronic keyboards. Indeed, in some regions, the ST is more readily available in music shops than in computer shops. But aside from this narrow vertical application, it appears the ST has failed to catch the imagination of consumers.

Atari remains a healthy company, thanks largely to overseas sales and the unexpected resurrection of the home videogame market. Unfortunately, STs seem headed for the same fate as the eight-bit Ataris; they will remain interesting machines dearly loved by their owners, but they'll be irrelevant to the industry as a whole.

We count ourselves among those who still own and love the ST, and fear not, we are determined to continue covering the ST as long as there is sufficient demand. But, like other ST supporters we have talked to, we just wish there were more demand.

Tom R. Halfhill, Editor

COMPUTE!'s Atari ST Disk and Magazine is published bimonthly by COMPUTE! Publications, Inc., 825 7th Ave., New York, NY 10019 USA. Phone: (212) 265-8360. Editorial Offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 6 issues, $59.95. POSTMASTER: Send address changes to: **COMPUTE!'s Atari ST Disk and Magazine**, P.O. Box 10775, Des Moines, IA 50347-0775. Second class application pending.

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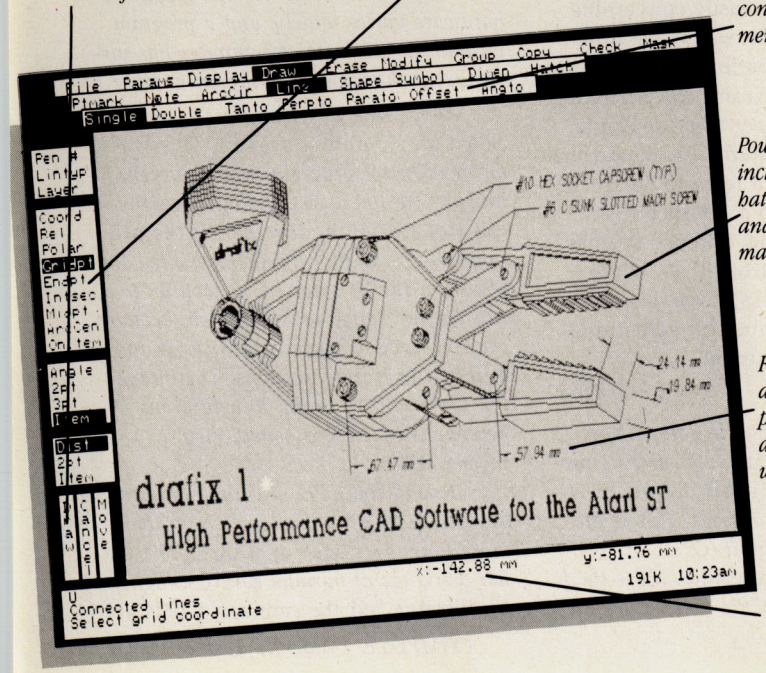

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Readers' Feedback

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 and Magazine, P.O. Box 5406, Greensboro, NC 27403.

The Eight-Bit Emulator Editorial

In the December 1987 "Editor's View," the desire to emulate the old Atari machines was pooh-poohed as useless in light of the "next generation" software possibilities. I would give my eye teeth to at least access my existing Atari 800 files on my 520ST. Consider the person maintaining a family history on a home computer; the mechanism must last at least a couple of generations. Curiously, there was nothing negative reported about the ST-PC emulator on page 14.

Thomas P. Becker

I just finished reading the editorial in the December 1987 issue and agree 100 percent concerning eight-bit emulators and the ST. I own several eight-bit computers and use them for a variety of favorite programs. On the same desk, I have an Atari 1040ST. Both computers are very functional and help with a lot of computer work in our household.

I agree that a Macintosh program like *HyperCard* is very appealing as next-generation software. I would like to have such a program for my ST. Atari programmers might try leapfrogging past programs like *HyperCard* and begin dreaming of software that might follow it. Such goals would be better long-range positive influences on the market, rather than trying to create eight-bit emulators to slowly duplicate the glorious past.

Conrad Weiler
President, Santa Barbara Atari Computer Enthusiasts (SBACE)

Thanks for your comments. Please note that our editorial did not "pooh-pooh" the idea of emulators in general. (See our review of the Magic Sac Plus Macintosh emulator in this issue.) Rather, we questioned the wisdom of continuing to invest resources in the development of an emulator that cannot match the original machine's performance and serves no practical purpose.

The point raised about family history is a good one. Because a new generation of computers comes out every few years, there is a genuine need for hand-me-down compatibility—databases, spreadsheets, and text files all need to be passed on somehow to a new machine. But this is merely a problem of transferring data files; no real emulation is required. In the MS-DOS (PC-compatible) world, many of the newer programs do have the ability to read and convert data files created with older programs. In some cases, special conversion utilities are available. There's no reason why this can't be done just as well on the ST—except, perhaps, that ST programmers are occupied with other matters.

How Compatible Is Compatible?

What goes into compatibility? Why do some programs seem to be carbon copies of others, like *PrintMaster* and *The Print Shop*, or easily convertible (*Degas* and *NEOchrome*), while others are totally incompatible? What are the differences in programs for different machines (like *Paper Clip* for Apple, Commodore, or Atari)? I've heard that you can work on a text file on an IBM at work, save it to a 3½-inch disk, take the disk home, and use the file on an ST. Is this true? If so, why? I realize this is a complex series of questions, but I think it's something people are interested in.

Dennis Ditchfield

To put your questions in perspective, we'll separate the computer and its programs into layers. At the deepest level, there's the microprocessor. This is the central processing unit (CPU), or "central brain" of the computer. More than anything else, the CPU determines the performance of the computer and the type of software that will run on it. The ST, Commodore Amiga, and Apple Macintosh all use the Motorola 68000 chip. The Atari 400/800/XL/XE, Apple II series, and Commodore 64/128 use chips in the 6502 family. IBM PCs and compatibles use the 8088/8086 family of processors. Each type of microprocessor chip has its own machine language, *or set of programming instructions. You could write a 68000 machine language (ML) program that adds two numbers and stores the result in memory, and be assured that it would run on the ST, Amiga, and Macintosh without modification. The 68000 ML instructions are the same on these three computers. In this sense, the computers are minimally compatible.*

However, the 68000 ML program would not run on an Atari eight-bit, Commodore 64/128, Apple II, or PC, because the microprocessors in those computers are completely incompatible with the 68000.

Above the ML level is another layer of hardware that affects compatibility. The CPU gets help from support chips for handling keyboard input, sound, video display, memory management, and other important tasks. On this level, the hardware varies widely, and a program written for one type of computer has virtually no chance of running on another.

Above this is yet another layer called the operating system. *This is a master control program that is largely invisible to the user but that nevertheless ties everything together. If the ML program for adding numbers printed the result on the ST's screen, it wouldn't run on the Amiga or Macintosh, because they all have different video chips and different operating systems. They have the same type of brain, but different personalities. In this sense, they're incompatible.*

Beyond the CPU and the operating system, there are high-level programming languages such as BASIC. The inner workings of various BASICs might be different, but the core commands are

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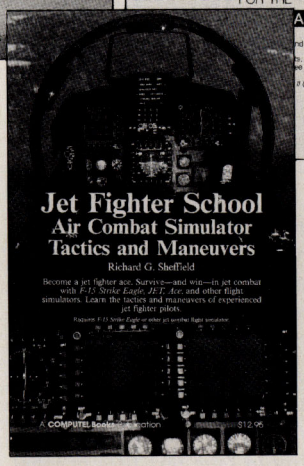

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the same. The line A=2+3:PRINT A *would work in many different BASICs on many different computers because the mathematical operators and the PRINT command are standard. However, many BASIC programs cannot be transported from one machine to another because of special commands called PEEKs and POKEs which directly manipulate memory almost on the same level as ML. Some BASIC programs are compatible, some are not.*

When you wonder how a program like PaperClip *can run on several different computers, you're really talking about three separate programs. Since the older Atari, Commodore, and Apple machines all use the same type of CPU, a few parts of the programs might be the same, or at least similar. But the differences far outweigh the similarities, so each of the three programs is customized for a specific machine. Many commercial software companies hire programmers to translate popular programs from one computer to another. Often this translation involves a complete rewrite.*

File compatibility, the other question you raised, is unrelated to computer compatibility. If your word processor has the ability to save text files in what is known as ASCII format *(straight text, with no special formatting codes), you could send the file over phone lines to a second computer which has a different microprocessor, different operating system, and even different disk format. If the second computer has a word processor that can load ASCII files (almost all do), you're ready to go. That's because ASCII, the American Standard Code for Information Interchange, is a nearly universal microcomputer standard for encoding characters.*

Nontext files, such as graphics screens created with NEOchrome, *don't adhere to any standards but their own. If the file structure is known, programmers can design their programs to load files from other popular programs; that's why* DEGAS Elite *can load* NEOchrome *pictures.*

Disk formats are one final area of compatibility. Different computers use various methods for storing and keeping track of data on their disks. As it turns out, the 3½-inch disk drives found on IBM PCs, Commodore 64s, and Atari STs use almost identical disk formats. (Amiga and Macintosh disks, on the other hand, are quite different.) Since the disk formats are compatible, it's possible for programmers to design word processors, spreadsheets, and other types of programs for the ST that can directly read files saved with PCs. You can transfer these files between an ST and a PC equipped with a 3½-inch drive as long as the disk was formatted first on the PC.

The FM Models

What are the main differences between the 520ST and the 520ST-FM?

Rinaldo J. Garcia

The 520ST-FM has a built-in floppy disk drive, just like the 1040ST. Otherwise, it is virtually identical to a regular 520ST.

Cartridges, Clocks, And Linefeeds

I bought a 1040ST this summer and I have several questions.

Why does typing a lowercase *c* create a cartridge directory window when I select Install Drive from the Desktop?

Can I buy a higher speed variant of the 68000 and run it at 12 MegaHertz? If so, what side effects would there be?

I run *PC-Ditto*, and, when I try to do a graphics dump from GW-BASIC, my printer insists on giving me linefeed stripes. When I suppress linefeeds, I get none at all. What can I do?

Lawrence Benjamin

The designers of the ST apparently made provision for multiprogram cartridges, although we haven't seen any. Presumably, you'd select the program by opening a directory and clicking on the program's icon. The drive icon would need an identifying letter, and c *(for cartridge) seems to make sense.*

A 12 MegaHertz (MHz) 68000 microprocessor wouldn't do you much good. An automobile that's capable of 150 miles per hour doesn't necessarily travel at that speed. Similarly, a microprocessor that's rated for 12 MHz doesn't necessarily run at 12 MHz. The ST's system speed is 8 MHz, and it's controlled by an internal clock. If you replaced both the 68000 and the clock, you'd have to worry about the effects on the other chips. Faster computers often need faster (and more expensive) memory chips, too. You might be forced to rewrite the operating system as well. In short, you can't increase the ST's speed by simply replacing the 68000.

The stripes between lines in your graphics screen dumps are not related to the presence or absence of linefeeds. Almost all printers are able to change the spacing between lines. Usually, you should set the spacing for six lines per inch for text and eight lines per inch for graphics. Check your printer manual for an escape code that changes line spacing (there may be a DIP switch setting that does the same thing). Before doing a screen dump, set the printer for eight lines per inch.

Reading The Mouse

Is there any way to detect collisions between the Atari ST mouse pointer and the playfield?

Josh Noble

If you've previously programmed on an eight-bit Atari or a Commodore 64, you probably understand how the sprite collision registers work. On both of those machines, sprites and collision-detection are built into the video hardware.

Although the mouse pointer on the ST acts like a hardware-generated sprite, the computer handles all mouse events in software. There aren't any collision registers you can check.

You can, however, call routines within the Video Device Interface (VDI) and the Application Environment Services (AES) to query the mouse. These routines are vq_mouse *and* evnt_multi, *respectively. Both return the current* x *and* y *coordinates of the pointer. You didn't mention which programming language you're using, but any language except the original ST BASIC can access these routines.*

When you know the mouse pointer's position, you can compare it to the known locations of other objects on the screen to see if a collision has occurred. Admittedly, this is clumsier than checking collision registers on an eight-bit Atari or Commodore 64, but it's the only method available when sprite graphics are not built into the hardware.

Another Solution For Monochrome Art

Regarding Glenn Fralic's inability to view color art on his monochrome monitor [December 1987 "Readers' Feedback"]: Acquiring PICSW7.ARC solved this problem for me. *Pic Switch* 0.7 enables you to view picture files created with *DEGAS, DEGAS Elite, NEOchrome, Paintworks,* and *MacPaint,* as well as picture files saved in the following formats: Tiny, Amiga IFF, Compuserve RLE, Atari graphics modes 8 and 9 screen dumps, Atari *Koala,* and Atari *MicroPainter.* It works on both color and monochrome monitors. It also converts any of the above formats

into *Degas, Degas Elite,* or *NEOchrome* format. It's terrific shareware.

Thomas W. Briant

We downloaded Pic Switch *(which is available on CompuServe, GEnie, Delphi, and various bulletin boards). You're right—it's an extremely useful graphics utility. Thanks for the tip.*

Correction

The machine language example from "All About File Selectors" (December 1987) has several problems. The most obvious error is that the label *dirloop* does not exist. This label *dirloop* is only used once in the *addext* routine, so the correction is simple. The fifth line of the *addext* routine should be **bne extlp**, not **bne dirloop**.

The other problems with the example are more subtle. Many times in the example, the stack pointer is manipulated by adding immediate values. In some cases, the stack pointer is treated as a word value and not as a longword value. In this example, the stack pointer should always be manipulated as a longword value. Make the following changes to correct the problem.

Line 4 of the *getdrv* routine should be **add.l #2,sp** instead of **add.w #2,sp**.

Line 6 of the *getpath* routine should be **add.l #8,sp** instead of **add.w #8,sp**.

Line 4 of the *necin* routine should be **add.l #2,sp** instead of **add.w #2,sp**.

Line 5 of the *writeln* routine should be **add.l #4,sp** instead of **add.w #4,sp**.

Line 5 of the *conws* routine should be **add.l #6,sp** instead of **add.w #6,sp**.

Faster *GFA* Fills

Is there a procedure call using *GFA BASIC* or an assembly language routine to speed up the FILL command? I don't want to use the SGET command as it eats up too much memory.

S.N. Plowden

The FILL command in GFA BASIC, *like those in most other languages, is rather slow. However, there are other options available which eliminate the need for resorting to machine language routines for coloring a screen area.*

To draw a filled box or circle, try using the PBOX orPCIRCLE command. These commands draw a solid object in the color defined by DEFFILL almost instantaneously.

An irregularly shaped object may be drawn and filled at machine language speeds by using the POLYFILL command. To use POLYFILL, define two arrays containing the x- and y-axis of each point in the object. The first point of the shape must be stored in X(0) and Y(0). The last point defined must coincide with the first point defined in order to close the shape. Note that any area where lines cross will not be filled in.

The following program illustrates the use of these commands and demonstrates the speed advantages over the FILL command. The source code is included on the magazine disk under the filename GFAFILL.LST. GFA BASIC *is required to run the program.*

```
DIM x(6),y(6)
DATA 10,10,20,30,5,45,100,100,200,10,10,10
DEFFILL 2
PRINT AT(1,23);"Filled Box ";
t=TIMER
BOX 50,50,100,100
FILL 75,75
PRINT (TIMER-t)/200;" Secs."
PAUSE 250
CLS
PRINT AT(1,23);"Solid Box ";
t=TIMER
PBOX 50,50,100,100
PRINT (TIMER-t)/200;" Secs."
PAUSE 250
CLS
PRINT AT(1,23);"Filled Circle ";
t=TIMER
CIRCLE 100,100,25
FILL 100,100
PRINT (TIMER-t)/200;" Secs."
PAUSE 250
CLS
PRINT AT(1,23);"Solid Circle ";
t=TIMER
PCIRCLE 100,100,25
PRINT (TIMER-t)/200;" Secs."
PAUSE 250
CLS
PRINT AT(1,23);"Defined Shape using
FILL ";
FOR i=0 TO 5
  READ x(i),y(i)
NEXT i
t=TIMER
DRAW x(0),y(0)
FOR i=1 TO 5
  DRAW TO x(i),y(i)
NEXT i
FILL 15,15
PRINT (TIMER-t)/200;" Secs."
PAUSE 250
CLS
PRINT "Standby for POLYFILL . . ."
PAUSE 100
CLS
PRINT AT(1,23);"Defined shape with
POLYFILL ";
t=TIMER
POLYFILL 6,x( ),y( )
PRINT (TIMER-t)/200;" Secs."
PAUSE 250
```

To change the background color, use the command SETCOLOR n,r,g,b.

A Reminder To Make Backups

Editor's Note: Some readers have reported problems with the "Personal Calendar" program from the August 1987 issue. Investigating the problems revealed two potential areas of difficulty.

The first is a simple shortage of space on the magazine disk. As explained in the article, Personal Calendar creates a disk file to store the information you enter. The August disk has only about 2K free, which is not enough for this file. The second problem is that the program doesn't check for all types of disk errors, so the result may be an early termination of the program.

The solution is to copy the Personal Calendar program to a disk that has a reasonable amount of free space (preferably an otherwise blank disk).

Note that very often, the magazine disk is nearly full. Before you run any of the programs, we strongly recommend opening the disk's write-protect switch (to prevent accidental deletions) and immediately making a backup copy. That way, if anything goes wrong, you still have the original disk. When an article indicates that a program creates data files, don't run the program from a disk that's full; instead, copy the program to a disk with plenty of room. **ST**

The Mega ST: New And (Slightly) Improved

As reported in the February issue, Atari's Mega ST computers have finally appeared in limited quantities in the U.S., although at higher prices than expected. The Mega STs have more memory (two or four megabytes) than earlier STs, a blitter chip, an improved version of the TOS operating system, an internal expansion connector, and a firmer keyboard that's detached from the system unit. Aside from these changes, however, there's little difference between existing STs and the Mega ST.

This is raising a question among many ST owners. Since memory expansion kits with up to four megabytes of memory are readily available for 520STs and 1040STs, and Atari has promised to sell blitter chips and TOS upgrades for existing STs, is it worth the price to buy a new Mega ST, or are you better off expanding your old machine?

To help arrive at an answer to this question, let's take a closer look at the new features incorporated in the Mega ST.

How Much Faster?

The blitter is a custom chip that makes it possible for the ST to move blocks of data through memory at higher speeds. This, in turn, speeds up the screen display, since graphics-oriented computers like the ST must shuttle large chunks of data around in memory in order to update or scroll the screen. The Commodore Amiga has a custom chip similar to the blitter, which accounts in part for its somewhat faster graphics processing.

Sheldon Leemon & The Editors

The Mega ST's new TOS operating system is stored on a set of read only memory (ROM) chips, much like those found in 1040STs and all 520STs manufactured after 1985. The Mega ST operating system isn't radically new, however. Basically, it adds support for the blitter and corrects some long-standing bugs in the old TOS.

How much do the new chips actually speed up the screen display? Opinions are mixed. Some users have noted as much as 50 percent improvement in text scrolling with some programs, and almost no improvement with others. Some claim the speed-up is almost entirely due to the new TOS, and that STs outfitted with the new ROMs but without a blitter run almost as quickly as a Mega ST. Others say the minimal speed improvement demonstrated by the Mega ST is due to programs that weren't written to take maximum advantage of the new chips, and that programs such as *NEOchrome*, which were written properly, virtually fly on the new machines.

It will be hard to sort out this large pile of conflicting claims until there are more blitter-equipped STs out there, but that might take a while. Although Atari is still talking about a 520/1040ST blitter upgrade, the target date has been postponed repeatedly. The price of the upgrade is predicted to be anywhere from $100 to $120 (not including dealer installation) for both the blitter and the new TOS chips.

Exterminating Bugs

The new TOS ROMs are designed to be compatible with all STs, even those without blitter chips. The revised code in these ROMs enhances system performance in many areas, and some of the most flagrant bugs in the operating system have been fixed. It should be noted, however, than many of these fixes are more important to programmers than to users. Well-written programs have shielded users from most of the vexing bugs in TOS.

One improvement, as mentioned above, is faster screen output. Character output routines within the Basic Input/Output System (BIOS) are now much faster, and this greatly improves the speed of text-handling (a benefit often attributed solely to the blitter in Mega STs).

Another improvement is that the system now returns immediately after a single mouse click if a mouse button event request to the Application Environment Services (AES) doesn't ask for multiple clicks. This makes for more responsive button detection.

When you select the Show or Print functions from the GEM desktop (after clicking on a nonexecutable file), the new TOS allocates a larger buffer and displays characters with ASCII codes above 127. These are minor improvements, but they do mean that you can more easily examine a nonexecutable file from the desktop without resorting to a disk editor utility.

The disk copy routine has been improved so that copies on single-drive systems require fewer swaps. Most people these days have two drives, or at least one drive and a ramdisk, but this is still a welcome improvement.

The Open Application dialog box that appears when you open a .TTP file now accepts lowercase

letters in the command parameter string, and it passes them unchanged to the application.

Faster Disk Access

Power users will appreciate this improvement: TOS now allows more than one device to be attached to the direct memory access (DMA) bus at power-up, making it easier to run the laser printer on a hard disk system. True, not many ST owners have both a laser printer and a hard disk at this point, but this modification was crucial for those who wish to build the ST into a desktop publishing system.

One new feature everyone benefits from is an improved floppy disk format that skews the tracks (*à la* the *Twister* program) to improve access speed. This does not affect read/write operations with older disks.

The AES now sends a continuous stream of window messages when the mouse button is held down on a window's arrow or page controls. This makes it possible to scroll a window without continuously clicking the mouse.

Here's one bug fix that everyone will enjoy: Entering an underscore character in a dialog box no longer crashes the computer. This nasty bug was first reported by COMPUTE! columnist Bill Wilkinson shortly after the ST was introduced in 1985.

The RS-232 handler now correctly supports RTS/CTS handshaking, a boon for programmers who write telecommunications programs. The GEMDOS clock is reset from the realtime clock at the termination of every program, eliminating time and date foulups. The desktop program no longer writes spurious characters to the DESKTOP.INF file. Cartridge support has been fixed, eliminating the need for CARTSTART code and allowing .TOS and .TTP programs to reside in cartridges as well as GEM-based .PRG programs. The GEM APPL_TPLAY and APPL_TRECORD functions now work, too.

