$10,000 Contest Winner Inside!

DISK INSIDE

COMPUTE!'s Atari ST DISK & MAGAZINE

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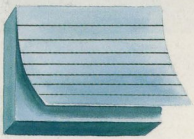
Waterhole
An Australian artist successfully mixes both oil painting and video styles in this issue's exciting "Atari Art" screen.



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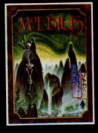

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for 520 ST – Better Graphics, Sound, Play Action!

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

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

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

Atari 520ST screens shown

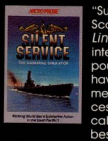
"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."

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

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

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

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



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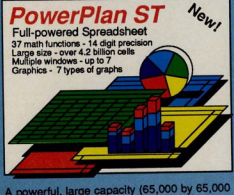

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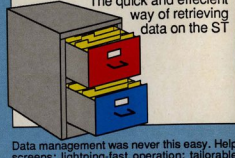

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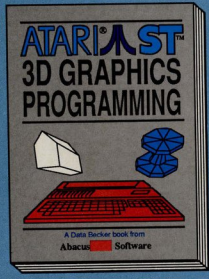

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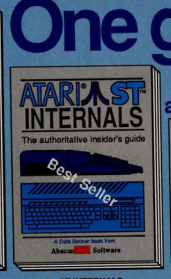

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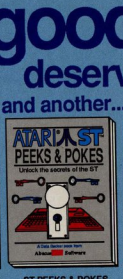

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The Editor's View

New STs And Atari PC Compatibles

We've just returned from the Winter Consumer Electronics Show (CES) in Las Vegas, where the big news is that Atari has announced three new STs, two IBM PC compatibles, and an under-$1,500 laser printer.

The new Mega STs are fully compatible with current models, but have detached keyboards, blitter chips, battery-backup realtime clocks, built-in double-sided drives, and one, two, or four megabytes of memory (one megabyte = 1024K). As it turns out, these computers are the final versions of the prototype we saw at the COMDEX show last November (see this issue's "ST News & Notes" section). Atari didn't announce prices, but the Mega ST-1 should sell for slightly more than a 1040ST; the Mega ST-2 should sell for roughly $1,500; and the Mega ST-4 should cost roughly $2,000.

The under-$1,500 laser printer is particularly exciting because it means a complete desktop publishing system can be assembled for about $3,000 (less than half the cost of a Macintosh system).

The low-end Atari PC clone has 512K RAM (expandable to 640K on the motherboard); one internal 5¼-inch floppy drive; RS-232 and Centronics-standard parallel ports; composite and RGBI video outputs; a mouse port with mouse included; software-switchable 4.77-megahertz and 8-megahertz clock speeds; and a built-in color graphics adapter. Atari says it will be bundled with MS-DOS 3.2, GW-BASIC, MS-DOS GEM, and some application software yet to be determined. Package price: $499. The higher-end Atari PC has everything mentioned above, plus a built-in monochrome display adapter, Hercules display adapter, enhanced graphics adapter (EGA), and EGA-compatible monochrome monitor. Price: $699.

But competition is heating up. IBM is expected to announce a new line of PCs, Apple is expected to offer a new Macintosh by March, and now Commodore is planning to bring out two new Amigas this spring. The high-end Amiga 2000 is briefly described in this issue's "ST News & Notes." At CES, Commodore was also showing—to selected viewers—a lower-priced Amiga that effectively wipes out the ST's price/performance advantage. The Amiga 500 is a fully compatible Amiga computer with 512K RAM, combination keyboard/system unit, built-in disk drive, ROM-based operating system, and improved keyboard. Price: $600–$700. For another $150, a small plug-in board expands memory to a full megabyte and adds a battery backup clock.

To remain competitive under this pressure, Atari may be forced to cut 520ST and 1040ST prices still further. Keep watching.

—*Tom R. Halfhill, Editor*

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Laser Chess™

First Prize $5,000.00 Winner Atari ST Programming Contest

Mike Duppong

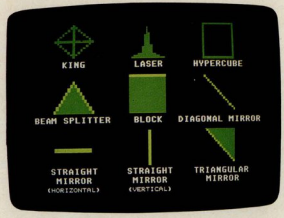

Figure 1: The basic types of pieces in *Laser Chess*.

COMPUTE!'s Atari ST Disk & Magazine is proud to present the First Prize Winner in our $10,000.00 Atari ST Programming Contest: Laser Chess *by Mike Duppong. Awarded $5,000.00 for its originality and skillful programming,* Laser Chess *is a two-player strategy game patterned after traditional chess—with some fascinating new twists. The program runs in the low-resolution screen mode on any ST with a color monitor. (The author is currently working on a high-resolution monochrome version, which we hope to publish in our next issue.) The disk file for* Laser Chess *is LASER.PRG, and the Modula-2 source code is included as LASER.MOD.*

Laser Chess, as the name implies, is a chesslike strategy game for two players. The goal is to manipulate a laser-firing piece and various reflective objects to eliminate your opponent's king. As in traditional chess, there are an infinite number of ways to accomplish this.

There are eight basic types of pieces in *Laser Chess*, and each has unique capabilities. Over time, you'll learn each piece's advantages and limitations. Obviously, the more you play *Laser Chess*, the more you'll understand the pieces in your arsenal, which in turn will make you a better player. So let's start with a description of the pieces.

A Geometric Army

Figure 1 shows each piece and its name. Notice that some sides of some pieces are highlighted (or appear thickened on a monochrome display). This indicates a reflective surface. When a laser beam strikes a reflective surface, it bounces off without harming the piece. But if a piece is hit by a laser on a nonreflective surface, it is destroyed.

A piece can also be removed from the board if it is captured by an opposing piece. This is similar to traditional chess; to capture a piece, you simply move one of your own pieces onto its square.

In addition to their ability to move from square to square, pieces with reflective surfaces can also be rotated in place in 90-degree increments. This lets you orient the piece to protect it against opposing laser shots, or to set up bounce shots with your own laser piece.

The *king* is the most important piece in *Laser Chess*. When the king is eliminat-

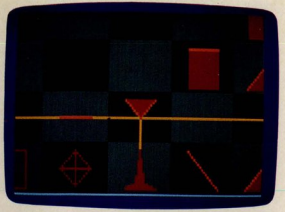

Figure 2: As seen in this magnified view, a beam splitter's vertex reflects a laser shot in two perpendicular directions.

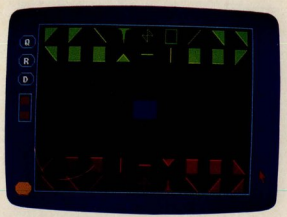

Figure 3: A full-screen view of *Laser Chess*, with its 9 × 9 board grid and game controls.

ed, the other player wins the game. Since it has no reflective surfaces, it can be destroyed by a laser from any angle. It can also be captured by an opposing piece. The king is not totally defenseless, however. It can capture any opposing piece by moving onto its square. But this can be done only once per turn.

The second most important piece is the *laser*. This piece is your primary offensive weapon; it's the only piece which can fire a laser shot. To take aim, it can be rotated in place at 90-degree angles. But like the king, it is completely vulnerable to enemy laser strikes, because it has no reflective surfaces. If you lose your laser, the game is not over, but only the most skillful (or incredibly lucky) player can overcome its loss.

Tricky Pieces

The *hypercube* is an interesting piece. It can't harm an opposing piece directly, but may very well do so indirectly. When the hypercube is moved onto another piece (even your own), that piece disappears from its original position and reappears on a randomly selected empty square. This can be done only once per turn. Thus, the hypercube is a two-edged sword; it may relocate a piece to a vulnerable position, or make it possible for the piece to capture an important opposing piece on the next move. The hypercube has no reflective surfaces and cannot be rotated. It is invulnerable to laser shots, however, because it's made of transparent glass—a laser beam passes right through it. Remember that.