Compatibility Problems

There are some drawbacks to the new TOS ROMs. For one thing, while TOS on the older STs consists of six ROM chips, the new TOS resides on only two higher-density ROMs. That means the new ROMs won't fit in the 520ST or 1040ST, so owners of the older machines have to wait until Atari releases the new TOS on a set of six lower-density ROMs. Atari says the six-chip ROMs have been ordered, but no one is sure when they'll be available.

Problems of another kind are besetting Mega owners who do have the new ROMs. A number of software titles, including early versions of *GFA BASIC*, *Publishing Partner*, and several utility programs, don't work with the new chips. In most cases, the blame for this falls squarely on the shoulders of the software developers.

From the very beginning, Atari has published clear guidelines on how to write software that will be compatible between succeeding versions of TOS. For example, Atari has documented a number of low-memory system variables that will always stay in the same locations, and has warned that all other variables would probably change locations from version to version. Nonetheless, some developers have insisted on using these undocumented variables. Predictably, their programs now won't work with the new version of TOS.

Disk copy-protection schemes also prevent some programs from running under the new ROMs. The new TOS reports a certain type of disk error more often than the old TOS, which means that some protected programs fail to load.

Long-time Atari owners may remember a similar problem that arose when the XL and XE eight-bit computers were first introduced in the early 1980s. Many programs written for the old Atari 400/800 operating system wouldn't run properly on the XLs and XEs due to inattentive programming.

Now, as then, the solution offered by Atari is to boot the old operating system from a "translator" disk, thus replacing the built-in ROM operating system. Atari has posted a file on some of the information services that allows ST users to create a disk-based version of the first ROM-based TOS (the version built into 1040STs and 520STs made after 1985). Of course, there are two disadvantages to this solution: You lose all the advantages of the new, debugged TOS, and you also sacrifice a considerable amount of usable memory, since the disk-based TOS loads into RAM.

On the lighter side, the fix has led some online wags to speculate that perhaps you'll have to flip the disk over and use the other side when running certain games, as with the eight-bit translator.

Finally: New ST BASIC

In addition to the blitter chip and revised TOS, another welcome feature of the Mega ST is a new version of ST BASIC. This has been in the works since the days when the first ST owners began complaining about the almost unusable window interface and myriad bugs of the original ST BASIC Indeed, some have labeled the original ST BASIC as the worst BASIC ever shipped with a personal computer, and the claim is supportable.

Although the release of the new ST BASIC was not officially announced, it has been packaged with the first Mega STs, albeit with very little documentation. An expanded manual is supposed to follow.

Owners of the original ST BASIC won't receive the new version for free. Atari says its contract with MetaComCo, the company that wrote both the old and new versions, prohibits Atari from distributing the revised BASIC free of charge. However, Atari is expected to sell the update for a modest fee.

Early users report that the window interface for the new ST

The Ear

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

Assembly-Line Language

To solve the problem of inadequate production capacity, Atari says it is searching for a site in California's Silicon Valley to build **a new manufacturing plant.** This would be in addition to the company's only current factory in Taiwan. Atari had hoped to set up the factory at its headquarters in **Sunnyvale,** but was stymied by zoning problems. Among the other possible locations Atari is exploring is a site in Santa Clara, where the factory and administrative offices might be **united under one roof.**

Soft-Sell Techniques

Yet another important holiday shopping season came and went with **no significant change** in Atari's marketing efforts for the ST, or—some would say—lack of effort. The promised TV and print advertising campaigns for the ST **failed to materialize,** except for a few commercials in a few major cities. There were also no special promotions to step up holiday sales. In fact, Atari actually **increased dealer costs** for the STs in the second half of the year. Atari claims it's selling so many STs in Europe that it can't manufacture enough machines to meet demand, so creating additional demand in the U.S. wouldn't increase sales.

"I'm not going to advertise just for the sake of advertising," said Atari Chairman Jack Tramiel. When asked whether in that case it wouldn't be wise to **start making more computers,** Tramiel said it wasn't possible to increase production capacity at this time. He also joked that by selling the bulk of his products overseas, he is helping to reduce the **U.S. trade deficit.**

Turnabout Is Fair Play

Meanwhile, Digital Research Inc. has announced a GEM-based word processor called *1st Word Plus* for the **IBM PC.** It's one of the only programs ever to appear first for the ST, **then be ported** to the IBM.

Write Now?

Among the many long-overdue products **lost in the fog of vaporware,** you may recall a word processor known as *Microsoft Write.* This translation of the popular IBM PC-based program was supposed to be available a year ago, but it hasn't been seen outside of trade shows. Now we hear, again, that *Microsoft Write* is scheduled to be on the shelves by the time **this issue appears.** When it was announced, way back in 1986, it was said to be a much-heralded step up from the rather mediocre field of word processors that were then available. In the interim, however, **several improved word processors** have been released—including *WordPerfect,* another port from the IBM world—and another new program, *Word Up,* promises to combine medium-powered features with integrated graphics. So, *Microsoft Write,* which at last report had neither a spelling checker nor graphics capabilities, may turn out to be just another **face in the crowd.**

BASIC, although similar to that of the old, is much less clumsy. Almost all of the serious bugs in the old version have been eliminated. Math functions have been greatly improved, and a host of new functions have been added.

These include:

- *Graphics functions.* Commands for moving blocks of the screen (GSHAPE and SSHAPE) have been added, similar to GET and PUT in some Microsoft BASICs. MAT functions allow you to create a number of connected lines or a complex filled shape from a list of vertices, rather than drawing each segment with a separate command. Other commands have been added to let you read and set the color registers (ASK RGB and RGB).
- *Sound.* The new MAT SOUND command gives you easy access to the XBIOS (Extended BIOS) *Dosound( )* function. This function plays music and sounds as an interrupt-driven background task, using a list of sound commands stored in a data array.
- *Mouse support.* A function has been added for reading the mouse position and mouse button status.
- *Operating system support.* Improved commands allow easier access to GEM AES and GEM VDI functions. Added commands allow direct access, for

Will Candor Kill The *Explorer?*

The Ear hears that influential eyebrows at Atari were raised over a recent issue of the *Atari Explorer*, the company's house organ. The issue in question ran a cover story titled "Will Piracy Kill Atari?". The magazine cover vividly depicts a buccaneer **thrusting his sword** through a computer monitor. Inside, the article asserts that widespread piracy has **virtually eliminated** all software support for the eight-bit Atari computers and is well on its way toward **inflicting the same damage** on the ST. Apparently, some Atari brass were not at all happy to see the company's own magazine accusing its customers of **software theft,** not to mention the implication that the New Atari might soon go the way of the Old Atari.

Under New Management

Hottest Atari-related gossip at the Winter Consumer Electronics Show: *ANALOG Computing* and *ST-LOG* magazines, which cover the eight-bit Atari and ST markets, respectively, were supposedly purchased in early January by ***Hustler* publisher Larry Flynt.** Both magazines were known to be in dire straits recently, with issues appearing sporadically throughout 1987. Efforts to reach Editors/Publishers **Lee H. Pappas** and **Michael J. Des Chenes** to confirm the rumor were unsuccessful; a recording at the editorial office in Worcester, Massachusetts informed callers that the company was in the process of **moving to Los Angeles.** *ANALOG Computing* is the oldest Atari-specific magazine, dating back to January 1981.

Atari: New GEMDOS Is Coming

Atari says it's definitely working on a **revised version of GEMDOS** (Graphics Environment Manager/Disk Operating System). Among other improvements, the new GEMDOS will eliminate the **infamous 40-folder bug** that plagues the ST. (The 40-folder bug can trash a disk if the number of directories examined during a session exceeds 40.) Atari says the revised GEMDOS will automatically load from the AUTO folder during bootup.

the first time, to BIOS, XBIOS, and GEMDOS functions. Improved PEEK and POKE commands allow you to specify the length of the data by appending a _B for byte data, a _W for word data, and an _L for longword data (for example, PEEK_L).

While these improvements and additions go a long way toward making ST BASIC more usable, it's questionable whether any enhancements can reestablish the bundled BASIC as the language of choice on the ST. MichTron's *GFA BASIC* has gained a large following due to its great speed and ease of use, and the new ST BASIC will have to be pretty fast if it's going to displace that language in the hearts of BASIC programmers.

Mega Maybe?

All this leaves us with the original question: Is it worth buying a new Mega ST, or is it wiser to upgrade your existing 520/1040ST?

We can't presume to answer that question for you, of course. You'll have to decide for yourself whether the extra memory, blitter, debugged TOS, improved performance, and new ST BASIC are worth the price of a Mega ST. Remember that a Mega ST2 (two megabytes) starts at $1,699 for a monochrome system, and a Mega ST4 (four megabytes) with color monitor tops out at $2,599.

If the blitter and TOS upgrades for existing STs become available soon for a reasonable price, it may make more sense to stick with your old machine. On the other hand, there's always the attraction of having the newest computer on the block, and a machine that isn't jury-rigged with piggybacked chips tends to be more reliable over the long run.

In the end, though, we suspect most ST users will stick with their current machines.

No News Is Good News?

LAS VEGAS—For the first time since the debut of the new Atari, the company did not exhibit here at the Winter Consumer Electronics Show.

Atari dealers and other enthusiasts who made the annual January pilgrimage to Las Vegas were disappointed, and a few software developers complained privately that Atari's absence betrayed a lack of support. However, Atari did maintain a hotel suite at Caesar's Palace for the duration of the show, meeting with dealers and other parties by invitation only. No new products were announced.

Several Atari executives also toured the show floor and made the rounds at evening cocktail parties. At a party sponsored by Electronic Arts to celebrate its fifth anniversary, COMPUTE!'s Atari ST Disk & Magazine spotted Atari Chairman Jack Tramiel and his son, Atari President Sam Tramiel. The younger Tramiel explained that it costs Atari $500,000 to $750,000 to exhibit at Winter CES, and the business the show generates isn't worth the expense.

Another reason Atari didn't exhibit, Tramiel said, is that Atari is now accepted as an established company and doesn't have to set up a lavish booth just to prove it's still in business.

Tramiel added that it's doubtful Atari will exhibit at the next major computer show, the Spring Computer Dealers Exposition (COMDEX) to be held in Atlanta this May. However, he did say that Atari will exhibit at Summer CES, to be held in Chicago this June, and at Fall COMDEX, scheduled for November in Las Vegas.

As an indication of the growing resurgence of the home videogame market, Atari decided to exhibit at the Toy Fair held in New York in February. At this trade show, Atari displayed its 2600, 7800, and XE videogame systems.

Another notable computer company absent from Winter CES was Commodore. (Traditionally, IBM and Apple never appear at CES.) In fact, by far the largest exhibit in the West Hall—where computer companies are usually located—was the Nintendo booth. Nintendo surprised attendees by showing up with a massive exhibit that dominated the entire central portion of the spacious hall. And nearby was another videogame company, Sega, with a smaller but nevertheless impressive exhibit. It was a clear signal that home videogame machines, pronounced dead after 1983, are back with a vengeance. **ST**

Desktop Organizer

James W. Maki

Do you find yourself overwhelmed by a sea of paper? Is your desk covered with hundreds of phone numbers, appointment notes, and scribbled reminders of upcoming birthdays? If so, this program is for you. It's like having your own personal secretary to file away and alphabetize all those notes. It even dials the phone for you. For all STs, color and monochrome (printer and Hayes-compatible modem recommended).

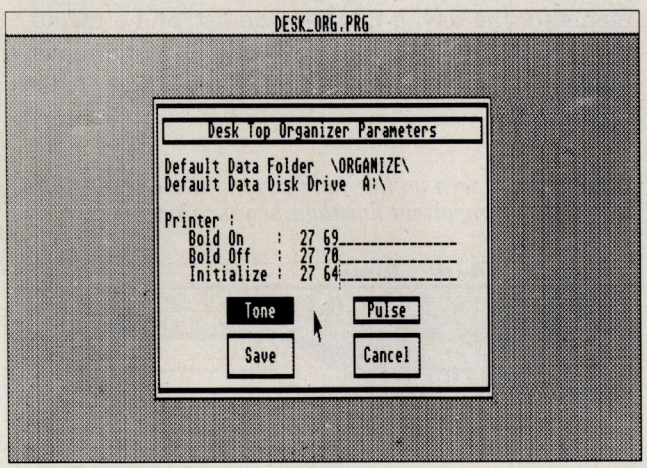
"Desktop Organizer" is a powerful five-in-one program that combines the most important functions performed by separate programs and desk accessories. It has an alphabetized address book that doubles as an address label/index card printer. If you have an autodial modem, it's also an autodialer. A calendar helps you keep track of important appointments and events. A notepad lets you jot down short memos. And a Things To Do window allows you to keep a list of tasks that need to be done.

In all, you can store up to 740 address/phone records, 1000 appointments, 30 things to do, and a 10-line memo with Desktop Organizer. Yet, despite its great versatility, Desktop Organizer is very easy to use. It takes advantage of GEM-style menus, icons, windows, and dialog boxes.

Getting Started

The program is named DESK_ORG.PRG on the magazine disk. It creates several data files when it runs, so you should copy the program to a disk that has some free space available. Do not run Desktop Organizer from the original magazine disk; there isn't enough room for the data files.

Figure 1: *The "Desktop Organizer" SetUp screen lets you customize the program for your own system configuration and printer.*



The first time you run Desktop Organizer, you'll see a dialog box that allows you to customize several program parameters (see Figure 1). The program then stores the parameters in a disk file named ORGANIZE.INF, which should be present on the program disk whenever you run Desktop Organizer.

The printer parameters allow you to customize the output for your specific printer. Enter the commands in decimal (not hexadecimal), separated by a

single space. For example, the printer command for enhanced print on a C. Itoh Prowriter is 27 33; on an Epson FX printer, it is 27 69. Any special commands (enlarged text, italics, condensed font, and so on) may be entered in the Bold On and Bold Off fields, if you wish. In the field marked Initialize, type the command string for initializing the printer; set the character width, print quality, or other special printer features you want to use.

The Tone and Pulse buttons set the program for the type of telephone line, not the type of telephone, that is used with the modem. In fact, even if you own a pulse phone, this program can Touch Tone dial if a Touch Tone line is available. If you don't have Touch Tone service, select Pulse.

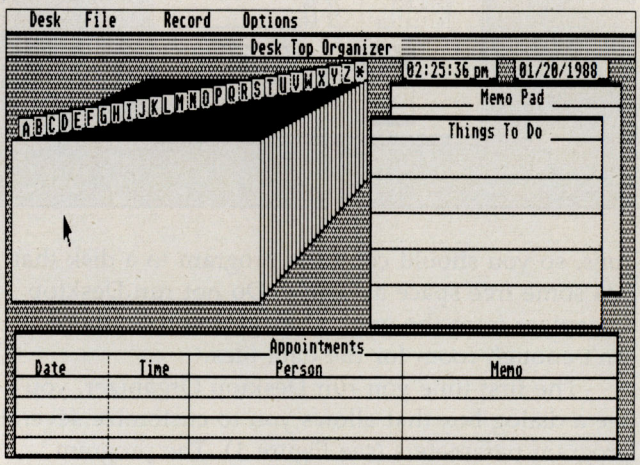
After entering the parameters, select Save to store them in the ORGANIZE.INF file. Clicking on Cancel keeps the previous default parameters in effect. These parameters can be changed from within the program, so the initial selections are not immutable.

Desktop Organizer's opening screen indicates the system time and date. Certain features in the program won't work properly if these aren't correct. Click on Continue to get started.

Four Files

Desktop Organizer presents four filing systems for your use: a card file with letters *A-Z* and *, an appointment calendar displaying the next four appointments for the day, a things-to-do list, and a memo pad. In addition, the time and date are continuously updated in the top right corner of the screen. (See Figure 2.)

Figure 2: *As seen on the main screen, "Desktop Organizer" puts four important functions at your fingertips.*



The menu bar presents menus named File, Record, and Options. Under File are the selections Address, Appointment, Things To Do, Memo Pad, Load Design, and Exit Program. Each of the first five selections opens the corresponding window for input. Exit Program closes all windows and files, returning you to the GEM desktop.

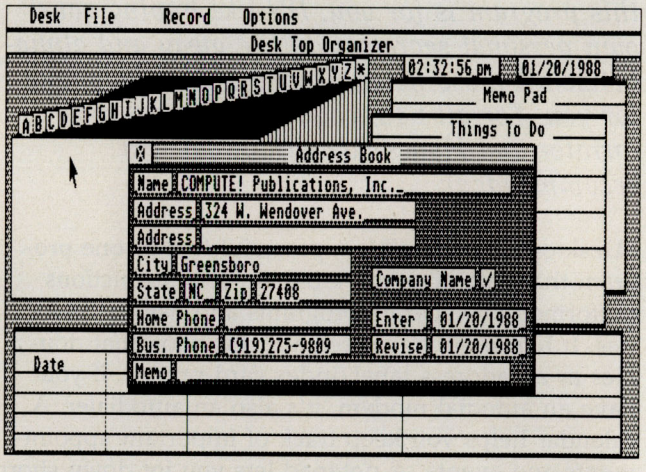
Under Record are the selections for manipulating individual records: Save, Save/Exit, Clear, Exit, Delete, and Restore. Selecting Save writes the current record to disk and clears the input screen. Save/Exit is similar, except it also ends the program. Clear resets the current window, clearing all of the input fields. Exit closes the window without saving the record. Delete removes the current record from the database. Restore can be used to recover a deleted record.

The Options menu includes Dial Phone (an autodial modem is required), Print Cards, Program SetUp (same as the opening screen on initialization), and Label SetUp. Print Cards prints out mailing labels or file cards in the format created under Label SetUp.

Editing Address Records

Selecting Address from the File menu opens the Address Book input window (Figure 3). Each address record has the following fields: Name, Address (two lines), City, State, ZIP (with room for the new 5 + 4 ZIP code), Home and Business Phone, and Memo. Enter contains the date the record was created and Revise displays the date of the last modification (or is blank if the record has not been modified). Company Name is a toggle switch you select with the mouse.

Figure 3: *The Address Book window lets you enter names, addresses, and phone numbers.*



Type the first, middle, and last name in that order. The program automatically alphabetizes by last names. In some cases, the first name should be used for alphabetizing (Jones Printing, for example, which should appear in the *J*, not the *P*, file). If this is the case, select Company Name with the mouse and a check mark will appear. Commas act as delimiters and any characters after the comma are ignored in alphabetization. This feature can be used to add Jr., MD, President, or other titles after the main name. When alphabetizing a name that starts with a nonalphabetic character, Desktop Organizer stores

the name under " * ".

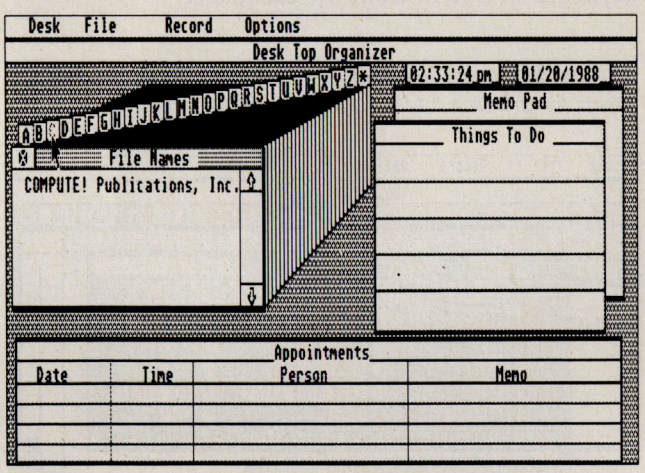
I use Desktop Organizer to print address labels for a number of sales representatives. The logical order is not alphabetical, but rather ascending territory number. I get the proper order by entering the names followed by the territory number (with no comma). The program then sorts by territory number (which it has interpreted as the last name) and the labels are printed in the desired sequence.

Phone numbers should be entered as they would be dialed. A long-distance number should include the 1- preceding the area code. Anything can be entered into the Memo field.

After entering all of the information, select the appropriate entry from the Record menu: Save, Save/Exit, Clear, or Exit.

To recall a Phone/Address record, click on the file card corresponding to the first letter of the last name. A window appears, listing all the names under that letter (Figure 4). Use the window arrows and slider to view additional names.

Figure 4: *After clicking on an alphabetical file card, this window opens to show you the names filed under each letter.*



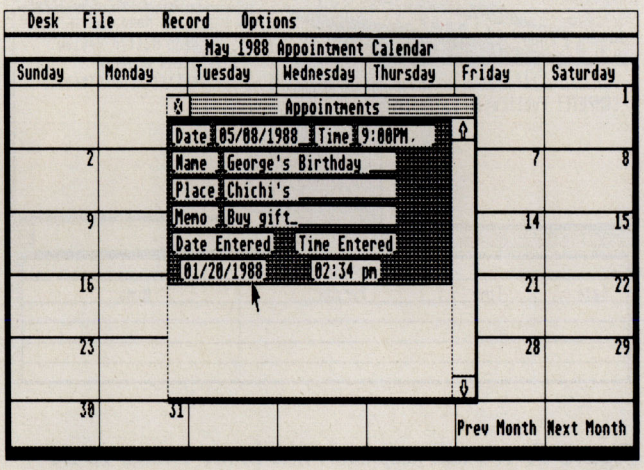
To view the entire record, click on the name. The Address Book input window will open, just like the one seen in Figure 3, except that it contains the record you selected. You may modify the record in exactly the same manner as it was originally entered. The modified copy can then be saved. If you make a mistake, leave the record unchanged by selecting Exit. Delete removes the record from the file. Selecting Restore before another record is saved allows you to recover the just-deleted record. Restore cycles through all of the deleted records that have not been overwritten by a new record.

Lunch, Golf, And Other Important Appointments

There are two ways to examine upcoming appointments. First, the next four appointments for the current day appear at the bottom of the main screen. Any 12:01 a.m. appointments are displayed first, followed by other appointments in chronological order. When an appointment comes within 30 minutes of the current time, a reminder window opens up. It remains open until the the appointment time passes. This is the only window you can move around the screen, incidentally.

Selecting Appointment from the Record Menu Item displays the current month's calendar (Figure 5). You may change the month by selecting Prev Month or Next Month. To enter an appointment, click on the date; an appointment input window then opens.

Figure 5: *"Desktop Organizer" has a Calendar window for scheduling important appointments and events.*



The Date fields containing the selected date and the current date cannot be changed. The editable fields include Time, Name, Place, and Memo. The format for time entry is *hh:mm Xm* (where *X* represents *a* or *p* for a.m. or p.m.). If you don't include a time, the program defaults to 12:01 a.m. (note that 12:01 is the first minute of the day, so these appointments will not show up on the main screen except very briefly at midnight). These 12:01 appointments are excellent for listing birthdays and holidays. If the a.m./p.m. designation is omitted, the program assumes a.m.

After you've entered and saved an appointment, a check mark appears on the selected day next to a.m. or p.m. If the 12:01 a.m. time was selected, the first ten characters of the Name field appear under the a.m./p.m. titles on the proper day. So the entry "Birthday Fred" in the Name field will show up as "Birthday" on the monthly calendar.

Once an appointment is saved, its time and name are displayed on the main screen below the input area. Use the window arrows and slider to view all of today's appointments. Clicking on an appointment retrieves that record and displays the information. The fields can then be modified and the record saved, deleted, or no changes made. Unlike addresses, deleted appointments cannot be Restored.

Jot A Few Notes

Selecting Memo Pad from the File menu opens the Memo window for input (Figure 6). The Memo Pad can hold up to ten lines of text. The cursor will not wrap to the next line; you must move to the next line by pressing the Return key or one of the cursor keys. The information you type is saved when the program ends and is displayed the next time you run the program. Selecting Clear erases everything from the Memo Pad.

Figure 6: *Short notes are easy to jot down in the Memo Pad window.*

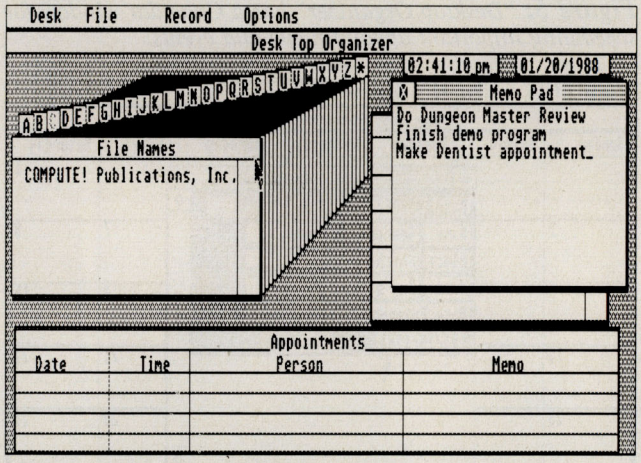
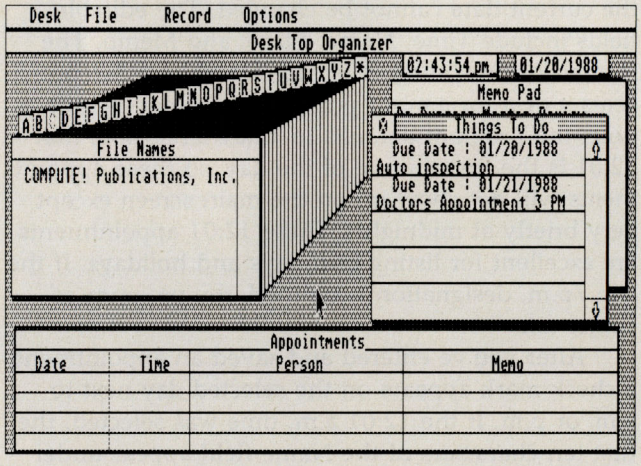


Figure 7: *You can keep short lists in the Things To Do window.*



Click on Things To Do from the File menu to open that window (Figure 7). The two editable fields are Date Due and New Item. Enter the date as *mm/dd/yyyy* or *mm/dd/yy*. The Things To Do items are listed in a separate window on the main screen. Only the first 5 are visible, but up to 30 may be included. Use the slider bar to view all of them. Selecting a thing to do opens the input window and displays the record. You can then modify/save, delete, or exit.

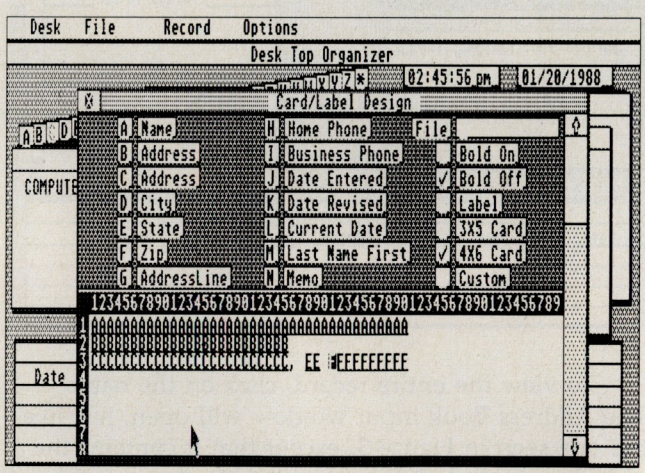
Customized Printing

Fancy input screens are nice, but the real test of a program is the usefulness of its output. The Card and Label Design option provides a great deal of flexibility in designing the printed output. (Refer to Figure 8.)

First, you have to create a template with the label designer. Four types of output forms are available: Label (5 lines of 35 characters), 3 × 5 Card (18 lines of 50 characters), 4 × 6 Card (24 lines of 60 characters), and Custom (any user-selected size up to 24 lines of 60 characters). The cursor determines where the output will appear and can be moved with the cursor keys, the Return key, the Tab key, or the mouse. You see only 8 lines at a time, but you can use the window arrows or the vertical window slider to move around the form.

Begin by selecting the type of output form desired from the list. The 4 × 6 card is the default. If you choose Label or 3 × 5 card, blocks appear in the forbidden portion of the window. This area is not available for printing. Next, position the cursor at the point where you want the output to appear. The output can consist of alphanumeric characters from the keyboard or a field from the database.

Figure 8: *"Desktop Organizer" lets you design your own forms for printing address labels and index cards.*



When you're customizing the printout, you may include two types of information: constants and variables. Any characters you type from the keyboard are treated as constants. They'll appear on the printout exactly as you typed them. If you click on a database field (above the label template), the selection is displayed as a row of characters that match the letter next to the selected field. For example, clicking on Name would display 40 *A*'s. This is a variable field; when the labels print, the individual names would be substituted on that line.

If the output is longer than the format allows, a graphic up arrow appears at the end of the line. This is not necessarily a problem. The display assumes

Pica type size (10 characters per inch). But the Program Customizing option allows the printer to be set up to print in Elite, Condensed, or any other available printer font size. Also, the maximum size of a field may not correspond to the length of the actual output. (The Name field is a prime example; the maximum name size is 40 while the maximum output to a mailing label is only 35. As long as no name contains more than 35 characters, the output will be correct.) A problem may arise when the Bold functions are to be used, as noted below.

Special Output

The available output selection offers several special fields designed for more professional output. The first is AddressLine. This field will output the City, State, and ZIP Code on a single line with a comma following the City and three spaces between the State and ZIP Code. This field was designed for printing address labels.

A second special output field is M, Last Name First. The name is entered into the database with the first name first, but there may be instances when you want the last name first. This option prints the last name, a comma, and then the remainder of the name (Franklin Delano Roosevelt would be displayed as Roosevelt, Franklin Delano).

The last special form of output is C, the second Address line. Rather than leaving a blank line if there is no second line to the address, the program moves the extra blank line to end of the output, if the output was directed to column 1.

The Label form is set up for the standard address labels available at most stationery or computer stores. These labels have room for five lines of output with one blank line between the labels. If you write your own custom output form, you should remember to compensate for blank lines between forms.

If the commands for Bold On and Bold Off are entered in the Program Parameter SetUp, the output can be selectively printed in bold. Position the cursor over the first letter of the word or sentence you want in boldface. To make a database field print in bold, place the bold command on the first letter of the field. After positioning the cursor, select Bold On. A check mark appears in the box marked Bold On and the letter you selected will appear in boldface print. The output will continue to be boldface until a Bold Off command occurs. The Bold Off command must be entered in an alpha text position or on the last letter of a database field. When you turn off boldface, the database field must not be longer than output area (the last character cannot be an up arrow).

After a form has been designed, you can save it by using the Save menu item under Record, or by selecting the File area with the mouse. A file selector opens to accept the filename. To retrieve a saved form, choose Load Design from the File menu, or select File with the mouse.

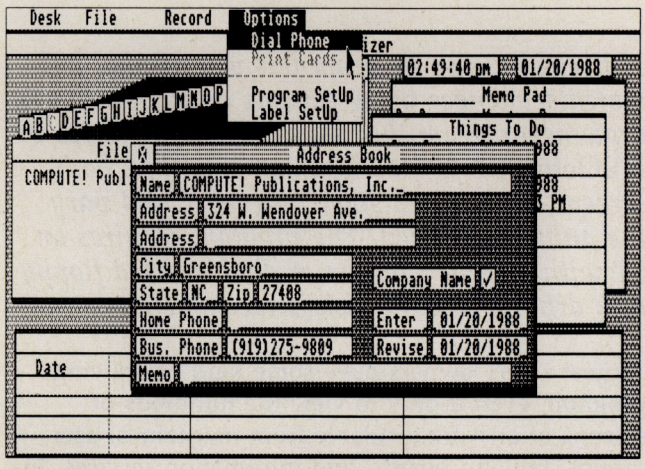
Select Print Card from the Option menu to print either a single card (if a Phone/Address record has been retrieved) or the entire database. The records will print in the format created with Card And Label Design. The names always print in alphabetical order.

Dialing The Phone

To use the Dial Phone option, you must have an autodial modem that responds to Hayes commands plugged into your ST.

First, retrieve a record from the address file. After selecting Dial Phone from the Option menu, you see a dialog box (Figure 9). You may choose to dial the home phone number, dial the work phone number, or exit. The modem then dials the phone.

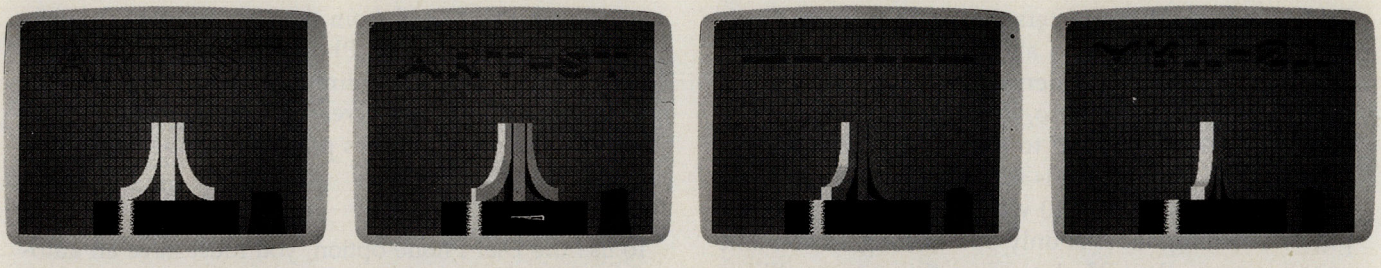
Figure 9: *If you have an autodial modem, "Desktop Organizer" can automatically dial any phone number in your address book.*



After the phone you're calling begins ringing, pick up your phone handset and press any key on the computer keyboard. This switches control to the phone and allows you to talk with the party you're calling. If you press a key on the computer keyboard without lifting the handset, the program aborts the call.

Note to programmers: Desktop Organizer was written in OSS *Personal Pascal*. Because of its length (over 200K), the source code could not be included on the accompanying disk, even in compressed form.

ST



With "Automatic Animator," it's easy to display cartoonlike sequences of picture files saved on disk in NEOchrome *or* DEGAS

Automatic Animator

Len Shikowitz

This easy-to-use program lets you display animated sequences using screens created with any drawing program that saves files in DEGAS *or* NEOchrome *format. You can even mix both screen formats in a single sequence and vary the animation speed. The program requires an ST with a color monitor. A double-sided floppy disk drive or a hard disk is recommended.*

Almost all ST owners have some kind of drawing program, even if only to view the hundreds of screens of artwork available from magazines, user groups, bulletin boards, and information services. Inspired by these pictures, many people go on to create works of their own. Inevitably, you start to wonder: What if I could make these screens move?

Most drawing programs include some animation features. However, they usually rely on a method known as *color cycling*. By changing certain colors in the picture in a predefined way, it is possible to simulate animation. But color cycling isn't nearly as flexible as true *frame animation*, in which different screens are flipped in rapid succession to make a cartoon.

One of the few drawing programs that offers true frame animation is *Art-ST*, a contest winner that appeared in the August 1987 issue of COMPUTE!'s Atari ST Disk & Magazine. This program can flip through as many as 24 screens in a sequence, but it's compatible only with screens saved in *DEGAS* or *DEGAS Elite* format.

"Automatic Animator" is a relatively short program that makes it easy for anyone to create animated sequences using true frame animation, and it works with low-resolution screens saved in *NEOchrome* format as well as *DEGAS* or *DEGAS Elite* formats (uncompressed). You can even mix these formats in a single sequence.

Since Automatic Animator reads each screen's color palette separately, a sequence isn't limited to a single palette of 16 colors; it can take advantage of all 512 colors available on the Atari ST. As many as 13 screens can be included in a sequence on an unexpanded 520ST, and 26 screens can be animated on a 1040ST.

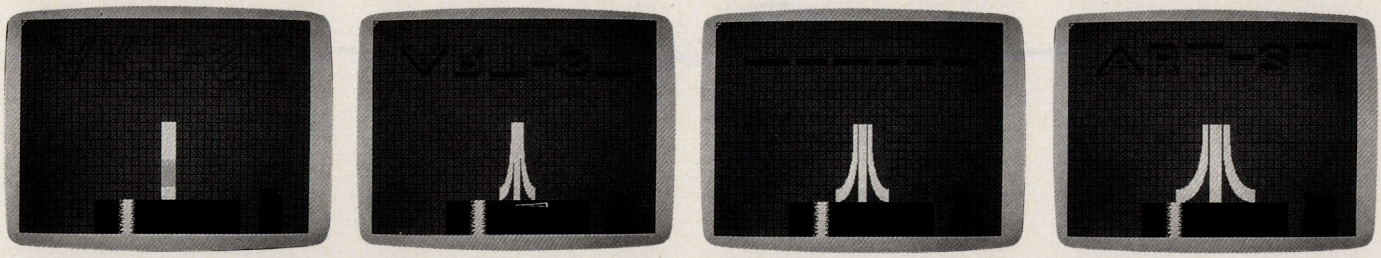
Getting Started

You'll find Automatic Animator on the magazine disk under the filename 1ANIMATE.PRG. The unusual filename begins with a number for an important reason, as we'll explain later. Remember that the program requires an ST with a color monitor and works only in the low-resolution (16-color) screen mode.

You can run Automatic Animator from the GEM desktop or from an AUTO folder. We recommend running it from an AUTO folder to leave more memory available for the screens which comprise the animated sequence. On an unexpanded 520ST, as many as 11 screens can be animated if the program is run from the desktop; 13 screens can be animated if the program is run from an AUTO folder.

To prepare Automatic Animator to run from an AUTO folder, simply format a blank disk, click on the disk icon, drop down the File menu, and create a folder named AUTO. Then copy 1ANIMATE.PRG from the magazine disk into the AUTO folder. As we'll describe in moment, you'll save the screens to be animated on the disk's root directory (*not* in the AUTO folder). When you boot from this disk (insert it in drive A and switch on the computer), the ST automatically loads and runs Automatic Animator, and the animation begins.

To leave as much memory as possible for screens, don't install any ramdisks or desk accessories when using Automatic Animator.



format. These screens were created with Art-ST *and first appeared in the August 1987 issue.*

Automatic Animator can handle up to 26 screens in a sequence. This requires a megabyte of random access memory (RAM), which means you need a 1040ST, a Mega ST, or an expanded 520ST. It also requires some way to store those 26 screens on a single disk along with the program. Since the screen files must be uncompressed, and an uncompressed screen consumes 32K of disk space, 26 screens won't fit even on a double-sided floppy disk. You can fit more screens on a disk by using a special formatting program (such as "Extended Formatter," COMPUTE!'s Atari ST Disk & Magazine, February 1987), but a hard disk is recommended for assembling maximum-length sequences.

Creating Animation

As its name implies, Automatic Animator requires very little effort to use. Just follow these steps:

1. Copy 1ANIMATE.PRG from the magazine disk to a blank disk (AUTO folder recommended).
2. Copy to the same disk the screens you want to animate. Remember that the screens can be in *NEOchrome*, *DEGAS*, or *DEGAS Elite* format, but they must be in the low-resolution mode and uncompressed.
3. Rename the screen files so that their alphabetic order reflects the order in which you want them to appear in the sequence. In other words, Automatic Animator will display the screens in alphabetic order according to their filenames.

   One approach is simply to change the filenames to A.NEO, B.NEO, C.PI1, D.NEO, E.PI1, and so on. (*NEOchrome*-format files always have the extension .NEO, and uncompressed *DEGAS* and *DEGAS Elite* files created in low resolution always have the extension .PI1.) However, this makes it hard for you to remember which file contains which screen if you need to change the sequence later. So you might prefer to keep as much of the original filename as possible, prefixing it with a letter to assign the picture its place in the sequence. For example: AROBOT.NEO, BPLANET.PI1, CSTARSHP.NEO, and so on.
4. Run the Automatic Animator program from the desktop, or—if you're using the AUTO folder method—reboot the computer with the animation disk in drive A. There is a short delay while the program loads all of the screens from disk into memory. Then the animation begins. When the sequence ends, it automatically wraps around and starts again from the beginning.
5. Press the number keys to control the animation speed: 1 is the fastest, 9 is the slowest, and 0 returns to the default delay between screens (7/50 second).
6. To end the animation and return to the GEM desktop, press the Esc key.

Additional Notes

Now you know why the filename of the Automatic Animator program begins with a number (1ANIMATE .PRG). If you rename the program so it begins with a letter, it will think its own program file is a screen and attempt to load it as part of the animation.

One advantage of Automatic Animator over *Art-ST* and other drawing programs with frame animation is that you can distribute your sequences to friends without wasting valuable disk space on the programs used to create them. Automatic Animator is easier for people to use, too, since it can run itself from the AUTO folder. All they need to know is how to change the speed and how to exit the sequence.

Automatic Animator also makes a dandy little slide-show program if you increase the time delay to give viewers a longer chance to see each picture. I don't know of any other slide-show programs that can mix *NEOchrome* and *DEGAS* files and load all of the screens into memory at once without using a ramdisk.

Source Code

Automatic Animator was written and compiled with MichTron's *GFA BASIC*. For programmers who are interested in studying how it works, the source code is included on the magazine disk in a special compressed format. The ASCII listing is named 1ANIMATE.LST and is contained within the compressed file SOURCE.ARC. See "Uncompressing Source Files" elsewhere in this issue for instructions on reading the source code. **ST**

Magic Sac Plus Macintosh Emulator

Sheldon Leemon

Requirements: Any ST system, color or monochrome. A monochrome monitor, at least one megabyte of memory, and a hard disk drive are recommended. Printer optional.

When the Apple Macintosh first appeared in 1984, it was billed as "The computer for the rest of us" because it offered an alternative to the IBM PC and featured a completely different user interface. But some of the rest of us soon found that the Mac was just too expensive to afford. When Commodore founder Jack Tramiel acquired Atari and introduced the ST, many of us ended up buying a "Jackintosh" instead. But even though the ST matches the power and style of the Macintosh, the Mac still enjoys a two-year lead in software availability, and much of that software is higher in quality than ST software. Wouldn't it be nice if there were some way to run the mature software of the Macintosh on an inexpensive machine like the ST?

There is, of course—a Macintosh emulator known as the Magic Sac. Created by David Small, a former columnist for the now-defunct *Creative Computing* magazine, the Magic Sac is a relatively inexpensive hardware/software combination that allows you to run many popular Macintosh programs on an otherwise-unmodified Atari ST. The Magic Sac has been available for about two years, but the most recent version—the Magic Sac Plus—has improvements that make it a much more viable alternative than past versions, which tended to be buggy and difficult to use in some respects.

Knowledgeable computer users generally take a skeptical view of emulators, because even though it's theoretically possible to emulate almost any computer on any other computer, the tradeoffs in speed and compatibility usually make emulation impractical. A case in point is the CP/M emulator for the ST, which is freely distributed by Atari. This program emulates the CP/M operating system fairly successfully, but runs at less than half the speed of a real CP/M computer. Other software-based emulators for the ST that suffer from speed problems include Avant-Garde Systems' *PC-Ditto* (MS-DOS) and the *Xformer*, Darek Mihocka's Atari 800 emulator that was recently placed in the public domain.

The Magic Sac takes an entirely different approach to emulation and is much more successful. In the first place, the Magic Sac's job is a little easier because the Macintosh uses the same microprocessor as the ST (the Motorola 68000). The other emulators are forced to simulate alien microprocessors like the Z80, 8088/8086, and 6502. Furthermore, the Magic Sac relies heavily on hardware to emulate the Macintosh; the other emulators are strictly software-based.

Buddy, Can You Spare A ROM?

The critical hardware component of the Magic Sac is a cartridge that contains a clock/calendar and empty sockets for a set of 64K Macintosh operating system chips. These read-only memory (ROM) chips are the secret of the Magic Sac's successful emulation. Because the Magic Sac is designed to use actual Macintosh ROMs, it doesn't really have to emulate the Mac's operating system at all; in effect, the chips turn the ST into the rough equivalent of a Macintosh.

The Macintosh ROMs don't come with the Magic Sac, however. Data Pacific, the company David Small formed to market the Magic Sac, cannot legally sell Macintosh ROMs. The ROMs are copyrighted by Apple, and Apple even forbids its dealers to sell the chips to anyone who doesn't own a Macintosh. Apple's tight control over the operating system is a big reason why there aren't any Macintosh clones—as there are IBM PC clones.

Rather than try to defy Apple, Data Pacific neatly sidesteps the copyright infringement question by requiring Magic Sac purchasers to obtain their own legal, genuine Macintosh ROMs. Special circuitry even prevents you from copying the Mac ROMs onto EPROMs (Eraseable/Programmable ROMs) and using them with the Magic Sac.