The *beam splitter* is another tricky piece. When a laser beam strikes a splitter's vertex (the point opposite its base), the beam splits in two. The two new beams travel in opposite directions, perpendicular to the original beam's path. (See Figure 2.) When a laser shot hits one of the beam splitter's reflective surfaces, it bounces off at a 90-degree angle *without* splitting. If the beam splitter's base is hit by a laser shot, it is destroyed. The beam splitter can be rotated.

The *blocks* are fairly simple pieces. However, they may impose some complex situations. A block can capture any opposing piece by moving onto that piece's square, much like a king. But unlike a king, a block has one reflective side and can be rotated as the situation demands. Therefore, blocks can be used either offensively or defensively. A laser beam that hits the reflective surface of a block is deflected 180 degrees—bouncing the beam back where it came from.

A *diagonal mirror* cannot be destroyed by a laser, because both of its surfaces are reflective. Diagonal mirrors can be removed from the board only when captured by a block or a king. When a laser beam strikes a diagonal mirror, the beam is deflected 90 degrees. Diagonal mirrors can be flipped to their opposite diagonal, but cannot be rotated to face horizontally or vertically.

The *horizontal mirrors* and *vertical mirrors* (known collectively as *straight mirrors*) are also invulnerable to lasers due to their reflective surfaces. When a laser hits a straight mirror on its flat surface, the beam is deflected 180 degrees. But if the laser hits a straight mirror edgewise, the beam passes straight through it. (Look closely at Figure 2; a laser beam is passing through a

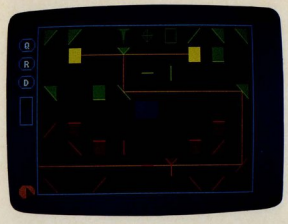

Figure 4: The combination of reflective and transparent surfaces of the various pieces can result in complex bounce patterns. Here, the red laser takes advantage of the green beam splitter to destroy two blocks.

Figure 5: When a piece such as this triangular mirror is hit by a laser beam on a vulnerable surface, it explodes into bits.

horizontal mirror just to the left of the red beam.splitter.) Straight mirrors can be rotated to become either horizontal or vertical mirrors, but not diagonal mirrors.

The *triangular mirrors* deflect laser beams just as diagonal mirrors do, but they are vulnerable to hits on their two nonreflective sides. A triangular mirror can be rotated in 90-degree increments.

Making Moves

All game functions are controlled with the mouse. Each player trades off the mouse after each turn. If you have a color monitor, you'll notice that the mouse pointer changes color to show whose turn it is.

The red player (at the bottom of the screen, unless you've reoriented the board as described below) always gets the first move. There's no particular advantage or disadvantage to moving first.

A turn consists of two moves. The number of moves remaining in a turn is indicated by the number of boxes in the square on the left side of the screen. (See Figure 3.)

Before you move or rotate a piece, you must select it. This is done by pointing to the desired piece with the mouse and clicking the left mouse button. You don't have to point directly at the piece; the mouse pointer may be anywhere within the square. When a piece is selected, its square is highlighted.

If you accidentally select the wrong piece, you can deselect it by clicking the left mouse button again while the pointer is within the highlighted square. (This won't cost you a move.) Deselecting is usually done after rotating a piece—more on this in a moment.

After selecting a piece, your next decision is whether to move or rotate it. To move a piece, simply point to the destination square and click the left mouse button. Moving a distance of one square takes one move; moving two squares takes two moves (although you can move a piece two squares in one step). Since you have only two moves per turn, the maximum distance a piece can be moved in one turn is two squares. If you try to move too far, the computer beeps to signal your error.

Pieces can be moved forward, backward, left, or right, but not diagonally. You can effectively move a piece diagonally by using two moves—forward and right, for instance. You can do this in a single action by simply pointing to the adjacent diagonal square and clicking the left mouse button; if there's a clear path, the program moves the piece to the square and charges you two moves (one full turn).

You cannot move a piece through other pieces. The only exceptions are captures with block and kings, and moves of the hypercube as described above.

Rotating A Piece

To rotate a piece, select it and firmly press the right mouse button. If it's not legal to rotate that particular piece, the program beeps. Otherwise, the piece rotates 90 degrees (one-quarter turn) clockwise. You may continue rotating the piece to any desired position before deselecting it. Rotating a piece to face any direction takes only one move, and the move is subtracted

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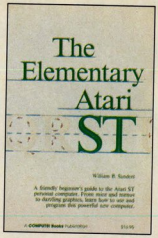

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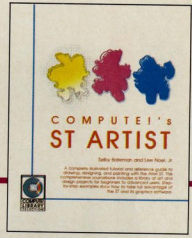

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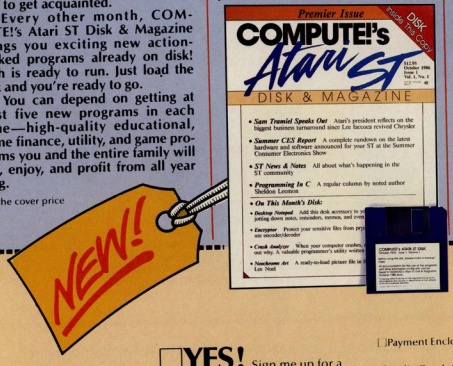

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after the piece is deselected. If you deselect the piece in its original position, no move is subtracted.

You can combine a rotation and a move in a single action. First, select the piece. Then rotate it to the direction you wish it to face. Finally, point to any adjacent square (except a diagonal), and click the left mouse button. The piece moves to that square and faces in the direction you chose. Since rotating a piece and moving a piece each take one move, this uses up your turn.

As mentioned above, the number of moves remaining in your turn are represented as boxes inside the square on the left side of the screen. If you wish to forfeit your entire turn or any remaining moves, just move the mouse pointer inside the square and click either mouse button.

Special Features

At the center of the 9 × 9 board is a special square called a *hypersquare*. It absorbs laser beams and acts like a stationary hypercube. That is, if you try to move a piece onto it, the piece disappears from its original position and reappears randomly on an empty square. This may be done only once per turn, however.

Along the board on the left side of the screen are four octagonal shapes. The top three octagons are labeled with letters: Q, R, and D. The four octagons are screen buttons, similar to those found in both dialog and alert boxes on the ST. They can be pressed by moving the mouse pointer inside the octagon and clicking the left mouse button.

The top octagon, labeled Q, is the Quit button. When selected, a dialog box appears and requests confirmation. If you confirm that you want to quit, the game is aborted and the program returns you to the GEM desktop.

Beneath the Quit button is the Restart button. This lets you start a new game without finishing the current game. (For instance, a player may be so hopelessly behind that he or she wants to resign.) Again, a dialog box appears, requesting that you confirm this choice.

Below the Restart button is the Direction of Play button, labeled D. Each time you press this button, the entire board rotates 90 degrees, so you can play in a left/right direction or place the red pieces at the top of the screen instead of the bottom.

Firing The Laser

The last octagonal button, which is unlabeled, is the laser trigger. When it's your turn, you can select this button to fire your laser. If your laser piece has been captured or destroyed, the laser button won't appear on the screen during your turn.

The laser beam flashes on the screen when you press the left mouse button, and remains there until you release the left mouse button. (See Figure 4.) It's usually a good idea to hold the button down for a few seconds, so you can see the effect of your shot. If you click the button too quickly, the beam may disappear before you can comprehend a complex bounce pattern.

Firing your laser takes only one move, but can be done only once per turn. Therefore, you may want to use your first move in a turn to aim the laser, rotate a reflecting piece to set up a bounce shot, or move another piece into position. Of course, you won't necessarily be firing the laser on every turn. Much of the strategy in *Laser Chess* involves moving and rotating your pieces to set up complex shots.