How can you legally obtain genuine Macintosh ROMs? The manual suggests prying the ROMs from your legally purchased Macintosh and plugging them into the Magic Sac for use on your ST. Needless to say, this is rather drastic, and it would add quite a bit to the actual cost of the Magic Sac, but from Apple's point of view it's the only method that's indisputably legal. In reality, however, there's no need to go quite that far. A good supply of these ROMs became available when Ap-

ple switched from the original 64K operating system to a 128K version, and the old ROMs are widely available for about $40 a set.

The Disk Problem

Along with the cartridge, the Magic Sac Plus comes with an ST-format disk and a Macintosh-format disk. The Mac disk is needed to run a transfer program to copy disks from a Macintosh to the ST. That's because an unmodified ST disk drive can't read Macintosh disks directly.

To get around this, the Magic Sac has its own floppy disk format that isn't compatible with either the ST or the Mac. Magic Sac disks hold the same amount of data as Mac disks (400K or 800K), but are formatted so that the ST drive can handle them.

The Magic Sac Plus package includes a couple of ST programs to format disks for use with the Magic Sac. All formatting must be done in ST mode, because Macintosh format programs don't work with the Magic Sac. This means you must always be prepared with extra formatted disks before running the Magic Sac. Otherwise, if you run out of disk storage while you're in Macintosh mode, you're out of luck.

Before you can start up the Magic Sac, you must convert at least one Mac system disk to Magic Sac format. You'll probably want to transfer a number of program disks at the same time. This transfer process won't work with copy-protected Mac disks. Although recent versions of most Macintosh business programs aren't protected, almost all Macintosh games are heavily protected. Don't count on playing commercial games with the Magic Sac.

Transferring Files

The Magic Sac Plus comes with facilities for transferring files from a Macintosh to an ST, but they're fairly crude. They consist of a Macintosh transmit program, an ST receive program, and a null-modem cable to connect the two computers. Of course, this assumes you can arrange to have a Macintosh and an ST in the same room.

The disk-conversion programs can be described as "programmer-friendly"; for average people, they make few concessions to ease of use. When you run these programs, they prompt you to insert disks in both computers and hit Return. If all goes well, a disk transfer takes about ten minutes. If all doesn't go well (for instance, if you put an unformatted disk into the ST drive by mistake), you may be forced to reboot both computers and start over.

Even if the transfer is successful, both the transmit and receive programs terminate immediately after copying a single disk. That means you must load the programs on both computers again to copy the next disk. The transfer process appears to work only with 400K Macintosh disks, so if the Mac programs you're transferring happen to be on 800K disks, you'll have to copy them onto 400K floppies first. If you have a lot of software to transfer, it may take several hours.

Fortunately, there are better alternatives. If you convert a single Macintosh system disk that contains a terminal program, you can start up the Magic Sac on the ST, run the Mac terminal software on both the ST and the Mac, and then download files directly from the Mac via the null-modem cable.

For maximum efficiency, you should pick a terminal program that can transfer data at a speed of 9600 bits per second (bps). It's not easy finding such a program, because many of them directly address the Macintosh's serial hardware and won't work with the Magic Sac. Two shareware programs, *TermWorks* and *Red Ryder 7.0*, seem to work the best for this purpose.

Another alternative is to buy Data Pacific's Translator One ($200). This is an optional hardware interface for the Magic Sac that plugs into the ST floppy disk drive chain. It allows the ST drives to read Macintosh disks directly. Since it plugs into the floppy connector, it can even be used with the internal drives on the 1040ST and Mega ST computers. Keep in mind, however, that even though the Translator One allows the ST drive to read Macintosh disks, it still cannot deal with most copy-protection schemes. You'll have no trouble with your own data files, but again, don't expect it to load most commercial games.

Is It A Real Mac?

Once you've prepared some Magic Sac-format Macintosh disks (or hooked up the Translator One), you're ready to plug in the Magic Sac cartridge, switch on the ST, and run the Magic Sac software. A few seconds after running the emulator software, the screen clears, the Macintosh happy face comes up, the computer starts reading the Magic Sac floppy, and you see the "Welcome to Macintosh" startup message, just as you would on a Mac.

A few more seconds pass by, and then the Macintosh Finder screen appears. (This corresponds to the Atari ST's GEM desktop.) At this point you can operate the computer almost as if it were a real Macintosh. I say "almost" because even though the Macintosh and ST both use the 68000 microprocessor, and, thanks to the Magic Sac, both are using the same operating system, there are still some important hardware differences between the computers. The differences show up in several areas.

To begin with, the ST's sound chip is vastly different from what's in the Macintosh. In fact, the sound hardware is so different that the Magic Sac program used to crash whenever Mac programs tried to make sounds. Data Pacific has fixed that problem, so now the worst that happens when Mac programs try to make sounds is that some misdirected data appears on the screen as garbage. As

of this writing, the Magic Sac software doesn't support the sound features of any Macintosh program. Data Pacific is looking into ways to add limited sound emulation, but they're not convinced it can be done.

A related problem has to do with the MIDI (Musical Instrument Digital Interface) ports. All MIDI software on the Macintosh addresses the hardware interface directly. Since this interface is completely different than the ST's MIDI ports, no Macintosh MIDI software works with the Magic Sac, and it seems extremely unlikely that any will ever work. Fortunately, the ST, with its built-in MIDI ports, is rapidly gaining on the Macintosh as the computer of choice among musicians. Much of the popular MIDI software for the Macintosh is also available for the ST, so this deficiency of the Magic Sac is a little easier to live with.

Printer Compatibility

Since Apple likes to keep things in the family, the Macintosh system was designed to work only with the Apple Imagewriter dot-matrix printer, and later, the Apple Laserwriter laser printer. These two printers are not among those most commonly owned by ST users. If you do happen to have an Imagewriter, however, you can hook it up to the ST serial port and use it with the Magic Sac just as you would with a Macintosh.

If you're like most ST users, you probably have some kind of Epson-compatible parallel printer. These, too, can be made to work with the Magic Sac. The Magic Sac software allows you to direct printer output to either the serial or parallel port of the ST. A company named SoftStyle sells printer drivers that enable a number of non-Apple printers to be used with the Macintosh, and these programs work just fine with the Magic Sac. In fact, one such program, *Epstart*, is available directly from Data Pacific on Magic Sac-format disks, for $45.

For this review, I tested the Magic Sac with a Toshiba 24-pin dot-printer and SoftStyle's *Toshstart* printer driver. After transferring *Toshstart* to a Magic Sac system disk, I printed both text and graphics from programs like *MacWrite* and *MacPaint*, flawlessly. Softstyle has recently released a series of *Printworks* programs which allow you to use a number of dot-matrix, daisy-wheel, and non-*Postscript* laser printers with the Macintosh or Magic Sac.

The printer of choice for the Mac, however, is still the Apple Laserwriter. The fine control offered by its *Postscript* page-description language has played a major role in making the Macintosh such a popular computer for desktop publishing. Unfortunately, the Magic Sac doesn't work with the Laserwriter, because the Laserwriter requires the AppleTalk bus, which the ST lacks.

If Laserwriter-quality desktop publishing is what you're after—a significant reason to yearn for Macintosh compatibility—about the best you can do is to create document files on the Magic Sac/ST, save them on Macintosh disks using the Translator, and then take the disks to a print shop or computer store that rents time on Macintosh/Laserwriter systems. This is a major drawback of the Magic Sac. The situation may change in the future, if any of the proposed local area networks for the ST that support AppleTalk materialize.

Outdoing The Mac

Oddly enough for an emulator, in some ways the Magic Sac actually outdoes a real Macintosh. For instance, the Magic Sac offers a larger screen display—not just physically in terms of monitor size, but also in terms of pixels.

A standard Macintosh has a 512 × 342-pixel monochrome display. An ST equipped with the Magic Sac, on the other hand, offers you a choice between a high-resolution 640 × 400 monochrome screen and a medium-resolution 640 × 200 color display. The latter display is a compromise, however. Although it's technically possible to run the Magic Sac on a color ST system, the results aren't very good. The color screen updates very slowly, and it's so blurry, it's almost unusable.

The monochrome screen is a different story. It's as good or even better than the Macintosh's own display. The ST's 640 × 400 screen has over 46 percent more pixels than a Macintosh screen. Although some Macintosh programs limit themselves to a 512 × 384 screen, most well-behaved programs have been written to automatically adjust themselves to the larger displays that are available for the newer Macintoshes and the Macintosh II. Thus, programs like *MacWrite*, *Microsoft Word*, and *Excel* take advantage of the extra resolution to show you more information on a Magic Sac screen than you'd see on a Macintosh screen.

The Magic Sac's disk input/output may also be a bit faster than the Macintosh's, although this is difficult to measure accurately. As noted above, ST floppy disk drives ordinarily can't read Macintosh disks because they lack the variable-speed controller found in Mac drives. The special Magic Sac disk format may be less convenient than using Mac disks, but because the Atari drives are a little quicker than the Mac's (at least those Mac drives that use the old 64K ROMs), throughput seems a bit speedier.

Button, Button, Who's Got The Button?

Another difference between ST and Macintosh drives is the method of ejecting disks. If you've ever looked closely at a Macintosh, you may have noticed that the disk drives have no eject buttons. Disks can be ejected only under computer control. This allows the Macintosh to make sure a disk is not removed before a write operation is finished, thereby preventing accidental damage to the disk.

(This was particularly important in the early days of the Macintosh, when the machine's limited 128K of memory required more frequent disk accesses.)

ST drives, of course, allow you to eject a disk at any time merely by pressing the eject button. But ejecting a disk at the wrong time could wreak havoc when running Macintosh software with the Magic Sac. To insure that disks are removed only when it's safe, the Magic Sac flashes a large drive letter in the window bar when it's time to remove a disk. It may take ST users a while to get used to this, but it is absolutely necessary. Forgetting to follow these rules can destroy not only the disk that you've removed, but the next one you insert as well.

The latest Magic Sac software allows you to use a hard disk drive in Macintosh mode and divide the hard disk into separate partitions for use with both the Magic Sac and the ST in its native mode. In other words, if you have an ST hard drive, you may divide it into a number of partitions (logical drives) and assign them to either the ST or Macintosh mode. Only the last partitions on a hard drive may be converted to Magic Sac drives. When this is done, the partition is dedicated for use strictly with the Magic Sac; it's no longer visible to the ST system.

The ability to use a hard drive significantly enhances the value of the Magic Sac, because the Macintosh is such a disk-intensive machine. A hard drive increases access speed and reduces the floppy disk swapping that can sometimes make the Macintosh such a pain to use. For maximum efficiency and comfort, a hard drive is strongly recommended for use with the Magic Sac.

Here, too, however, the importance of ejecting disks at the right time can't be overemphasized. It seems strange to talk of "ejecting" a hard disk, since it's fixed in its box, of course. But because of the way hard drive partitions are integrated into the Magic Sac system, this step is necessary before shutting down the computer. "Ejecting" the hard disk makes sure that any unwritten data is flushed from the disk buffer, and it insures that files are properly closed. Forgetting this can result in lost data and can even corrupt the entire disk partition.

Fake Folders

Because the Magic Sac uses the old 64K Macintosh operating system, it defaults to the Macintosh File System (MFS). This is the original disk storage system that was designed for the slow 400K floppy disk drives, and it was never intended for use with hard disk drives. In this system, folders are not really subdirectories as they are on the ST. Instead, they're actually files that point to other files in the main directory.

Since all the files are really in one directory, the system gets completely bogged down when there are more than 100 files on a disk. This means that hard disk partitions should be limited to about three or four megabytes to keep the system running quickly. Sound familiar? ST hard disk drives suffer from a similar malady.

Fortunately, because most ST users will probably want to split their hard drives between the ST and the Magic Sac, the limit on partition size should be no great problem. Even with relatively small partitions, the ST's fast hard disk drives make running disk-bound Macintosh programs a genuine pleasure.

It's possible to switch to the faster Hierarchial File System (HFS) using *Hard Disk 20*, a program that Apple created to allow Macintoshes with 64K ROM operating systems to work effectively with hard disks. This program is available on many of the commercial information services and bulletin boards. HFS provides true subdirectories, faster response time, and smaller hard disk cluster sizes. *Hard Disk 20* is a bit difficult to install on the Magic Sac drives, however, and it's even more sensitive to ejecting disks at the right time. Floppy users, therefore, may find that it isn't worth the trouble. But those who wish to use 800K Macintosh disks with the Translator One must obtain a copy of *Hard Disk 20* and switch to HFS.

It should also be noted that if you don't have a hard drive, a one-megabyte ST system leaves you with plenty of memory for a ramdisk. Most Macintosh ramdisk programs work well with the Magic Sac. They speed up the system as much as a hard drive and are almost as convenient. If your ST system has only a single floppy drive and no hard drive, a ramdisk is almost a necessity.

The Old Operating System

The 64K ROM Macintosh operating system used by the Magic Sac has other drawbacks besides defaulting to the MFS. A small but growing body of Macintosh software works only with the newer 128K ROM operating system. This includes the multitasking MultiFinder and *Hypercard*. Since Mac owners generally equate the importance of *Hypercard* with that of the discovery of fire, this may be a major disappointment to potential Magic Sac users. *Hypercard* is still in its infancy, however, and few applications support it. Data Pacific is already thinking of ways to support *Hypercard* when it becomes a major force.

As the Macintosh continues to evolve, the differences between the 64K ROMs and newer versions of the operating system will no doubt become even more pronounced. Apple is rumored to be completely rewriting the Macintosh operating system to provide true preemptive multitasking and greater communications capabilities. While Macintosh owners may be able to upgrade their computers, it seems less likely that Magic Sac owners will be able to follow where Apple leads in the future.

In the meantime, Magic Sac users may be content with the fact that they can run Macintosh soft-

ware faster on the ST than Mac users can on a real Macintosh. This is a real oddity in the world of emulators. Four main factors make it possible.

First, as mentioned before, the Magic Sac depends on actual Macintosh ROMs, so there's less emulation going on than you might expect. Second, the Macintosh and ST both use 68000 microprocessors, so the Magic Sac doesn't even have to emulate a different instruction set. Third, the Macintosh's 68000 microprocessor runs at a speed of less than 7 MHz, while the ST's 68000 runs at 8 MHz. And finally, the ST's screen display hardware operates more quickly than the Mac's.

The net effect of these differences is that most Macintosh software runs about 20 percent faster on the Magic Sac/ST combo than it does on a regular Mac. This is a small but significant improvement. On the downside, software that uses the system routine TickCount for timing will be off by about 20 percent. I ran a terminal program side by side on a Macintosh and an ST and found that the program's timer ran significantly faster on the latter.

Memory Requirements

Like most computers, Macintoshes come with varying amounts of random access memory (RAM). The first Macintosh had only 128K, but that soon proved to be far too little. Next came the "Fat Macs" with 512K, followed by the one-megabyte Macintosh Plus and Macintosh SE.

If you run the Magic Sac on an unexpanded 520ST (512K RAM), you're limited to emulating a 256K Macintosh system, which is only a little better than 128K. This means you'll be able to run only a few programs, and those that do work will run very slowly, due to frequent disk accesses. With a one-megabyte ST system, however, you can use up to 832K for Macintosh memory. This lets you set up a 300K ramdisk and still have more than 512K left for programs.

With a two- or four-megabyte ST system, you have enough memory to keep multiple programs in memory with *Switcher*, in addition to maintaining a very large ramdisk.

That's why, even though the Magic Sac works on virtually any ST system, the recommended setup consists of at least a megabyte of memory, a monochrome monitor, and perhaps a hard disk drive.

Is It Practical?

Discussions of all these technical niceties are well and good, but what most people want to know is how well the Magic Sac really works. Is it a viable alternative to buying a Macintosh?

The Magic Sac runs all of the big-name Mac software:
MacWrite, MacPaint, MacDraw, Word, Excel, File, Works, Multiplan, BASIC, FORTRAN, Omnis III, Reflex, Pagemaker, *and* Ready-Set-Go.

The answer is that minor differences aside, it runs most of the currently popular Macintosh software as well as, if not better than, a Macintosh. Data Pacific claims a compatibility rate of 70 to 80 percent. When it comes to running popular software packages produced by major software companies, that's probably true. The Magic Sac runs all of the big-name Mac software, such as Apple's *MacWrite, MacPaint,* and *MacDraw;* Microsoft's *Word, Excel, File, Works, Multiplan, BASIC,* and *FORTRAN;* the *Omnis III* and *Reflex* database managers; and desktop publishing programs like *PageMaker* and *Ready-Set-Go.*

The Magic Sac even runs some of the trickier system software, like *Switcher,* which allows you to load more than one program into memory at once and switch between them at will. It also runs *Stepping Out,* which creates a scrolling virtual screen which is larger than the actual display. In general, the Magic Sac's compatibility is highest in the area of business software. Fortunately, this is the area where Macintosh software can really contribute to the usefulness of the ST. After all, not many ST owners will probably want to play the kind of two-dimensional monochrome games that are found on the Mac.

It should be noted, however, that all of the programs mentioned above were created by established software houses that are very careful to play by the rules for Macintosh compatibility. A large percentage of public domain software for the Mac is not so carefully written. Out of a random sampling of five programs I downloaded from various information services, none ran correctly on the Magic Sac. Some entire categories of commercial software seem prone to incompatibility. For instance, terminal programs like *MacTerminal*—even when upgraded for compatibility with the Macintosh II—don't work on the Magic Sac.

Of course, this compatibility problem is not confined to the Magic Sac. Since the introduction of the first Macintosh, each new model has been slightly incompatible with previous machines. The Macintosh II is so different from its predecessors that it even broke most of Apple's own software, like *MacWrite* and *MacPaint.* These tighter compatibility requirements work to the advantage of Magic Sac owners, since software that is robust enough to run on such widely differing machines as the original Macintosh and Mac II probably will run on the Magic Sac as well.

It's Getting Better

When the Magic Sac first appeared almost two years ago,

frankly it wasn't much more than a "neat hack"—a clever stunt. It was great for astonishing your friends by bringing up the Macintosh Finder screen on an Atari ST, but there wasn't much more you could reliably do with it. Floppy disks were limited to the old 400K Mac floppies. A monochrome monitor was absolutely required. Only certain early versions of the Finder could be used. Hard disk drives didn't work, and Mac software crashed the system far too frequently for dependable use.

In the meantime, Data Pacific has expended a great deal of time and effort into turning its neat hack into a truly useful tool for ST owners. Support has been added for color monitors, double-sided disks, hard drives, and HFS. The Translator One allows you to use Macintosh-format disks in ST drives. Data Pacific has offered help and upgrades on all of the major information services. And most importantly, the company has been constantly improving the compatibility and reliability of the Magic Sac software.

The result is that I've been able to write this review using *Microsoft Word* for the Macintosh on my expanded Atari 520ST, just as if I were using a Mac—only with a slightly larger screen and a slightly faster processor. The Magic Sac may not be perfect, but if you already have a one-megabyte ST system and a monochrome monitor, it opens up a whole new range of computing possibilities for under $200.

For that kind of money, it may still be worth it to buy the Magic Sac just to watch your friends' jaws drop when they see you running Macintosh software on your ST.

Magic Sac Plus
Data Pacific
609 E. Speer Blvd.
Denver, CO 80203
$149

Star Trek— The Rebel Universe

George Miller, Editorial Programmer

Requirements: Any ST; a color monitor is required.

"Space, the final frontier.

"Captain's Log, Stardate 4107.6. In accordance with the directive issued by Starfleet Command seven days ago, the *Enterprise* has now entered a region of space designated as the Quarantine Zone, and we have now established that this Quarantine Zone is, in fact, a Klingon construct."

So begins your adventure in *Star Trek—The Rebel Universe.* The Klingons have discovered that a rare isotope of dilithium, dilithium delta 6, found only on Dekian II, acts as a telepathic amplifier, rendering sentient beings within its range open to telepathic suggestion.

Through use of a psimitter,

which generates carriers of telepathic information, the Klingons have induced a state of mutiny on 20 Federation vessels that have entered this zone. Your mission is to discover the cause of this rebellion and reverse its effects within a five-year period, or the Federation will order this section of space sealed forever.

In *Star Trek—The Rebel Universe*, you take command of the *Enterprise* and direct Captain Kirk, Mr. Spock, Dr. McCoy, Scotty, Sulu, Uhura, and Chekov through this universe.

You'll be exploring new worlds, beaming down to investigate the type M planets you find. Star Fleet has thoughtfully provided a document marked as "SFC Classified Document #0214-77," which contains listings of life-supporting planets within the Quarantine Zone. But not all of the planetary systems you'll need to visit are listed in this booklet.

Some of the planetary systems are still under Federation control and will provide aid. You can make some repairs to the *Enterprise*, replenish your fuel and weapons, and maybe relax, unless a rebel starship or Klingons are in the vicinity.

Some planets are controlled by the Romulans, but they are neutral. Look out for Klingon-controlled systems, though. You'll need to investigate them with caution.

If that's not enough, clues on how to solve the mystery are scattered throughout the more than 4,000 planets within the Quarantine Zone. It's a huge universe, and time may be your worst enemy.

Best Star Trek To Date

I've been a Star Trek fan since the days when the show was on prime-time network TV. I've managed to tape most of my favorite episodes, and I've purchased all of the Star Trek movies. I guess you could say I'm a Trekkie.

My first Star Trek computer game was played after-hours at work on a PDP 11/34 minicomputer many years ago. I don't think the boss knew we had the game on the system.

I've eagerly played each ensuing version of Star Trek on various personal computers, watching as each game became more and more sophisticated.

Star Trek—The Rebel Universe is easily the most technologically advanced version of Star Trek to date. The opening sequence is guaranteed to send chills down the spine of any Star Trek fan as the digitized voice of Captain Kirk intones, "Space, the final frontier," and the familiar theme music swells from your monitor's speaker. Occasionally, you'll also receive messages from other characters via digitized voice. To give you an idea of how much attention was paid to detail, when Uhura receives a message at the communications console, you'll immediately recognize the alert signal.

On a machine such as the ST, I've come to expect spectacular graphics. You won't be disappointed here—the simulated three-dimensional battle sequences against rebel starships and Klingon cruisers are excellent.