It's critically important to realize that *any* laser hit on a piece's nonreflective or nontransparent surface will destroy that piece. (See Figure 5.) You can just as easily destroy your own pieces as well as your opponent's. You can even zap your own laser, particularly if you fire directly into the 180-degree reflective surface of a straight mirror or block, or if you fail to anticipate the effects of a beam splitter. Be forewarned.

Advice On Play

Get your mirrors out early. Use them to gain the fullest potential of your laser. Try to position mirror networks on both sides of the beam splitter so you can inflict as much damage as possible.

Take advantage of the blocks. Since they "control" an area around them with their threat of capture, no other pieces can safely move within their range. Make your opponent work to displace them. Remember to rotate the reflective side of a block to the most probable direction of laser fire. If you can prevent a laser from destroying the block, your opponent will most likely have to gang up on it with two or more of his own blocks.

Use mirrors to protect your king. If you surround your king with straight and diagonal mirrors, there is no way it can be hit by a laser. Therefore, your opponent will have to break through your defense with blocks. (This is a pretty dirty trick, because if your opponent loses all of his blocks, your king is almost invulnerable.) Defending your king with blocks is also a good strategy.

The hypercube should be used sparingly, since you have no idea where a relocated piece will reappear. Most players use the hypercube as a last resort—if another piece is going to be destroyed anyway, it doesn't hurt to take a chance and relocate it with the hypercube. Also, if your opponent decides to encircle his king with mirrors, you can march right in with your hypercube, followed by a block. This tactic may displace your opponent's defense, forcing him to evacuate his king from its mirrored fortress. Escorting the hypercube with an adjacent block prevents the opponent from attacking the hypercube with his king. Your opponent's only options will be to flee or be displaced. **ST**

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 Readers' Feedback, COMPUTE!'s Atari ST Disk & Magazine, P.O. Box 5406, Greensboro, NC 27403.

Buying A Second Disk Drive

I own a 520ST with an SF354 single-sided disk drive. What would be the advantages or disadvantages of using the SF314 (double-sided) as a second drive? Would I be better off with another single-sided drive instead?

C.P. Fulton

Double-sided drives can read both double-sided and single-sided disks, but a single-sided drive can read only single-sided disks. If you decide to buy an SF314, you should carefully label your disks as either single- or double-sided to avoid confusion.

The primary advantage of the SF314 is the extra storage it offers—698K (formatted) versus 349K. Even though blank disks certified for double-sided use cost more than those certified for single-sided use, they don't cost anywhere near twice as much. Data files can be twice as long on double-sided disks, which could be important if you're using a database management program or spreadsheet. If you're writing programs in a compiled language—such as Pascal, Modula-2, or C, for example—you can fit many more libraries (or modules) on a double-sided disk.

The larger capacity is also an important factor if you upgrade your 520ST to a megabyte of memory, or buy a 1040ST. A program or data file that takes up 600K would fit easily into the memory of a 1040ST or upgraded 520ST, but wouldn't fit on a single-sided disk. It's clearly desirable to attach mass storage (disk capacity in this case) which is greater than the memory capacity of the host computer.

Eventually, the single-sided SF354 will probably be phased out in favor of the double-sided format, as has happened with floppy drives on the IBM PC. Even then, however, it's likely that commercial software will still be issued on single-sided disks because of the large number of drives in use. In the end, it's your decision—more storage space or a lower price?

The Monochrome Blues

I own an Atari 520ST with a monochrome monitor. For various reasons, I'm well satisfied with that. I've noticed, however, that some of your programs are designed for color only. I'd like to point out that here in Europe, the monochrome monitor is the rule rather than the exception. Wouldn't it be a rather simple matter to include with your listings some REM lines containing alternative commands, enabling the reader to choose between two versions?