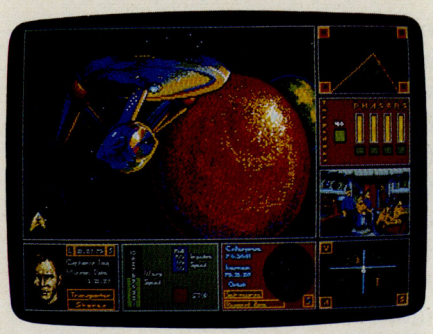
Realistic Game Play

Many highly detailed screens pop up as you progress through the adventure.

The primary screen is surrounded by seven blocks, providing access to secondary screens. You control the *Enterprise* and various other functions by selecting the appropriate screen with the mouse pointer.

As the game begins, the bridge of the *Enterprise* appears, surrounded by pictures of the seven officers who are the primary characters in the game.

Each of the main characters controls the portion of the game you'd expect. Mr. Sulu is responsible for navigation, Scotty runs Engineering, Chekov is the weapons officer, and so forth. As you access the functions of each officer, subsequent screens become available via control points on the



primary display screen. All screens, with the exception of Scotty's, McCoy's, and Uhura's, contain at least one control point.

Captain Kirk controls most of the game functions, such as saving, loading, and pausing games, keeping track of the time elapsed and the number of enemies destroyed, and providing access to the Transporter Room.

Mr. Spock provides such scientific information as solar system types, planet types, enemy status, and the condition of the *Enterprise*.

Mr. Sulu, your helmsman, controls the course and speed of the *Enterprise* via the Starglobe, a three-dimensional animated display of the surrounding universe. The Starglobe may be selected to show the universe on three different scales, from wide range to local area. Sulu also controls the drives and allows you to select planets to visit when you're in a solar system.

Mr. Chekov, the Weapons Officer, controls the weapons and the tracking and targeting computers.

Scotty keeps you informed on the status of the warp and impulse drive systems.

Dr. McCoy runs Sickbay and monitors the health of the crew.

Lieutenant Uhura is responsible for communications.

Multiple Display Screens

As the game progresses, the secondary display screens change. A selected screen becomes the primary screen, and the previous primary screen replaces it on the

bordering screens. Any officer may be selected at any time by selecting the screen which displays the bridge and then pointing to the character whose functions you wish to access.

The Rebel Universe contains many screens, but only eight are visible at a time. The bridge screen is always available, and the system contains an editor which selects the other seven most appropriate screens at any given time.

Since the universe in this game is huge, it's imperative that you maintain an independent log on paper, noting features and actions for future reference. A format for such a log is suggested in the manual.

The manual, by the way, describes several winning strategies that may be employed.

Sound is an important part of this game, but there's no way to turn it off if desired. During late-night sessions, the sound alarms for various actions unnerved my household. Perhaps some visual attention-getting devices should have been provided as well.

Although the program file for this game is quite large, the computer accesses the disk only when the game first loads.

An important feature in a complex game of this type is the ability to save a game in progress. Fortunately, *The Rebel Universe* allows you to save up to eight games at a time. Here's where I encountered the most serious bug in the program, however: The program doesn't check the disk before writing. Be certain you have a blank disk in drive A when saving a game; I accidentally destroyed one copy of the program disk by saving a game while the original disk was still in the drive.

A Few Minor Details

Although I very much enjoyed *Star Trek—The Rebel Universe*, I did feel a few items were missing. When Klingons attacked, I usually didn't know they were in the area until the first phaser blast rocked the *Enterprise*. What happened to the *Enterprise*'s short- and long-range scanners? Are the Klingons using a cloaking device? Also, I'd feel better when entering combat if I could issue the order to raise the shields.

If you travel through space at high warp speeds for too long, Mr. Scott's digitized voice issues a warning that the engines may blow up. Somehow, it would seem more satisfying if he'd say, "She canna take much more of this, Captain!"

Access to the *Enterprise* computer banks was also missing—a puzzling omission in a computer game.

Hours Of Excitement

All in all, if you enjoy Star Trek, and games that require more than quick reflexes, you'll find *Star Trek—The Rebel Universe* filling many hours of your spare time.

Much more than another adventure game, this one's a "must-have'" for the collection of any computer adventurer or Trekkie.

Star Trek: The Rebel Universe
Firebird Software
Distributed by Simon and Schuster Software
One Gulf & Western Plaza
New York, NY 10023
$39.95

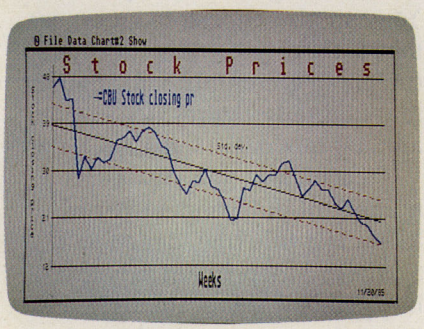
Chartpak ST

David Plotkin

Requirements: Any ST system, color or monochrome. Printer or plotter optional.

It is sometimes difficult to understand just what a series of numbers signifies, and even harder to analyze those numbers and make projections. Often, it's easier to visualize what's going on by creating a chart that shows your numbers in a graphical relationship. *Chartpak ST*, from Abacus Software, is a program that lets you turn your numbers into 11 different types of charts, customize the charts, and apply statistical relations to the data.

Chartpak ST is easy to use, with menus and the mouse doing most of the work. And while *Chartpak ST* may not be the "presentation graphics" package promised by the documentation, the results are still quite useful.



Entering Data

You can enter up to ten sets of data (maximum 1000 points) into *Chartpak ST*, either by punching in the numbers yourself or by reading data from a word processor or spreadsheet file. The data sets need to be related, but you don't have to read in all the data sets in a file, nor do you have to show all the data sets in a chart.

Each of the data sets can have its own name. Data sets can also have *group names*, which identify each point in the data. For example, you might have one

data point for each year in a survey. The group names might then be 1985, 1986, and so on. You can choose to read the group names from disk along with the data, or specify them yourself after reading the data.

If you're entering the data from the keyboard, you can select from the built-in group names (years, months, days, and quarters are just some of them), or you can enter the group names yourself. You can go back and edit the data and group names at any time, even if you read the data from disk. Familiar GEM dialog boxes make all data entry and editing easy to follow.

Summing The Parts

Once the data is entered, *Chartpak ST* draws a default chart on the screen. You can change the type of chart by making selections from a drop-down menu. Selections include vertical and horizontal graphs, area charts, two-dimensional and three-dimensional bar charts, line graphs, and pie charts. You can also choose to group certain parts of your data together (organizing monthly sales figures into quarterly figures, for example), mix data, and stack data.

Each chart you create has a number of independent parts. There is a title line, dependent axis text, independent axis text, independent axis scale, up to six lines of comments, the legend, borders, background, and a space for the date and your name. When you drop down a menu and click on the name of each of these parts, a dialog box appears and makes it possible for you to extensively customize your chart.

For instance, text items can be changed, moved around the chart, centered, flushed right or left, and restyled (italics, bold, underlined, shadowed, and so forth). You can also change text colors, resize the text, and print the text vertically or horizontally. Since *Chartpak ST* works with GDOS (the ST's Graphics Device Operating System), you can even load and use different fonts. These fonts are available separately from Abacus—the same ones used by Abacus' drawing program, *Paintpro*.

You can plot data on the chart using any symbol accessible from the keyboard, and different data sets can use different symbols. The line color, line type (solid, dashed, thin, medium, or thick), fill color, and pattern can all be adjusted. You can change the scale and number of divisions for each axis, and you can choose whether each axis division should be indicated by a line or a tic mark. Even log scales are available. You can pull out as many sections of a pie chart as you want, and set the color and fill pattern for each section of the pie chart.

New data sets can be generated from other sets by building equations with the Data Calculations option. You can perform the four math functions on other data sets or on a specified constant. You can compute averages and standard deviations, do a least-squares fit, and perform exponential smoothing. When you compute standard deviation, *Chartpak ST* even prompts you for which of the available six lines you want to use to show +1 deviation and −1 deviation. These lines can be any color or type.

Multiple Charts

Up to four different charts can be constructed using the data in memory, and these four charts can be resized so that more than one is visible on the screen at once. In fact, you can display all four charts (one in each quarter of the screen) if they aren't too complicated.

You can resize and move each chart any way you like, but it's better to decide on the size before beginning a lot of customizing. Quite often when you shrink a chart, the text ends up in strange positions. In fact, sometimes parts of the text run off the screen.

You can further customize the screen by loading clip art from disk and pasting it on your chart, as long as the artwork has been saved in IFF format. Clip art cannot be resized, however. You can also load a *DEGAS*-format picture from disk as a background for your chart.

Each chart specification can be saved to a disk file, so you won't have to recreate all of this customization later. If you wish, you can save the data independently.

Another option lets you save the whole screen as a *DEGAS*-format picture file. This is fortunate, because *Chartpak ST*'s printing function simply uses the ST's built-in screen dump routine, which doesn't work well with some printers. Saving the chart as a *DEGAS*-format file may make it easier to print; there are *DEGAS* printer drivers available for most kinds of printers.

Chartpak ST also lets you clip out a section of the screen and save it as clip art, which makes it handy for loading into another graphics program. In addition, you can send output to a plotter.

Built-In Help

With all of these capabilities, you might think that *Chartpak ST* would be confusing to use. It is a little daunting at first, but the program is well designed, and you'll soon find yourself constructing graphs like a pro.

One thing that makes *Chartpak ST* much easier to learn is the built-in help feature. Simply by pressing the Help button, you'll be guided through the steps of creating a chart, step by step. *Chartpak ST* prompts you to enter data, choose a graph, customize each axis, and so on, until finally the process is complete and you have your chart. The Help button doesn't take advantage of *every* option, but it does get you to the point where only a few minor details need to be changed to yield the exact graph you want.

In addition to this, the generally well-written manual contains four good tutorials and a reference section. I did find one error in a tutorial, but I don't consider it

serious.

Chartpak ST works in all three of the ST's screen modes. The charts look best in the high-resolution mode on a monochrome monitor, but then you're limited to black-and-white, of course. In medium or low resolution, you can choose from 4 or 16 colors, respectively, but there's no provision for changing the palette to gain access to the ST's 512 possible colors. This is a strange oversight, considering how well the rest of the program uses the GEM environment. To change the palette from within *Chartpak ST*, you'll need to load the Control Panel desk accessory that came with your ST.

Some of the dialog boxes in *Chartpak ST* show fields in which you aren't supposed to enter data, a minor glitch. Another minor flaw is that some of the type fonts' attributes don't work well together, but this is primarily GEM's fault, not the program's.

Why isn't *Chartpak ST*, as I mentioned above, a true presentation graphics package? In the business world, presentation graphics packages generally allow you to make up a variety of slides, with multiple lines of different colored/sized text, and charts which don't require numbers (you just specify a pie or bar graph and enter the titles and so forth right onto the screen). *Chartpak ST* doesn't let you do these things.

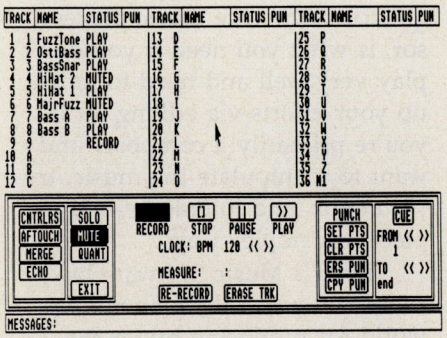
Despite this, however, *Chartpak ST* performs its functions very well. You can construct charts and experiment with them endlessly until they're just right, and this well-designed package couldn't be easier to use. If you need to turn raw data into informative graphs and charts, *Chartpak ST* will do the job very nicely.

Chartpak ST
Abacus Software
5370 52nd St. SE
Grand Rapids MI 49508
$49.95

Keyboard Controlled Sequencer

Richard Mansfield

System requirements: Any Atari ST with a MIDI-compatible instrument or device. Version 1.5 was reviewed.



The world of music has been transformed by computers. Synthesizers and samplers can create virtually any sound, and sequencers can reproduce almost any music.

Synthesizers are rapidly becoming the dominant musical instrument due to their orchestra-in-a-box qualities. For years, traditional organs have had buttons labeled Flute or Human Voice, but they always sounded pretty much like an organ. By contrast, the Flute button on a synthesizer sounds like a real flute, complete with the breathy undertone.

A sampler is similar to a synthesizer, except the sounds aren't synthesized—they're actual digital recordings. When you press the Human Voice button on a digital-sampling synthesizer, you hear a real human voice (at your choice of pitches, controlled by the keyboard).

These powerful music machines have come down in price so much, they now pose a serious threat to the traditional family piano. After all, why get one instrument when for the same money you can get a whole orchestra, piano included?

To control all these sounds, many people buy sequencers for their synthesizers or samplers. A sequencer is a computer program that listens to and memorizes anything a musician plays on a MIDI-equipped instrument. (MIDI stands for Musical Instrument Digital Interface, and is a standardized computer interface for electronic instruments and related devices.) The sequencer memorizes the notes, touch, loudness, and other parameters of the musician's performance. In this respect, it is very similar to a tape recorder. But after the notes are stored in the computer, you can correct and edit the music in ways that simply aren't possible with tape-recorded music. In effect, a sequencer is to music what a word processor is to writing.

A sequencer, however, is far more versatile than a word processor because its raw material—music—can be manipulated in more ways than can words. There are hundreds of transformations you can perform: adjust the key, try new instruments, create patterns in the loudness, use different harmonies, double the melodic line, rearrange the rhythm. With a good sequencer, all these things can be done quickly, and you can listen to the results to see if the piece is improved, or undo the changes.

Two Kinds Of Sequencers

Commercial sequencers fall into two categories. The first group attempts to make musicians comfortable with computers by stressing the tape recorder analogy. These programs often display a picture of a recorder, complete with fast-forward buttons and the rest. Musicians already know how to use Pause and Stop keys, so they can simply record and play back performances. The editing and music processing aspects of such sequencers, if available at all, is downplayed. This type of software is best for performers who merely want a simple way to

practice, or who want to add an extra musician (the computer) to their live performances.

The other category of sequencers, the true music processor, is what you need if you don't play very well and need to touch up your efforts via editing, or if you're primarily a composer and want to manipulate the music, try variations, and interact with a piece in complex ways.

Dr. T's Music Software became famous in the Commodore world for producing by far the most powerful processing sequencer available for any computer. Dr. T's *Keyboard Controlled Sequencer* for the Commodore 128 is rich with useful transformations. While retaining the overall structure of a song, you can delete every *n*th note, or delete by pitch, loudness, and so on. Or you can reverse that process and delete everything except a particular pitch, note, and so forth.

Because the original song is still stored in the computer, it is possible to create, for example, a drum part via these selective deletions and play it along with the original complete song. Whatever you have in mind, you can do. There are global transformations, such as crescendos; changes that replicate the rhythm of an entirely different song; and any kind of musical scale. Want to try the song in a minor key? A rhumba beat? Replace the snare drum with rim shots? It's all a keystroke or two away.

For some people, all that control is a problem. The Commodore 128 *Keyboard Controlled Sequencer*, although extremely popular, has been criticized for offering too many alternatives. Some have called it a "mad scientist approach" to music. For someone who's not yet comfortable with computers, there's validity to that warning. It would be a nightmare, like suddenly finding yourself piloting a 747. There are a lot of strange controls and some of them are alarmingly powerful.

But after spending some time with the software, most people find that it becomes second nature. There's just that initial confusion when you become aware of how much power is at your disposal.

A True Music Processor

Dr. T's *Keyboard Controlled Sequencer* for the Atari ST falls into the category of being a true music processor. It includes all the features of the Commodore 128 version, and much more. Plus, by the time you're reading this, a version with further enhancements (Version 1.6) should be available for a slightly higher price.

In addition to the lavish editing facilities, the *Keyboard Controlled Sequencer* also has a recorder mode, complete with the tape recorder picture. If you want to remain in recorder mode, you can ignore all the other levels of this software and still get your money's worth—but that would be a shame.

With this package, Dr. T's has outdone itself. Now the program includes an artificial intelligence component, the Programmable Variations Generator, which acts like an experienced assistant composer. With the PVG, you can generate variations with controlled degrees of randomness that often yield surprising, musically valid new sequences.

Among the dozens of other amazing features in this program is a bridge generator which attempts to provide an effective transition between two musical ideas, and an ornamentation generator which adds trills and little extras to a piece.

To take a simple example, let's say you want to create a second polyphonic line to weave in and out of your primary melody. With the PVG, you can construct a variation on the melody, and the improvisation can preserve the harmony and rhythm of the original. You can also specify how many variations you want generated and then audition them one after the other, judging how well they harmonize with the original melody.

And since here, too, the *Keyboard Controlled Sequencer* has provided so many approaches—so much control over the process—you can manipulate any or all of the elements to any degree of change. Whether you want a subtle variation on a drum pattern, a moderate swing to the rhythm, considerable syncopation, or a massive thickening of the harmony, just set up the parameters—the *Keyboard Controlled Sequencer* will offer evolving variations from which you can select.

Working with this versatile program is like sitting in with a group of experienced musicians, a knowledgeable arranger, and an imaginative composer. It's really like nothing that's ever been available before—without a computer, it couldn't be done.

Keyboard Controlled Sequencer
Dr. T's Music Software
220 Boylston St.
Suite 306
Chestnut Hill, MA 02167
$225 (Version 1.5)
$249 (Version 1.6)

LDW BASIC Compiler, Version 2.0

David Plotkin

Requirements: Any ST, color or monochrome.

The *LDW BASIC Compiler* takes programs written in ST BASIC and compiles them into fast, stand-alone programs that don't require a BASIC interpreter to run. What's more, *LDW BASIC* improves on the commands built into ST BASIC and adds about 50 new ones, primarily for handling GEM applications. The package includes a shell program, compiler, linker, and all necessary libraries and GEM bindings.

This is a completely new version of the *LDW BASIC Compiler.* The original version did just one thing: It compiled ST BASIC programs. This was no small feat,

however. The drawback was that the compiling process took an incredibly long time and certain commands (such as RESUME NEXT) were not supported. Version 1.1 fixed most of the command problems and offered a faster compile option which bypassed the intermediate step of generating assembly language source code (which was of little use to BASIC programmers anyway). It also offered a batch file for compiling so you could walk away and come back later to find the process complete.

In version 2.0, compiling ST BASIC programs is just a minor part of *LDW BASIC*'s repertoire. The large number of new and improved commands will probably convince you to abandon ST BASIC in favor of the far more powerful command set of *LDW*.

Menus And Options

The first thing you need to do when you get *LDW* is set up some working disks for your system configuration. The *LDW* disks are not copy-protected, so making working copies is simple. The manual walks you through the setup process—which programs go on which of the working disks—in a more or less straightforward, though somewhat cryptic, fashion. There are even some instructions on setting up a batch file for compiling programs on two-drive systems. Although a batch program for one-drive systems is included, there are no instructions for using it. You can't really do a full batch compile on a single floppy system, anyway. In any case, a hard disk system is the preferred setup for maximum efficiency.

Compiling a program without the batch options is made very easy by a shell program called BASLDW.PRG, which allows you to run the compiler and/or linker. It is very easy to use, with drop-down menus, multiple windows for the program listing and error messages, and dialog boxes.

The menus allow you to configure the compiler according to your needs. For example, if your BASIC program doesn't use line numbers, you set the line number option to OFF. You can also decide whether to compile straight to binary code (fast) or to produce intermediate assembly language source code, which can be modified if you know assembly language programming. This option takes considerably longer than the first.

The menus also let you set other options, such as Trace, Stack Checking, Integer Overflow checking, and which window environment to use (GEM or full screen). Most of these can be left at the default settings, although once your program is fully debugged you may want to turn off some of the options which make your code "safer" but cause it to run slower.

In addition, you can choose which disk and directory your files will be read from and written to. Finally, you can save all of your choices in a configuration file, and they will be restored the next time you run the shell.

Compiling And Linking

When you're ready to compile a program, the shell lets you select whether you want to compile and link your program in a single step, just compile it, or just link it. The compile step is what translates the BASIC program into rough machine code. The link step ties in some external programs (libraries) the code needs to run. After compiling and linking, you can run the resulting .PRG file (or any other GEM program) without exiting the shell.

Setting up your system for batch compiling is not very well-explained in the manual. First, you must have a batch file on your working disks; a sample file named BASIC2.BAT is included. You then double-click on LDWBATCH.TTP and type *BASIC2 FILE* on the command line, where *FILE* is the name of the BASIC program you want to compile.

Unfortunately, the first time you try to compile one of the sample programs, the compiler starts spitting out errors like a machine gun. The problem is that the sample programs don't use line numbers, but the batch compile programs (like BASIC2.BAT) are set up to expect line numbers. Even going to the shell program and changing the configuration as detailed above doesn't help, because the batch version of the compiler ignores your configuration file.

As it turns out, you must load a word processor or text editor and modify the batch file to accept files without line numbers. But you don't find out how to do this or what the various command parameters are until Chapter 4 in the manual.

Calling VDI And AES

Once you've sailed past the shoals of setting up *LDW*, however, the seas grow calmer. A set of GEM bindings is included both in the manual and on the disk. These bindings make it easier to get at VDI and AES functions.

The bindings include just about every VDI and AES function. In earlier versions of *LDW*, you had to resort to PEEK and POKE to get at the array elements (contrl, intin, intout, and so on).

Since ST BASIC doesn't allow parameters to be passed to subroutines, you still have to set the values of any variables, arrays, and strings you need before the GOSUB. For example, in the V_pieslice routine, which draws a filled segment of a circle from a beginning angle to an ending angle, you must set the values of BEGANGLE and ENDANGLE before jumping into the subroutine.

LDW does support stand-alone procedures. These are similar to subroutines, except that parameters can be passed to them and local variables used in the procedure do not affect the values of any variables with the same name outside the procedure. If the GEM bindings had been set up as procedures, you could simply pass the values you wanted to work

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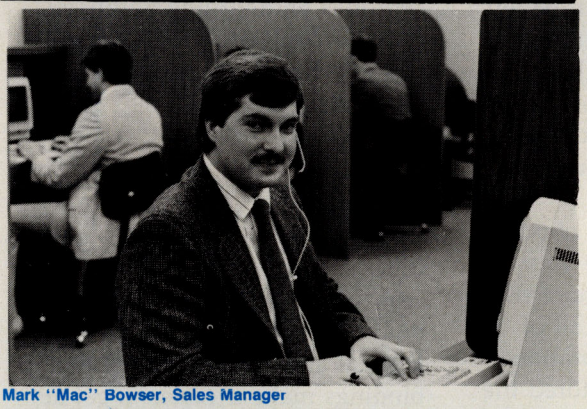

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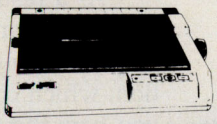

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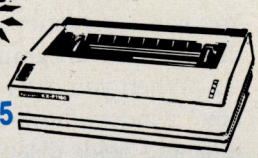

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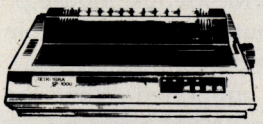

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with to the procedure. For this reason, I'm puzzled about why *LDW* didn't provide the GEM bindings in procedure form.

Support For GEM

The extended commands in version 2.0 make *LDW* far easier to use with GEM. Menus, mouse position and button status, multiple windows, and event messaging are all fully supported. When the user triggers a GEM event by clicking on a menu item or moving the mouse into a user-defined rectangle, the information is returned to your application so it can respond. Among other things, *LDW* tells you which menu item was selected or whether the close box on a particular window was clicked (your program might then respond with CLOSEW wind_num).

You can even set up your program so that GEM events are detected automatically while your program is doing something else (like looping indefinitely). When one of these conditions is detected, the program automatically branches to a subroutine whose name you specified at the beginning of the program

LDW automatically handles the respositioning and resizing of windows. And if you set things up properly, you can even redraw any window that needs it (*LDW* will send you a message when a window needs to be redrawn): Simply call the REDRAW commands. *LDW* maintains buffers which can store what was in the window.

One of the more confusing aspects of *LDW BASIC*, though, is that these events which are returned to your application are known as DIALOG events, and various pieces of information are returned in the elements of the DIALOG array. Yet, they have nothing to do with dialog boxes.

Ersatz Dialogs

LDW does not support true dialog boxes, but it does have a rather nifty substitute. You can open one of the four GEM windows available and draw buttons or edit fields within it. There are several different kinds of buttons and edit fields, and the buttons can be labeled. Your program can then detect when a button is selected by the user, and it can read the text entered in any of the edit fields. You can even fancy up your fake dialog box with graphics.

When you close the "dialog box" window, however, the buttons and fields disappear and have to be respecified when you reopen the window. Also, you can't use templates to validate data as you can with a real dialog box, although you can put default strings in the edit fields. Still, these buttons and edit fields can do most of the things you would use a dialog box for, and they're automatically redrawn if their window is redrawn.

In addition to the GEM commands, *LDW* supports IF/ELSEIF/ELSE/ENDIF constructions, making it easier to specify decisions in the program. There are PEEK and POKE commands for bytes, words, and four-byte integers, so the confusing and illogical DEFSEG is no longer necessary (it's not supported in the new ST BASIC either, by the way).

A compiler directive called INCLUDE allows you to include the code from another BASIC program on disk in your current program when compiling. This is especially helpful for the GEM bindings mentioned above. The code is inserted wherever the INCLUDE directive appears, and multiple INCLUDEs are allowed.

Among the other enhancements are the easy-to-use time and date functions, plus the MATDRAW, MATLINEF, and MATAREA commands, which let you draw lines, shapes, and fill areas of the screen based on data stored in an array. The manual's explanation of these commands leaves a lot to be desired, however.

Manual Labor

Overall, in fact, the manual can be described as a disaster. It's the only significant black mark against this otherwise outstanding product. As mentioned above, this is the third major version of *LDW BASIC*. But instead of writing a new manual for each version, Logical Design Works has added new sections to the original manual.

As a result, the first section of the latest manual consists of the original manual; the second section, which covers version 1.1, tells you how the original manual has been added to and changed; and the third section tells you what has changed since the second section. This is extremely confusing, and at times even misleading.

For example, section 2 lists 44 pages of GEM bindings. These are considerably different from the actual GEM bindings included on the disk with version 2.0. You have to print out the ones on the disk and ignore the ones in the manual. Why didn't LDW just print the new GEM bindings?

The separate sections even have their own indexes which reference only their own sections. In addition, large parts of the manual are extremely technical. Even the nontechnical parts are difficult to understand, due to the stilted language and strange organization. Beginning and intermediate users would probably be less confused if the technical sections were moved to the back of the manual, and if the language reference of new commands (currently in the back) was moved toward the front.

Despite these problems, the latest *LDW BASIC Compiler* is a solid language. It's even more powerful than *GFA BASIC*. If you have a hard disk or a one-megabyte ST with a ramdisk, the compiling times are acceptably short, speeding up the development of large programs. And *LDW BASIC* can make your programs look pretty professional.

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Logical Design Works
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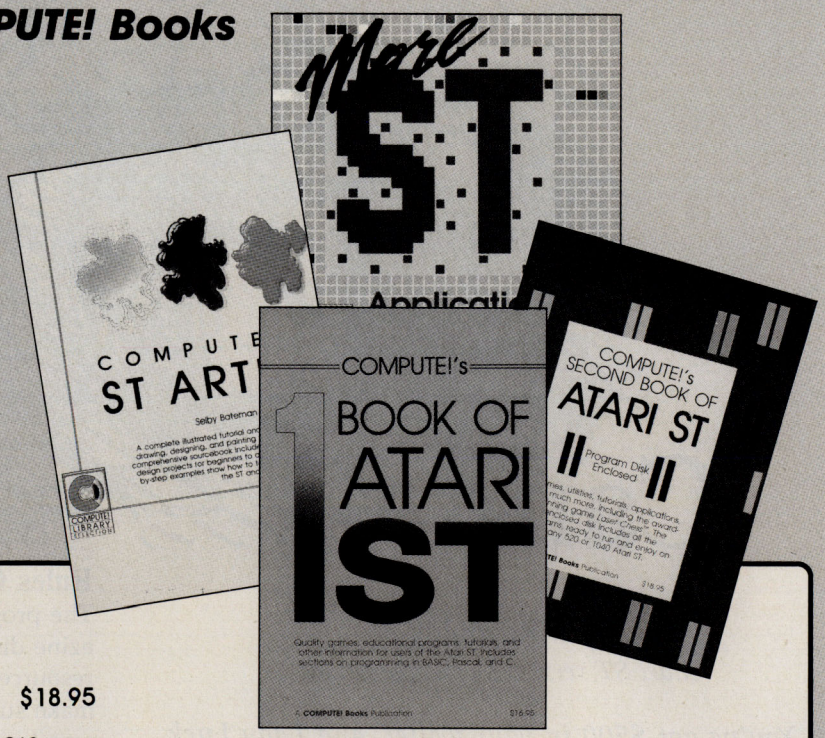

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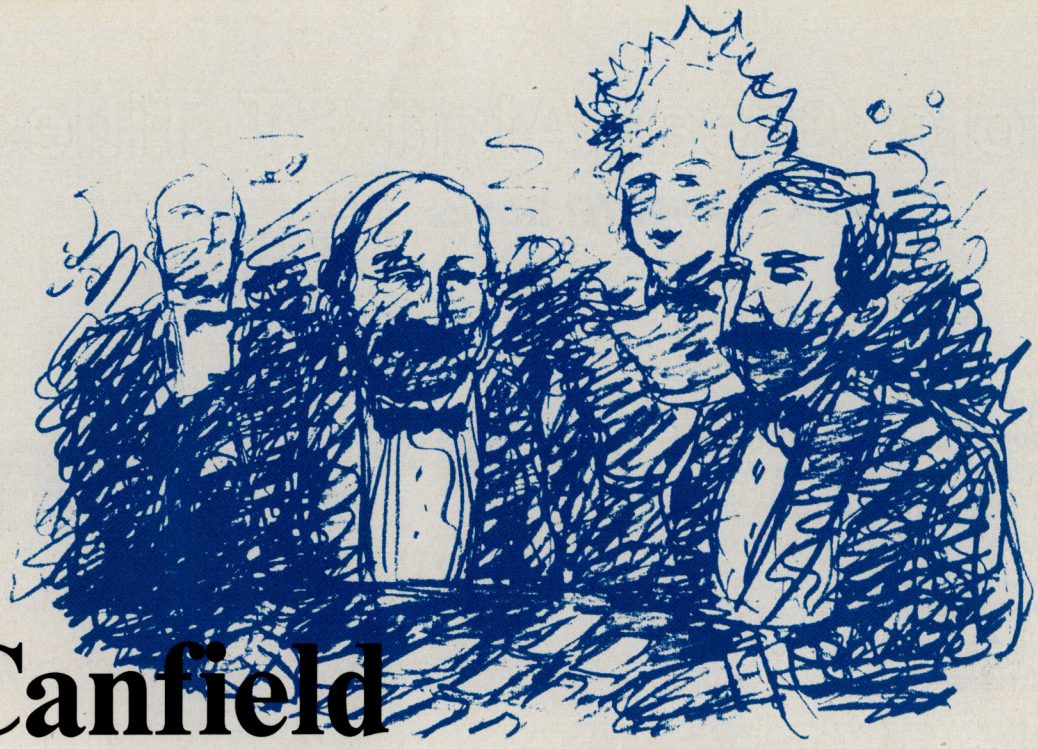


Canfield

Ed Reynolds
Atari ST version by George Miller

You've got $500 in your wallet, and Lady Luck beckons you. When you play this historic solitaire game, will you break the bank or lose your shirt? For all STs with a color monitor.

At the turn of the century, Saratoga Springs, New York was home to a lavish casino called the Saratoga Springs Club House. Known as the "Monte Carlo of America," the club entertained European royalty, U.S. senators, and scores of American millionaires. When a wave of antigambling sentiment forced the casino to close in 1914, its founder and proprietor, Richard A. Canfield, retired with only his millions to console him.

One of the most popular games at the Saratoga Springs Club House was a variation on solitaire invented by and named after Canfield. The player would purchase a deck of cards for $50 (a princely sum in those days). Under the watchful eye of one of Canfield's croupiers, the player would deal the layout and try to beat the odds. The object was to get all 52 cards (or as many as possible) on four foundation piles. For each card placed on a foundation pile, the player would receive $5.

The computer version of Canfield preserves the spirit of the original game, but the ST handles the tasks of shuffling and dealing the layout.

As with all card games, the rules seem more complicated in print than when you're playing the game. Since the computer won't let you make an illegal move, you can learn to play by trial and error. If you want to know what you're getting into, complete rules are presented below.

Rules Of The Game

The program is named CANFIELD.PRG on the magazine disk. It's a stand-alone program; no additional resource or data files are needed. Before beginning, make sure the screen is in low-resolution mode. It won't work in medium or high resolution. You can run the program from the GEM desktop or from the disk menu program.

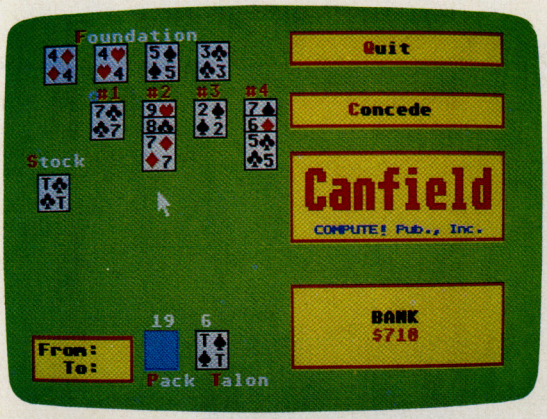
First, a standard deck of 52 cards is shuffled. (Note that the letter *T* is used to designate each of the number *10* cards.) Then, 13 cards are dealt face-down into a pile, which is placed face-up to the player's left to form the *stock.* One card is dealt above and to the right of the stock for the root of the first *foundation.* Four cards, labeled #1 to #4, form the *tableau* to the right of the stock. The remaining 34 cards (held face down) constitute the *pack.*

During the game, the cards in the pack are turned up in batches of three and placed face-up in the *talon* to the right of the pack. The top card of the talon is available for play. When all of the pack has been played onto the talon, the cards are turned over, becoming the pack once again.

The three cards of the same rank as the first foundation card are also foundation cards. If they become available during play, they must be placed face-up alongside the first. You then build on the foundations in suit and sequence until each foundation pile contains 13 cards. For example, if the 7 of hearts is a foundation card and the 8 of hearts becomes available, you can play the 8 on the 7.

For each card you place on the foundation, you're awarded $5. The cards may come from the tableau or the talon. If a suitable card becomes available, you're not forced to move it to the foundation; indeed, it's sometimes a good strategy to delay placing a card.

Note that the ranking in each suit is circular; the



"Canfield" is an interesting variation on regular solitaire that was invented around the turn of the century.

cards wrap around from king to ace. For example, if the queen of hearts is in the foundation, you would build hearts on this pile by playing next the king, then the ace, then the deuce, and so on. The computer gives you a little help here. Whenever a root card is exposed during play, the program automatically places the card in the proper place in the foundation row.

On the tableau piles, you build downward in alternating red and black colors. Only the top cards may be played on foundations. To build on another tableau pile, you must move an entire pile as a unit. If any pile is moved away, leaving a space, the top card from the stock fills the space. Here again, the computer helps by moving the card automatically until the stock is exhausted. When the stock is gone, spaces are filled from the talon, but you may keep a space open as long as you want.

Command Keys

The computer shuffles the deck and deals the layout. You move cards to and from the various piles by pressing the following keys:

Key	Action
S	Move a card from the stock.
T	Move a card from the talon.
F	Move a card to its foundation.
P	Turn over the next three cards from the pack.
1	Move a card to or from tableau 1.
2	Move a card to or from tableau 2.
3	Move a card to or from tableau 3.
4	Move a card to or from tableau 4.

You may also move cards using the mouse; just click on the card you wish to move and then click on or near the destination pile. The exception to this rule is the pack. Clicking the top card on the pack automatically moves the next three cards to the talon. When moving cards to or from the tableaus, you need not click directly on top of a card; clicking anywhere below the tableau will work. Moving cards to the foundation is similar in that you can click anywhere in the area near the top of the screen.

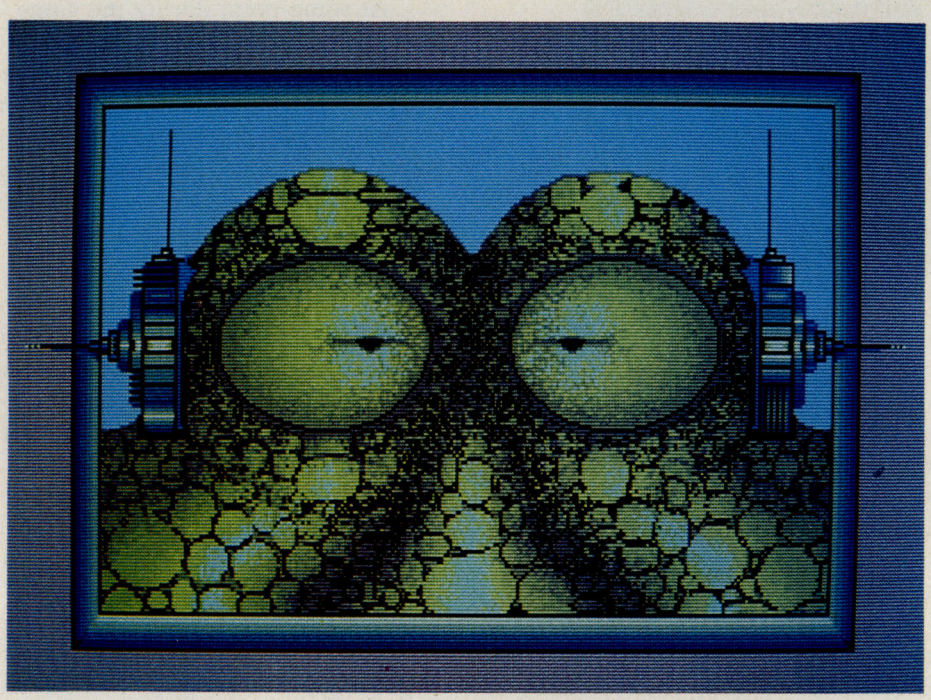
Stock cards may move to the tableau or the foundation, but not the talon. Talon cards may move to the tableau or the foundation, but not the stock. The numbered tableau cards may be played elsewhere on the tableau or on the foundation. A card placed on the foundation may not be removed.

At some point during the game, you'll find that you have no moves available. When this happens, press the C key or click in the Concede box to concede this game and begin another. Press the Q key or click in the Quit box to concede the game and quit the program. Since foundation cards are worth $5 each, you'll lose money if you've placed less than ten cards.

Notes For Programmers

Canfield was written and compiled with MichTron's *GFA BASIC*. If you're interested in studying how the program works, the source code is included on the magazine disk in a special compressed format. The ASCII listing for Canfield is named CANFIELD.LST and is contained within the compressed file SOURCE .ARC. See "Uncompressing Source Files" elsewhere in this issue for instructions on reading the source code.

The cards were created with *NEOchrome* and converted to DATA statements within the Canfield program. Note that the system palette is saved at the beginning of the program and restored at the end; this keeps the Canfield colors from being used when you return to the GEM desktop. **ST**



At The Hop

Doug Thomas

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, NC 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, plus royalties for artwork on the disk. Accepted artwork becomes the property of COMPUTE! Publications, Inc. Only those disks accompanied by a self-addressed, stamped mailer will be returned.*

Notes By The Artist

Although I sculpt for a living, I have been a chronic cartoonist since age three, when I specialized in crayon designs on the kitchen wall. I've been hooked on computer art since 1981, when I purchased an Atari 800 (which is still in use). "At the Hop" was rendered on a 1040ST using *DEGAS Elite*. The picture was originally called "PROG," due to the creature's frog-like qualities. But since he's also an alien, I couldn't call him "FROG."

I seldom work from sketches, finding that, like sculpting in clay, the medium suggests new ideas as I create a picture on the screen. When a sketch is required, I draw on workable acetate and use it as a screen overlay. This seems to be best for my style of work. I don't think sculpture is closely related to flat-screen computer art, in terms of techniques or approaches. A good sense of three-dimensionality is helpful, however, when you create animated sequences. Lately I've been experimenting with an image scanner, modifying and adding to the digitized pictures. **ST**

Karma

Todd Heimarck, Assistant Editor

This unusual strategy game will keep two players entertained for hours. The goal is to maximize the happiness of numerous households within a city, thereby expanding your dominion. The game runs on all STs, color or monochrome.

In "Karma," you have the power to make people very happy. Perhaps you're a college vice president in charge of awarding scholarships, or you're a billionaire who enjoys giving 10 thousand bucks to total strangers, or maybe you just have a nice smile.

Paradoxically, while you're being altruistic and dispensing gifts to a grateful and increasingly happy world, you're greedy, too. You want to gain the approbation and adoration of the beneficiaries of your largesse. You want people to like you.

Unfortunately, there's another philanthropist who has the same power as you. While you're dispensing your gifts and making people happy, your opponent is doing the same thing. You're locked in a popularity contest from which only one victor will emerge.

Running Karma

You'll find the main program on the magazine disk under the filename KARMA.PRG. It runs on either monochrome or color monitors, but only in the low-resolution mode in color. You may run it from the disk menu program or from the GEM desktop.

The opening screen (Figure 1) shows a map of the city of Karma and a list of the four game variations you can play: Capture All, Corners, Two Pies, and 2500 Points. Each variation has a different goal, as explained below. To select a game, press one of the number keys (1–4) on the keyboard or numeric keypad. The basic game is Number 1 (Capture All), which you select by pressing the 1 key.

Levels Of Happiness

The main game screen is divided into three parts: the big map, the small map, and the scoreboard (Figures 2 and 3). The big map on the left contains the most important information. It tells you the relative levels of happiness within each household in the city of Karma:

Mood	Color Karma	Mono Karma
1 Gloomy	Coal tar blue	Foggy gray
2 Content	Deep purple	Conservative gray
3 Pleased	Leaf green	Caviar
4 Joyous	Daisy yellow	Ebony
5 Ecstatic	Saffron	Goose bumps

When it's your turn, you'll see a check mark appear next to your name on the scoreboard. In the color game, the red player moves first, blue second. In monochrome, white plays first, black second.

During your turn, you may move the mouse pointer to any household on the big map, but the household must be on your side. Click the left button once (you may have to hold down the button for a microsecond or two to make sure the click registers). Whichever block you select will instantly increase one step in happiness. A purple transforms to green, green becomes yellow, and so on.

It may strike you that you're not gaining a lot of popularity if you can give happy points only to the households that are already on your side. You click the mouse pointer on your followers and your opponent clicks on his or her followers. How do you move into neutral (or nonfriendly) territory?