Jorgen Jensen

When choosing the contents for each issue of COMPUTE!'s Atari ST Disk & Magazine, we try to maximize the number of programs which work in both color and monochrome. Ideally, we'd like every program we publish to be compatible with all ST systems.

However, most of the programs submitted to us are written for color systems only. This reflects the balance of ST systems in the U.S., about 80 percent color, according to recent estimates. Sometimes we ask an author to revise a submission so it works in both modes, but few authors have both types of monitors. Usually our staff programmers modify a color-only program to make it work in monochrome (and in low resolution color, for the minority of 520ST users who don't have RGB monitors). Unfortunately, for several reasons, this isn't always possible.

To keep everyone happy, we strongly encourage authors who submit programs to us to make them work in both color and monochrome whenever possible. Programs with the greatest potential audience are, of course, the most likely to be published.

Disabling Windows

I am working on a BASIC program for my ST to keep track of my checking, credit card, and charge accounts. I would like to know how I can get rid of the windows used in ST BASIC and how to get my program to automatically run when the disk containing it is booted up.

Floyd L. Fry

The answer to both questions involves the ST's Graphics Environment Manager (GEM), through which programs access and manipulate windows. GEM programs are marked by a .PRG extension in the directory. Other programs run under the Tramiel Operating System (TOS) and have filenames that end with either .TOS or .TTP. GEM programs can use windows and various other graphics features, while TOS programs are strictly text-based.

Since BASIC is a GEM program, you can't completely eliminate windows from your BASIC programs. However, if you're really asking how to remove all the windows except Output, it's easily accomplished. (You can't close all the windows, because a bug in ST BASIC causes it to crash when this is done.) To close a window, use the CLOSEW command. It is followed by the number of the window you wish to remove:

0 Edit
1 List
2 Output
3 Command

If you want to use the entire screen for output, put the FULLW statement at the beginning of your program. FULLW 2, for example, makes the Output window the same size as the screen. It's still a window, but it covers the entire screen.

There's no simple way to automatically run a BASIC program from a boot disk. You can create a folder named AUTO and put TOS programs inside it. Programs in the AUTO folder will automatically run when you boot. But the ST checks for the AUTO folder before it initializes GEM, so any programs that

use windows or the various graphics functions of the ST cannot run from the AUTO folder. BASIC is a GEM program, so it won't run from an AUTO folder.

There is a shortcut to loading BASIC programs, however. Click once on BASIC.PRG and drop down the Options menu. Select Install Application. On the line that says Document Type, enter BAS. Thereafter, any time you open a .BAS file, the ST will load and run ST BASIC, then load the .BAS file. (Normally the computer would ask if you wished to Show or Print the file.) To make this a permanent feature, put your boot disk in the drive and choose Save Desktop from the Options menu. (For more about saving the desktop, see "Customizing The GEM Desktop" elsewhere in this issue.) This doesn't force the program to automatically run when you boot, but it makes it a little easier to load both BASIC and a program at the same time.

One note, though: Due to a bug in ST BASIC, certain BASIC programs won't automatically load even when BASIC.PRG is installed in this manner. The bug seems to be related to the length of the BASIC program's filename.

Two Heads Better Than One?

I have a problem. Drive B on my system reads all my disks, and if it writes to a disk, the data can be read by other drives. But if I format a disk on drive B, no other drives can read the disk. Why is that?

Sam Atkinson

Disk drives sometimes go out of alignment. After heavy use over a long period of time, the read/write head that transfers information to and from the disk can slip out of adjustment. The usual symptom of misalignment is that the disk drive can read disks it has formatted, but can't read other disks—or other, properly aligned drives can't read the disks formatted on the misaligned drive.

Fortunately, this is probably not what's wrong with your drive, since it can read disks from other drives. We suspect that you own an SF314 double-sided drive and that you're formatting the disks using the double-sided option. Disks formatted as double-sided can be read only by SF314s. Disks formatted as single-sided can be read by both SF314s and SF354s. Try using the single-sided format—at least for disks you may be using on other disk drives.

Customizing The Printer Driver

I own a 520 ST and a Roland PR-1111 printer. When using *1ST Word*, there is one small thing that bothers me. When I print a file, the printer advances two blank pages before beginning to print on the third page, which wastes paper. My *1ST Word* program is set up to use the Epson printer driver.

My *Express* and *ST Writer* word processors don't display this behavior when I send one of their files to the printer. Is this just a characteristic of *1ST Word* that I'm going to have to live with? Or am I missing out on something?

Doug Forsyth

The two form feeds are most likely a consequence of the printer driver you've chosen. If you continue to use the Epson driver, you'll continue to see the two blank pages. It's not very difficult to make modifications to printer drivers, so you might want to experiment a bit.

Run 1ST Word, *and when you're asked for a filename, click on the folder called PRINTER on the original* 1ST Word *disk. You'll probably see a blank directory, in which case you should go to the directory line and change *.DOC to *.* and click on the top bar of the directory. Select one of the files with a .HEX extension. If the Epson driver has been pretty reliable, you'd probably choose that file.*

There are four sections inside the HEX file. The first is the name of your printer, which will appear in the printer window when you start a printout. The second is called Miscellaneous configurable variables; *ignore it. The third is named* Printer characteristics. *It lists the codes for going into bold, italics, and so on. Near the end is a line that may look like this:*

1F, 12 * Horizontal initialization

The 1F is just the line number for that function. The 12 means that when you begin printing, a hexadecimal 12—CHR$(18)—is sent to the printer. To remove this line, just put an asterisk (*) in front of the 1F. Or change the 12 to some other code to be sent before printing begins.

You may also want to look through the .HEX file for other features that your printer supports. After changing the file, save it under a new name, preferably one that includes the name of the printer. Make sure it ends with the .HEX extension. Exit 1ST Word, *and run the program called* INSTALL.PRG. *Select the HEX file you modified, and a new printer driver will be created. Its name will be either* 1ST_PRNT.DOT *or* 1ST_PRNT.DSY, *depending on whether it's for a dot matrix or daisy-wheel printer. Copy this file to the root directory of your* 1ST Word *disk and test it out. With some experimentation, you should be able to create a custom printer driver that takes advantage of your printer's features.*

Tracking Down The BASIC Bwins Bug

I have been trying to use "ST-Shell" from the December 1986 issue and have been able to get the commands to work, including the use of batch files. I've run into a problem with "QuikFlip" (also from the December issue). Either I get BASIC to run without QuikFlip—although I can run the program from BASIC—or else I get the BASIC screens to appear, with a dialog box which says *Fatal Error! Window not available for bwins. Abort.* Then I must reboot because the keyboard is dead. Can someone tell me what this dialog box means? I haven't been able to find it in the manuals.

Kenneth Lewis

We ran STSHELL.TOS from the December disk and then ran BASIC from the shell. The mouse pointer didn't appear, so after copying it to a new disk and renaming it to STSHELL.PRG (to allow it to work as a GEM program), we tried again. The syntax for loading both programs at the same time should be something like basic quikflip, *passing the parameter* quikflip *to the program called BASIC.PRG. The first attempt loaded BASIC, but QuikFlip didn't load at the same time. After typing QUIT (or SYSTEM) to exit BASIC, we tried again. The second time, this message appeared:* Fatal Error! No windows available for bwins. Abort. *The keyboard locked up, requiring a reboot of the system.*

There are three possible reasons for the crash: a bug in ST-Shell, a bug in BASIC, or a bug in QuikFlip. QuikFlip is not to blame. The same system crash occurs with other BASIC programs. In fact, if you run STSHELL.PRG, type basic, *then* quit *(back to ST-Shell), and type* basic *again, the dialog box and error message appear. The problem is not related to loading a program from BASIC. BASIC loads once, but it crashes the second time you run it from ST-Shell.*