Figure 1: *The opening screen of "Karma" lets you choose from four variations of the game.*

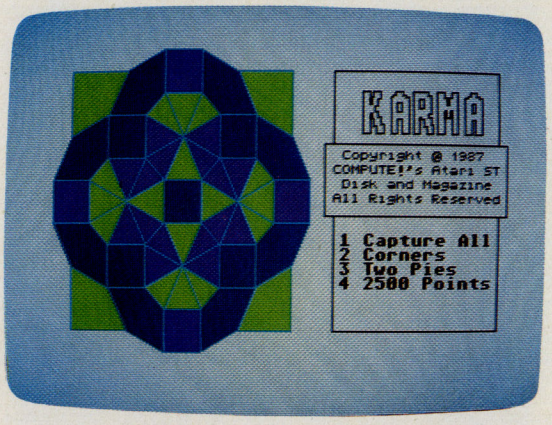


Figure 2: *The main game screen of "Karma" (color version).*

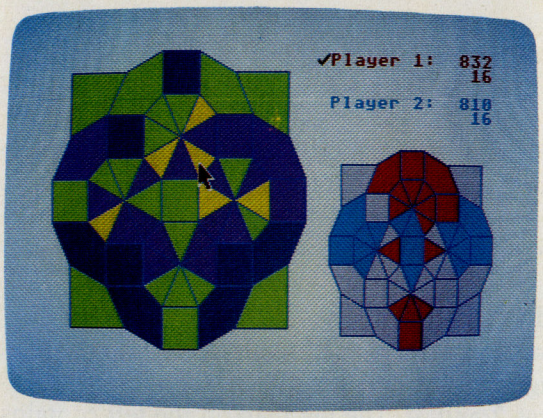
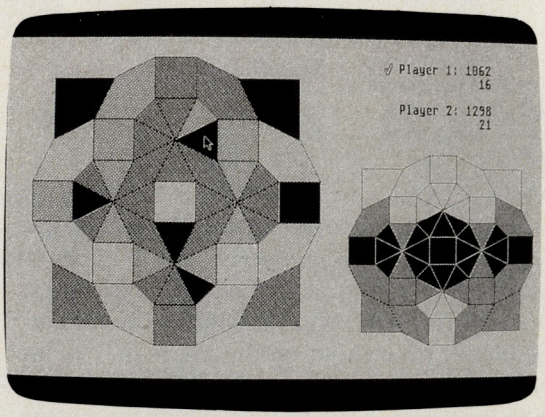


Figure 3: *The main game screen (monochrome version).*



The Power Of Gossip

The levels of glee stop at ecstatic; there is no more blissful state. That's because ecstasy has a curious effect on the citizens of Karma. When their happiness hits level five, they immediately tell all of their next-door neighbors. This is known as a *gossip explosion.*

Three things happen after a gossip explosion. First, the ecstatic household drops back down to a lower level of glee (1, 2, or 3, depending on the type of house). But at the same time, each of the neighbors jumps *up* one level in happiness. Finally, the neighbors also move over to your side.

If you watch the two maps during a gossip explosion, you'll see the happy colors change on the big map. You'll also see your own color spread outward on the smaller map:

	Color	Mono
Player 1	Red	White
Player 2	Blue	Black
Neutral	Gray	Gray

When the game begins, a majority of cells are neutral. However, once a household is converted to one side or the other, it never reverts to neutral.

You win and lose games by controlling strategically located joyous households. If you click on a yellow piece (black in the monochrome game), it affects all of the neighboring pieces. If a neighbor is also joyous (yellow or black), it too triggers a gossip explosion. It's fairly common to see long strings of chain reactions as gossip spreads through a block of neighbors and gradually affects every house in the city.

As you plan your strategy, remember this: If you own a joyous Karmalite (yellow in the color game or black in monochrome) and your own Karmalite lives next door to another joyous Karmalite on your enemy's side, either one of you can capture both of them, plus all of their neighbors.

From Condos To Suburbs

The city of Karma offers elegant living, arranged as four types of dwelling units:

	Points	Minimum Happiness
Condos	3	Content/2
Houses	4	Gloomy/1
Ranches	4	Gloomy/1
Estates	2	Pleased/3

Take a look at Figure 2 if you're playing Karma on a color system, or Figure 3 if you're using a monochrome ST. The condos appear on the screen as four pie-shaped units of eight wedge-shaped condos. Each condo has three neighbors and is worth three points. A group of eight condos looks circular like a pie and is commonly referred to as a *condo pie.*

Houses and ranches have four neighbors and a value of 4. There are nine houses, which are square in shape. The house at the very top of the city is connected with the house on the southern edge. Likewise, the east and west houses are neighbors. The eight ranches are the five-sided shapes on the fringe of Karma. Each ranch borders on two houses, one condo, and an estate.

In the outer corners, you'll see the four estates. They have only two neighbors (both of which are ranches) and are worth two points.

Scoring And Winning

At the end of each turn, both players are awarded popularity points according to which households they've swayed to their sides. The points accumulate as the game progresses. If you control 12 condos, 3 houses, a ranch, and two estates, you'll gain 56 points: (12 × 3) + (3 × 4) + (1 × 4) + (2 × 2).

Underneath the score is a second number that indicates how many households are on your side. If this number dwindles to 0, the game automatically ends because you can only click on households you currently control. If you don't control any, you can't make a move.

In the first three variations of Karma (Capture All, Corners, and Two Pies), the point totals are irrelevant except to provide the loser with some consolation in case he or she loses while leading in points. The fourth variation (2500 Points) is just what you might think. The first person to reach 2500 points wins.

In the first variation (Capture All), the goal is to send your opponent packing. As soon as one player controls all of the households, the game ends.

The second variation (Two Pies) takes a little less time, since the purpose is to capture two complete eight-unit condo pies. There are four condo pies, so you might believe a tie—two blocks each—could happen, but it's mathematically impossible.

In the Corners game, your aim is to capture all four corner estates. Each corner has only two neighbors, so this is a game in which defense is crucial. Once you control a corner, you can (and should try to) hold it for as long as you can.

Tactics And Strategies

The gold pieces (the joyous households) are on the verge of exploding with gossip, so watch them. At the beginning of a game of Karma, you may want to set off several strategic explosions in order to gain more territory to develop.

In the middle of a game, push a few isolated cells (households in an unhappy neighborhood) up to the yellow level and then leave them as an investment in the future. There's nothing worse than setting off a chain reaction that leaves the board in a situation where your opponent simply replies with another chain reaction that decimates your households. If you have nothing but purples, you can't do much to get back.

The final few moves in a game are crucial. You'll often see a city where one move creates a small chain reaction, while another move removes your opponent from play.

Although yellows are primed to explode, greens will often receive gossip from two directions. If three yellows are immediate neighbors, all three will explode. If a green is next to two of the yellows, it will receive gossip from two directions and will also explode.

At any point during a game, you may press the R key. *R* means *restart*, but you can think of it as *resign*, too. If the situation is hopeless, you might as well resign. Chess players do it all the time. Why drag out a game to an inevitable defeat when you can just quit and try again? If the score is 2300 to 1000 in game 4, or if your opponent has captured nearly three pies in game 2, press R and start a new game.

To quit the game completely, press the Q key.

Notes For Programmers

Karma was written with *Megamax C*. If you're interested in studying how the program works, the source code is included on the magazine disk in a special compressed format. The source code files for Karma are named KARMA.C and KDATA.C. They're contained within the compressed file SOURCE.ARC. See "Uncompressing Source Files" elsewhere in this issue for instructions on reading the source code.

Although the specific rules for Karma are new, the idea of a game in which the player makes a move and the computer calculates a new screen from the positions of the pieces is old, at least in terms of the history of computer games. For instance, *Life* falls into this category. You place little pieces on the screen and if they're too crowded or too lonely, they die off. *Chain Reaction* (also called *Atomic Reaction*) follows this theme as well. In *Reaction*, you plant atoms in a grid. When a square builds up to a critical mass, it explodes into the nearby squares, often setting off long sequences of chain reactions.

The graphics are an important part of Karma, yet they're easy to handle because of the ST's built-in Virtual Device Interface (VDI) routines. The VDI is responsible for low-level graphics support within the ST.

The two key VDI routines are called *v_fillarea( )* and *v_pline( )*. To use v_fillarea( ), you create an array of *x* and *y* coordinates and send to v_fillarea( ) the number of coordinate pairs and the address of the array. For example, here's how you'd draw a rectangle on the screen:

```
int rectangle[ ] = {50,50,100,50,100,190,50,190,50,50};
v_fillarea(5, rectangle);
```

Note that to draw a figure with four corners, you send five pairs of coordinates—the first two are the same as the last two. This insures that the rectangle or other shape is closed—because the ending point equals the starting point.

The v_fillarea( ) routine draws a solid shape from the list of *x/y* points it receives. Several other functions control the attributes of the shape: vsf_color( ) sets the fill color, vsf_interior( ) sets the interior to patterns or solids, vsf_perimeter( ) controls whether or not the edge of the shape is visible or not, and vsf_style( ) sets the internal graphics pattern.

The v_pline( ) function is similar to v_fillarea( ), except that it only draws lines (called *polylines*) between the coordinate pairs. It's like a connect-the-dots function. In the color version of Karma, the

polylines are all the same color. In the monochrome game, the polylines on the edge are white if the interior is dark, and black if the interior is white or gray.

The two functions that redraw the screens are called *bigscreen( )* and *smallscreen( )*. They draw the large map and the small map, respectively.

Smooth Animation

An earlier version of Karma redrew the maps while they were visible. The screen flickered noticeably while it was being updated, however. Fixing this problem required a second screen and a technique that's sometimes called *page-flipping* (a common technique in graphics programs and games on eight-bit machines such as the Atari 800, Commodore 64, and Apple II). With page-flipping, you draw the new screen in a section of memory that's not currently visible, and then abruptly switch the screens.

The main( ) function—after initializing the application with appl_init( ), opening a virtual workstation with v_opnvwk( ), and setting up a window with wind_open( )—asks the ST to reserve a chunk of memory that will later be used to hold the second screen. The Malloc( ) function allocates memory, returning the address of the memory block.

The ST can handle additional screens quite easily with the built-in function Setscreen( ). You pass three values to Setscreen( ): a pointer to the logical screen, a pointer to the physical screen, and the resolution (0 is low resolution, 1 is medium, and 2 is high resolution). If you send a long-word value of −1, the logical or physical screen remains where it is.

The *physical* screen is what you actually see on the monitor. It's the chunk of memory that maps bit-by-bit the pixels on the screen. The *logical* screen, on the other hand, is where the ST (including the VDI routines) does its drawing. To manage page-flipping, all you do is set the logical screen to the invisible alternate screen, leaving the physical screen where it is. Draw any shapes you want; they're plotted on the second screen. When you're done, set the physical screen to the alternate piece of memory. The new shapes and colors appear instantly.

In fact, the ST waits for a vertical blank, so there's not even a hint of flicker when the change occurs. If you look at the end of the explode( ) function in the source code, you'll see the line where the Setscreen( ) function precedes the bigscreen( ) and smallscreen( ) functions. Then, Setscreen( ) makes the new screen visible.

Color Cycling

If you run Karma on a color monitor, you'll notice that during chain reactions, the colors in various cells fade from one color to another. This technique is called *color cycling*.

The ST in low resolution can display 16 colors simultaneously. These 16 colors make up the *palette*, which can be selected from 512 different combinations of red, green, and blue (each of the RGB values can range from 0 to 7). The Setpalette( ) function changes the current palette to a new group of colors. (If you have version 1.0 of *Megamax C*, this function is misspelled with two *l*'s and one *t* as *Setpallete( )*. If you have version 1.1 or later, it's correctly spelled as *Setpalette*.)

To create a new palette, you establish an array of 16 integers and send the address to Setpalette( ):

```
int colors[ ] = {0x0777, 0x0000, 0x0721, 0x0147,
0x0656, 0x0760, 0x0372, 0x0526,
                0x0234, 0x0056, 0x0775, 0x0760,
                0x0372, 0x0526, 0x0234, 0x0000};
Setpalette(colors);
```

Although you could put decimal values in the colors[ ] array, it's more convenient to use hexadecimal (marked by the 0x prefix). An integer, also called a *word*, is two bytes long. Each byte consists of two nybbles of four bits each. If you use the Control Panel accessory (CONTROL.ACC), you'll notice that each RGB value lies between 0 and 7, which are the values that fit into the three final nybbles of the entries in the color palette.

For example, 0x0721 means 7 Red, 2 Green, 1 Blue. The decimal value of 0x0721 is 1825, but it's difficult to see how 1825 would translate to 7 Red, 2 Green, and 1 Blue, so in this case, hex makes more sense than decimal.

The blend( ) function near the end of the program takes care of the color cycling. Only certain colors are cycled, after which the program delays for 1/5 second to allow the colors to remain briefly visible on the screen.

Actually, the ST's 16-color limit can be overcome with a technique known as a *raster interrupt* on the Commodore 64 or a *display list interrupt* on the Atari eight-bit computers. But color cycling is more interesting (and easier).

Call Me When Dinner's Ready

The ST has a very flexible and useful function called *evnt_multi( )*. If you've previously programmed on an eight-bit computer, you may have written program loops that repeatedly check the joystick port, the keyboard, or whatever. If the joystick is active, you move a sprite in one direction or another. When you're programming the ST, keypresses and mouse movements are called *events*. The key to the Karma game is the play_game( ) function, which consists of a do-while loop beginning with an evnt_multi( ) function.

It works like this: You give the computer a list of events you're interested in monitoring; then, you just wait until something happens. It's like saying, "I'm going out to sit on the porch. Call me when dinner's ready." Your program can sit back and relax until a specific event has been triggered.

The three events that matter in Karma are a timer event, a keyboard event, and a mouse event. The

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timer is set for 1.2 seconds. If nothing happens within that period, a timer event causes the first routine to go into action. It just cycles the perimeter colors on the map (color version only).

The *keyboard* event routine checks for which key was pressed. If it was *q* or *Q*, the user wants to quit and appropriate flags are set. If *r* or *R* was pressed, the restart flag is set.

The *mousebutton* event routine checks for the current *x* and *y* coordinates and figures out in which cell the mouse pointer is located. If the current player controls that cell, the status is changed. This might or might not trigger a gossip explosion. Afterward, Karma redraws the screen and passes control to the other player.

An Array Of Structures

The KDATA.C file starts off with a structure containing several integers and a couple of arrays of integers. The karma[ ] array is an array of structures. Each element of karma[ ] contains important information about a particular cell on the map.

The variable *num_corners* contains the number of corners for a shape. The *corners[12]* array contains the *x/y* points for plotting the shape (using v_fillarea and v_pline). *Num_neighbors* and *neighbors[4]* hold the number of neighbors and their respective positions within the karma[ ] array. *Owner, renters,* and *update* keep tabs on the current owner, how many happiness points the cell has, and whether or not the happiness of the household was changed during the last round.

When you see a reference such as *karma[j] .num_neighbors,* it means the number of neighbors for the *j*th structure in the array karma.

The *translate[14][14]* table is a two-dimensional array of values mapped to an imaginary grid on the screen. A −1 means there is no corresponding cell. A number from 0–52 means the grid maps to a particular cell from the karma[ ] array. A number from 100–191 means you subtract 100 and use the *diagonal [92][4]* array to resolve the question of which cell the player is clicking on.

Other Variables And Functions

The start[20] array lists the starting cells owned by each player. The even-numbered elements (0, 2, 4, 6, and so on) belong to player 1 and the odd-numbered elements belong to player 2.

The sfx[12][23] array contains 12 sound effects. They're called in the order defined by the second array named *zounds[ ]*. The function that creates the sounds is called *sound_fx( );* it's found near the bottom of the KARMA.C source code. All of the sound effects in Karma were created and tested with the "Sound Editor" program published in the December 1987 issue of COMPUTE!'s Atari ST Disk & Magazine.

ST

Uncompressing Source Files

Todd Heimarck, Assistant 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.

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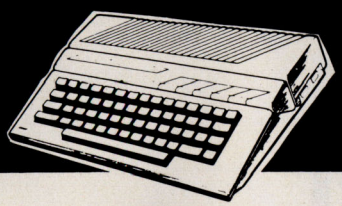

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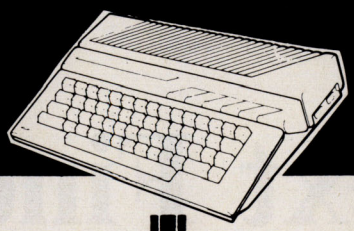

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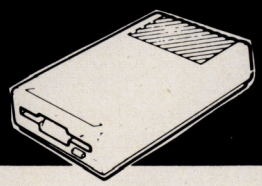

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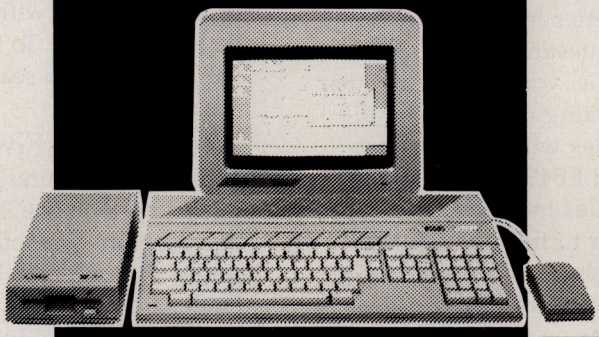

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Text Finder

Mike M. Duppong

Almost anyone who owns an ST will find this program useful. It searches text files for specific words or phrases, offering several options for output. For all STs, color or monochrome.

Have you ever needed to find a certain file but couldn't remember its name? For example, imagine that today's mail brought a letter from Uncle Wesley. He writes, "To answer your question, it would be a pleasure." The only problem is, you don't remember the question. So you start looking through disk directories and find scores of files with meaningless names like SQUIZL.DOC and EB4SM3.DOC. It could take hours of loading files into a word processor and looking through them to find the original letter you wrote to Uncle Wesley.

But with "Text Finder," you can discover the letter in a matter of minutes or even seconds. You simply tell Text Finder to look through all files matching the filename pattern *.DOC, searching for the word *Wesley*. The program tackles the drudgery of the search while you sit back and relax with a cup of coffee.

Or let's say that you once wrote a C program with an extremely useful function called *xref( )*, but it's six months later, and you don't remember which program contained the function. With Text Finder, you'd just ask for all *.C files that contain the word *xref*.

This capability alone would make Text Finder worth its weight in bytes. But Text Finder has even more powerful features that allow you to search for up to five different words or phrases in as many as five different kinds of files—all in one operation. For instance, let's say you've written a book, and you want to find all references to George Washington *and* Valley Forge. You can tell Text Finder to look for both *Washington* and *Valley Forge* in all files matching the patterns *.DOC, *.TXT, and CHAPTER*.*, and also to display the context in which the phrases appear so you can ignore references to Washington, D.C. or the state of Washington.

Text Finder can even serve as a simple but effective database manager. Use your word processor to type in the text, keeping each record on a single line. You could create a list of videotapes you've recorded, for example, with the tape's title and the movie on the same line. To find the movie *Star Wars*, simply tell Text Finder to search for the words *Star Wars*.

Five Phrases, Five Paths

Text Finder is found on this issue's magazine disk under the filename TEXTFIND.PRG. When you copy this program to another disk, be sure to copy the resource file TEXTFIND.RSC as well. You can run Text Finder from the GEM desktop or from the disk menu program. It works in medium resolution with color monitors and in high resolution with monochrome monitors. If you try to run it in low resolution, an alert box warns you to switch to medium resolution.

Using Text Finder is easy. You simply tell the program *what* to look for and *where*. It handles up to five lines of text and up to five different pathnames. These can be linked together in any way you desire. The results of the search can be displayed on the screen, saved in a file that you specify, or both. You have the option of displaying the names of the files in which the phrases were found, the context in which the phrases were found, and line numbers within the files where the text was found, making it possible to pinpoint exactly where that elusive text is hiding.

When you run Text Finder, you'll see a column labeled *Text* on the left side of the screen (refer to Figure 1). Underneath are five lines; that's where you type the various words or phrases you're trying to

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find. To the right of each of the five fields is a small box. These are linking buttons as described below.

On the right, under the heading *Filenames/paths*, there are five additional fields. This is where you specify the file (or files) you want Text Finder to look through.

To enter a filename or path, click inside any field. A dialog box pops up. Type your selection and click on OK. The filename or path is inserted into the corresponding box.

You may also use the standard GEM file selector. Point and click on the Set Path button. A dialog box appears, asking which drive directory you wish to view. Enter a single letter and click on OK. A file selector box then appears; select the desired filename or path. When you click on OK, the path or filename you entered is placed in any available path box. Text Finder ignores paths or files that already exist in another box.

Using Wildcards

When selecting a path, you may enter a specific filename (such as LETTER.DOC) or specify a path with wildcard characters (* or ?). For example, the path F: *.MOD tells Text Finder to look through all files on drive F that have any filename with the .MOD extension. The pathname B: \ASSEMB \TEST??08.S tells Text Finder to search all files in the ASSEMB folder that start with TEST, have any characters in the fifth and sixth positions, end with the characters 08, and have an extension of .S. Matches could include TEST0108.S, TEST0208.S, TESTXX08.S, and so on. If you name your files in a consistent way, wildcards can be very useful.

If you're not sure how to use wildcard characters, consult the manual that came with your ST for complete instructions.

Once the text and path fields on the Text Finder screen contain the correct information, you need to link them together so Text Finder knows where to look for each target phrase.

When Text Finder first runs, the only link is *All of the above* for the text fields to *All of the above* for the path fields. For simple searches, this is sufficient. It tells Text Finder to search all of the files you've specified for all of the phrases you've specified.

For more complex searches, however, you may need to link the fields individually. To do this, just point at any of the text field link buttons and click the mouse. The button will reverse its color. Then point to any of the path field link buttons and click again. Text Finder graphically displays the link, indicating that you wish to search for that specific text field within the indicated path or file. (See Figure 2.)

You may link any target phrases to any paths or filenames, and Text Finder automatically checks for redundancy. For example, if you define several individual links and then link the two *All of the above* buttons, the program dissolves the individual links.

Figure 1: *"Text Finder" can automatically search through a number of files for any word or phrase.*

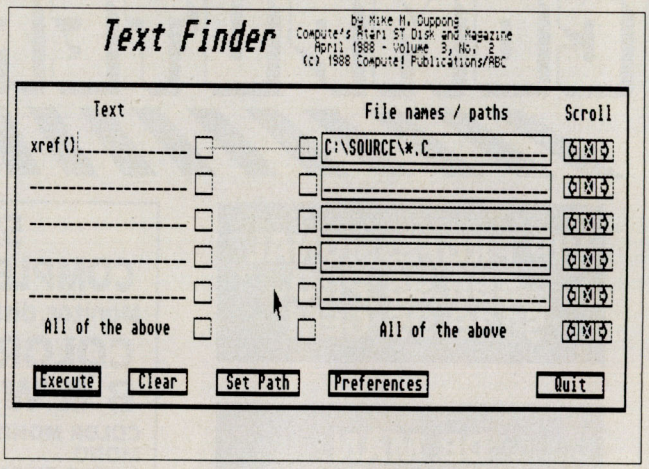
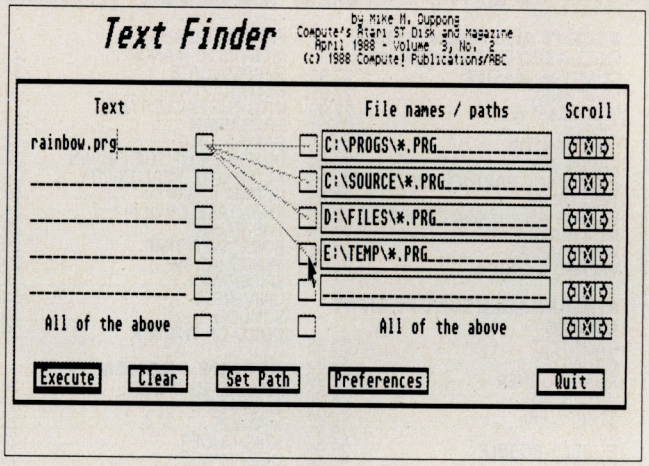


Figure 2: *For more complex searches, "Text Finder" lets you specify up to five different target phrases and as many as five different pathnames, linking them any way you wish.*



Occasionally, you may need to specify a long pathname that won't fit in the short path fields. In this case, simply click on the scroll buttons to the right of the long pathname to move it back and forth. You can scroll each path field independently, or you can scroll them simultaneously with the *All of the above* scroll buttons.

The Clear button clears all text fields, clears all path fields, and breaks all links.

Selecting Additional Options

After you've filled in the text and path fields and defined your links, you can tell Text Finder to begin the search.

First, however, you might want to click on the Preferences button to select additional options. The Preferences button brings up a dialog box with options for case sensitivity, destination of output, and contents of the output.

Turn on case sensitivity if you want a specific match for lowercase or uppercase letters. For example, let's say you're searching for the name *Ted*.

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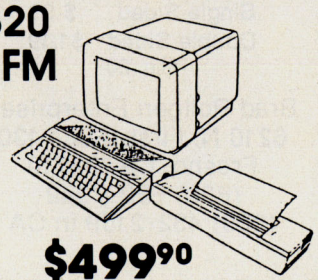

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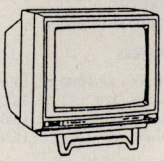

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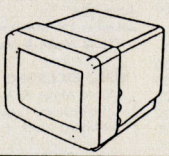

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To make sure Text Finder doesn't stop on *ted* (which would show up at the end of words like *wanted* or *boasted*), you could turn on case sensitivity. Text Finder would then ignore all occurrences of *ted, TED, tED,* and so on.

If you want to find *all* instances of a word, turn off case sensitivity. Remember that words are capitalized at the beginning of a sentence, so if you're searching for *regardless,* Text Finder will skip it if it's capitalized and case sensitivity is on.

The destination option determines whether any matches discovered by Text Finder are printed on the screen, saved in a disk file, or both. Most of the time, you'll find the screen option preferable. If you want hardcopy output, tell Text Finder to save the matches in a disk file and then simply print out the file from the GEM desktop.

The contents option lets you select what kind of information you receive: only the names of the files in which the target phrases were found or the context in which the phrases occur. When the context option is switched on, Text Finder displays a few lines of text surrounding the target phrase.

You can save the preferences you select for later recall the next time you run Text Finder. The preferences are saved with the filename TEXTFIND.PRF.

Help is available for any of these functions. Just point and click on the small question mark button next to the item you're puzzled about.

Performing A Search

To tell Text Finder to begin the search, click on the Execute button or press Return when the main screen is displayed. An alert box tells you to press P to pause the search, C to continue, or the Esc key to abort.

Text Finder always searches the text and pathname fields from top to bottom. For example, if you have text fields 1 and 2 linked to paths 3 and 5, every line of text in each file of path 3 will be compared against text fields 1 and 2. When it's finished with this path, Text Finder progresses to path 5 and continues in the same manner.

Hint: Keep case sensitivity switched on if you can. The time required for a search may more than double when sensitivity is off. This is because Text Finder must convert each line read from the file to uppercase letters before it compares the line to your text (which is also converted to uppercase letters).

Notes For Programmers

Text Finder was written with *Megamax C.* If you're interested in studying how the program works, the C source code is included on the magazine disk in a special compressed format. The source code file for Text Finder is named TEXTFIND.C and is contained within the compressed file SOURCE.ARC. See "Uncompressing Source Files" elsewhere in this issue for instructions on reading the source code.

ST

New Programs From MichTron

MichTron has recently released a new drawing program, a designer's tool, and a switching program.

GFA Object, a three-dimensional drawing program, constructs 3-D pictures that can be rotated, resized, and displaced. You can save objects as pictures (*DEGAS* format), ASCII data files, *GFA Draft Plus* files, and macros. Objects can also be saved in vector file format for use in *GFA Basic* and *GFA Vector* assembler routines.

You can draw objects on the screen by setting the points, edges, and surfaces in the graphics editor. Modular principles can be used to create complicated objects. The mouse can be used to place object components.

Geometric primitives, including spheres and blocks, are provided inside the module folder on the disk, and they can be made any size. You can also create your own shapes that can be saved and used again. The screen constantly displays the straight-ahead view of an object while showing two smaller pictures of the top and side. The three views are updated each time an object is redrawn or manipulated.

The package also includes an animating program that allows you to move drawn objects with the keyboard.

The suggested retail price of *GFA Object* is $99.95.

MichTron's new designer's tool, *Master CAD*, allows you to project two-dimensional designs into three-dimensional images and to spin objects around a user-defined axis. You can move, copy, rotate, and flip any object horizontally or vertically; change proportions and textures; and export or import objects to and from other objects.

Objects can be observed from various points and angles, from inside to out, and either transparent or solid. With a color ST system, you can control color and shading in the 3-D mode. You can either view objects on the screen or output them to a printer.

The program requires an Atari ST with at least one megabyte of memory and two floppy disk drives, a color or monochrome monitor, and an Epson FX-80 compatible printer. There is also a plotter driver for Hewlett-Packard plotters, the Color Pro, HP-7550A, and the HP-7585B. The program also accepts any GDOS-compatible driver for different printers and plotters.

Master CAD retails for $199.95.

The new switching program from MichTron is *Juggler*, which allows users to keep up to seven GEM applications resident in memory at the same time. You can move from one application to another without saving files, exiting the application, or reloading a new program. *Juggler* recognizes files with .PRG, .TTP, and .TOS extensions.

The suggested retail price of *Juggler* is $49.95.

MichTron, 576 S. Telegraph, Pontiac, MI 48053

Circle Reader Service Number 220.

New *Real BASIC*

Computer Crossware Labs has released a new version of *Real BASIC*, its BASIC interpreter for Atari ST computers.

Real BASIC Version 1.3 incorporates new optimization techniques that are said to make it the fastest BASIC interpreter available for any personal computer on the market. It is completely compatible with all previous versions of *Real BASIC* as well as with ST BASIC. In addition, it has a series of new statements and functions to simplify software development.

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Most GEM tasks—such as the creation of drop-down menus, dialog boxes, alert boxes, and file selectors—can now be accomplished with a single BASIC statement instead of PEEKs and POKEs. Another new statement allows use of the MIDI (Musical Instrument Digital Interface) ports.

All registered users of *Real BASIC* will get free updates.

The suggested retail price for *Real BASIC* Version 1.3 is $49.95.

Computer Crossware Labs, 516 Fifth Ave., Suite 507, New York, NY 10036

Circle Reader Service Number 221.

Integrated Accounting Package

ISD Marketing has announced the release of *Accounts*, an integrated accounting package for all Atari STs and IBM PC compatibles with GEM.

Accounts is aimed at small- and medium-sized companies and takes full advantage of the GEM user interface. Help screens are available throughout the program. Accounts receivable, accounts payable, inventory control, and general ledger are fully integrated in *Accounts*, and the program also handles batch invoicing, check writing, and order entry for both sales and purchases. All reports can be viewed on the screen, printed, altered, amended, or entirely reconfigured using the built-in report generator.

The suggested retail price for the ST version is $149.95; the IBM version is $299.95.

ISD Marketing, 2651 John St., Unit 3, Markham, Ontario, Canada L3R 2W5

Circle Reader Service Number 222.

Roland Synthesizer Editor

Tigress Designs, a British-based company, has announced an editing package called *Patchman 32* for the Roland MT32 synthesizer. The software is compatible with all Atari ST systems, color or monochrome.

Patchman 32 offers the following features:

- Easy access to all areas of the MT32's memory—64 user voices, 128 preset voices, 30 drum voices, the system area, 128 patch memories, and 30 drum memories.
- Built-in "soft keyboard" with a step-time sequencer, so the synthesizer and drum voices can be played with the mouse while editing.
- Full GEM-style user interface.

The British price of the package is £85.95; a price for the U.S. market has not been announced.

Tigress Designs Limited, 25 Burmester Rd., London, England SW17 OJL

Circle Reader Service Number 223.

MIDI Music Sequencer

MIDImouse Music has released *Fast Tracks ST*, a full-featured MIDI music sequencer designed for all ST systems and MIDI-compatible devices.

Fast Tracks ST allows you to store up to 50,000 notes with an unexpanded 520ST and 110,000 notes with a 1040ST. Up to 16 sets can reside in memory at once, and each set may contain up to 16 sequences of 16 tracks each. The tracks run simultaneously, as with a multitrack tape deck. Each sequence can be looped or chained with other sequences in the set using the Song Mode feature.

External devices can be synchronized to the sequencer via MIDI clock information. If the internal computer clock is used to drive the sequencer, the clock speed may be programmed for the entire sequence, as is typically done with drum machines.

The edit mode in *Fast Tracks ST* has a full range of features designed

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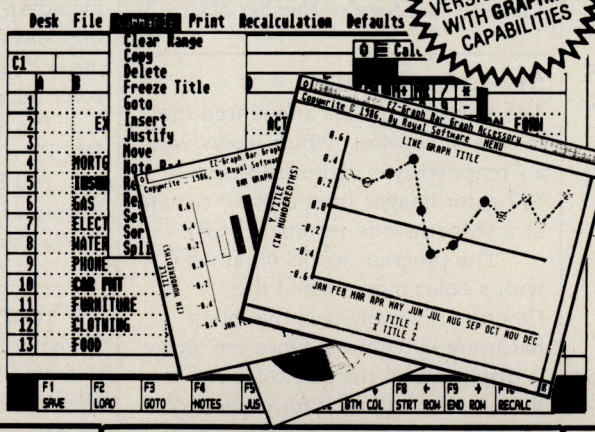

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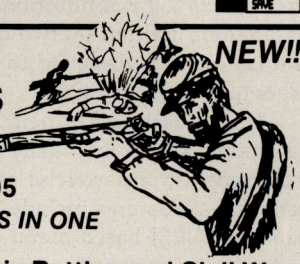

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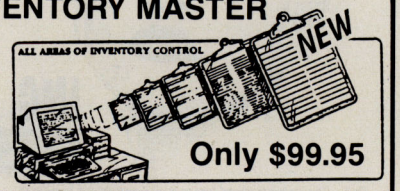

INVENTORY MASTER is an easy to use **Gem** based inventory program that will do everything from keeping track of inventory to generating detailed printed reports. With **GEM** pull down menus you can execute fast and easy searches, sorts and printouts. It is so easy you can do it almost without looking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

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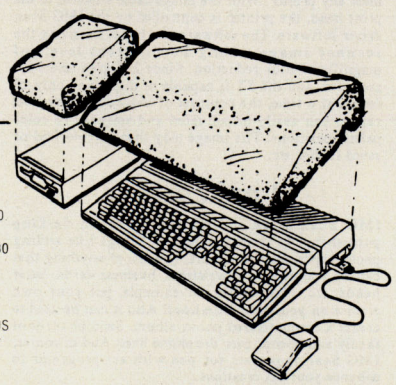

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The suggested retail price for *Fast Tracks ST* is $129.95 plus $3 shipping in the U.S. and Canada.

MIDImouse Music, Box 272, Rhododendron, OR 97049
Circle Reader Service Number 224.

ST *Ultima*

Ultima IV: Quest of the Avatar has been released by Origin Systems for the Atari ST. Players must respond to ethical dilemmas in this role-playing fantasy game. These ethical dilemmas help determine the player's character and his traits. The object of the game is to reach the spiritual level of Avatarhood. The program watches the player's every move and penalizes the player for lying, cheating, or stealing.

Features include high-resolution 16-color graphics, a mouse interface, an original musical score, and battle sequences that take into consideration the terrain and the player's skills.

Ultima IV retails for $59.95 and is distributed by Brøderbund Software.

Brøderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101
Circle Reader Service Number 225.

512-Color Digitizer

Trio Engineering has announced the release of *Digispec*, which works with a ComputerEyes digitizer to capture 512-color images from a video camera or a videocassette recorder (VCR).

The program works on any ST with a color monitor and the ComputerEyes digitizer. No other hardware is required. Once the image is displayed on the 512-color screen, the user can adjust it for proper color balance, brightness, and contrast.

Digispec also offers dithering capabilities, which brings the number of simulated color shades to about 24,000.

Images created by the program can be viewed with the *Spectrum-512* slide show program provided on the disk. It displays single pictures, animated sequences, and stereo pictures. (Stereotek 3-D glasses are required to view the stereo pictures.) Users can create script files to mix different animations and individual picture displays in one slide show.

You can also load images into *Spectrum-512* to perform editing tasks, including touch-ups, recoloring, resizing, and creating compositions with other digitized and hand-drawn 512-color images.

The suggested retail price is $39.95.

Trio Engineering, P.O. Box 332, Swampscott, MA 01907
Circle Reader Service Number 226.

To Your Health

Schaefer Supergraphics has released two new health programs for the ST. *Diet Version 2.0* is a nutritional analysis program written by two doctors, and *Longevity* is designed to advise users how to live longer.

Diet is designed to help the user determine weight loss, daily caloric requirements, and exercise caloric expenditures. Features include an expandable GEM-based menu planner and calorie counter. The program rec-

ommends an ideal diet and body weight. The documentation includes discussions on rational weight loss, fad diets, and updates on nutrition and exercise. The program can run in color or monochrome.

The suggested retail price is $25.

Longevity suggests how users can maximize their lifespan through risk factor modification, nutritional awareness, and sensible exercise. The program can do all of the calculations found in *Diet* and can create nutritional databases and weight-loss calendars, and it can print out nutritional profiles. Subjects covered in the program include aging, exercise, vitamins, cholesterol, aerobics, cancer, smoking, and AIDS.

The program requires a color monitor and carries a retail price of $39.95.

Schaefer Supergraphics, 1201 Wilder Ave., #1801, Honolulu, HI 96822

Circle Reader Service Number 227.

For People Who Dig Diamonds

XLEnt Software has released a new multilevel arcade game. *Diamond Mike* requires players to assist Diamond Mike as he tunnels through rocks and dirt to collect treasures. Players must also avoid radioactive bats and guard droids along the way.

When players master all of the mazes on the disk, new ones can be created by the player. Other features include three skill levels, multiscreen play on each level, and one- or two-player options.

The suggested retail price is $19.95.

XLEnt Software, P.O. Box 5228, Springfield, VA 22150

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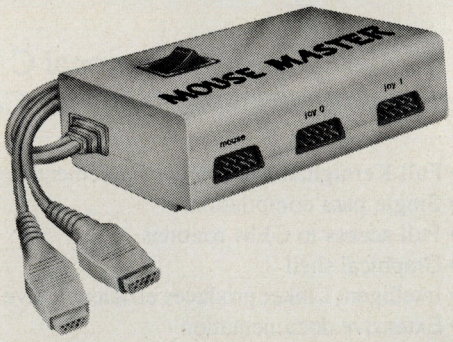

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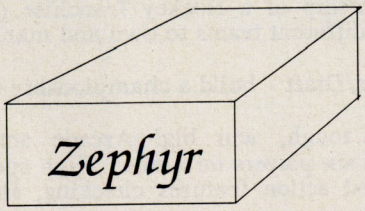

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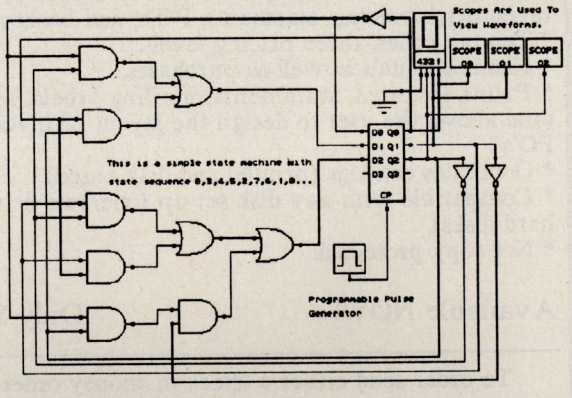

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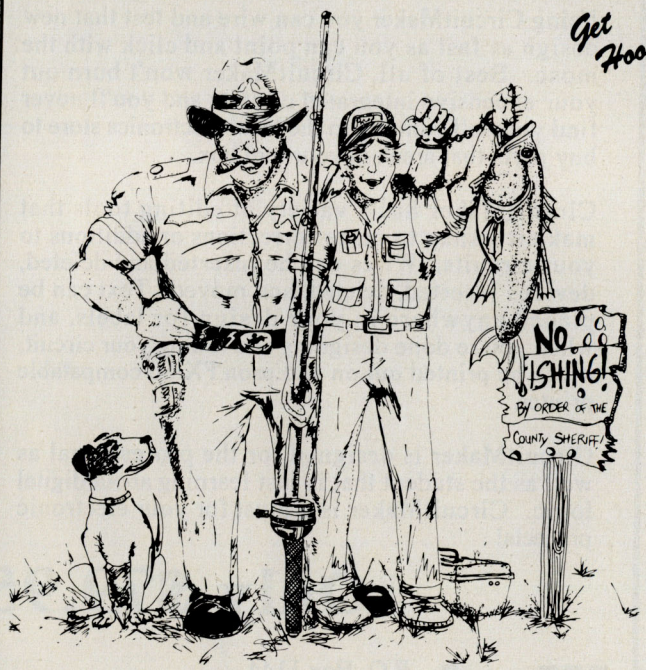

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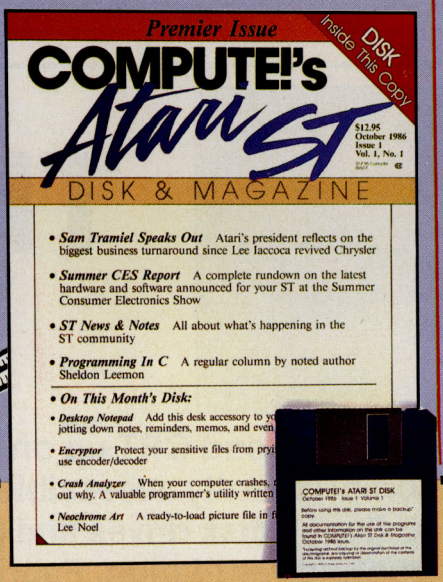

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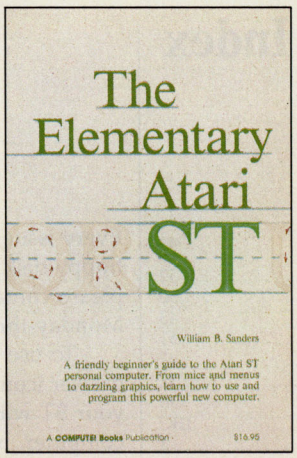

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How To Use The Disk

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.APR. 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.

Special Notes

If you insert the magazine disk in drive A, click once on the drive icon, and select Show Info from the GEM desktop, you'll note that the disk is completely full, with 0 bytes available. Thus, if you copy the magazine disk to another single-sided disk, make sure the backup disk is empty when you begin.

Remember that the "Desktop Organizer" program creates its own data files, so you shouldn't run this program from the magazine disk or from a completely full backup disk. Instead, copy Desktop Organizer to a disk that has some free space.

Also, the "Automatic Animator" program isn't designed to run from the magazine disk, either; it requires *NEOchrome* or *DEGAS* picture files, which you must create or acquire yourself.

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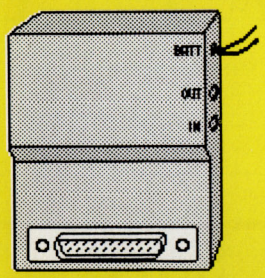

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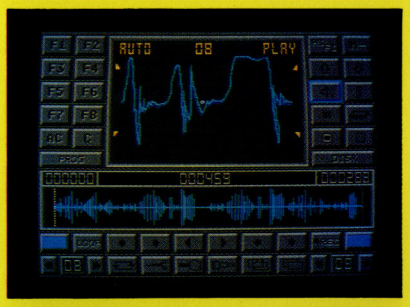

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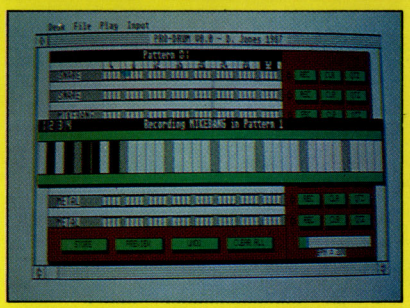

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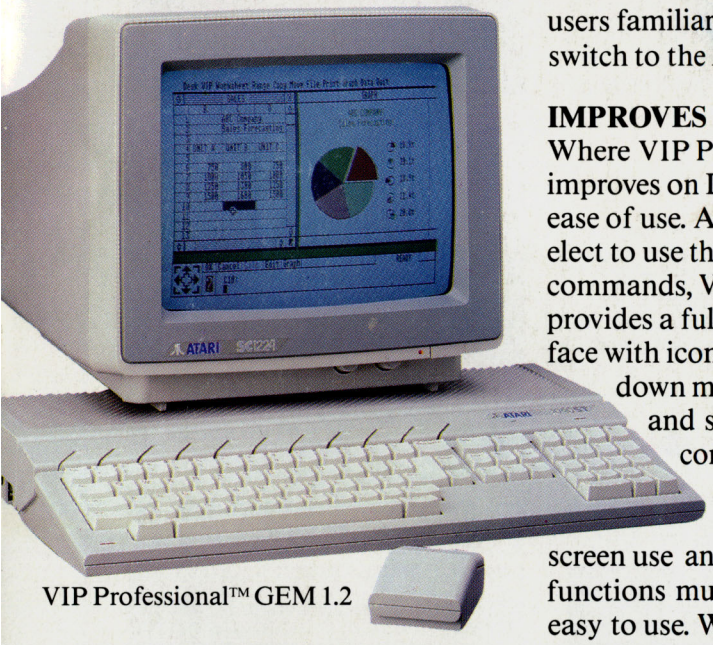

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