Testing ST-Shell with various GEM and TOS programs convinced us that ST-Shell works correctly. To confirm that BASIC is the culprit, we ran a different shell program—the one that comes with Megamax C. *Like ST-Shell, it loads BASIC once and crashes the second time.*

So what's wrong with BASIC? The Window not available *error message provides a clue. The ST allows no more than four windows to be open and active at any one time, and BASIC uses all four available windows. When you rerun BASIC, at least one of the windows is not available. (The meaning of* bwins *is unclear; it might be an abbreviation for* basic windows.*) If you experiment with running BASIC twice from ST-Shell, you'll notice that the Edit, List, and Output windows appear the second time, but the computer crashes before the Command window opens. The fourth window is not available.*

When you write an ST program using GEM and AES calls, in C or Pascal, for example, there are certain rules to follow. First, you request a handle and initialize the application. Next, you get a window handle, create a window, and open it. This window belongs to your program. When the program is finished with whatever it does, it's considered good manners to close all windows, delete the windows, and close the application.

When you run BASIC from ST-Shell and then exit, you'll see that the windows are never closed, a good indication that BASIC doesn't follow the rules. It doesn't clean up after itself. After you leave BASIC, remnants of the previous windows remain in memory, ready to crash the computer the second time you run BASIC from a shell.

Why Use A RAM Disk?

I have a commercial RAM disk utility which I use along with *Personal Pascal* for the Atari ST. As a beginner, my programs are usually very short. After I deduct the time required to load the Pascal compiler into the RAM disk, the time savings are negligible. Are there any other applications of the RAM disk besides shortening disk access time?

Abner K. Wang

If you perform only one compilation during each computing session, it's true that a RAM disk doesn't save time. In fact, it actually takes more time than if you compiled entirely from disk, since the RAM disk itself must be loaded and installed before you load and run the compiler.

However, in many applications and programming situations, you will probably have to recompile a program or recalculate a spreadsheet many times before it's finished and debugged. Each time you run a compiler, the computer must load it into memory. Every load takes a certain amount of time, which can be reduced greatly if you keep the compiler in the RAM disk during the entire programming session. Virtually every compiler—including Personal Pascal*—loads many times faster from a RAM disk than from a floppy or even a hard disk. On some development systems, you can gain additional time savings by storing the source code, linker, and library files in RAM, since the compiler then uses the RAM disk for temporary work files.*

In fact, RAM disks have many uses. If you have a single-drive ST system, copying files from one disk to another can be an agonizing process: Even though the computer has half a million or even a million bytes of memory, the ST typically requires several disk swaps to copy even a small file on a single-drive system. A RAM disk allows you to transfer an entire group of files with only one disk swap.

Ultimately, a RAM disk will save time in just about any disk-intensive operation. To illustrate: Imagine that you are using a data management program which frequently reads and writes disk files. If those files are located in a RAM disk, the program can do jobs such as searching and sorting many times faster than if the files were on a floppy disk. Another typical application is a slide-show program, which loads large amounts of graphics data from disk to display each screen. If you put several NEOchrome *or* DEGAS *files into a RAM disk, a slide-show program can load and display each new screen almost instantly (indeed, sometimes too fast).*

The only real drawback of a RAM disk is its volatility. Like other RAM-resident programs, the RAM disk disappears completely when you turn off the power. Thus, if you keep work files on a RAM disk, you must take care to write the updated files to a floppy or hard disk before shutting down. If you store source code for a compiled program in a RAM disk, you must remember to save the most recent version to a real disk at the end of the session.

Brooklyn Hard Disk For Sale

I recently bought the golf program *Leader Board* by Access Software [see review, COMPUTE!'s Atari ST Disk & Magazine, February 1987] and discovered it would not load on my 520ST. After calling my dealer, I was informed that in order to load the game I need a hard disk installed. I was shocked! When I bought my ST in December 1985, I felt 512K RAM was more than enough memory.

My dealer also informs me that most of the better software and future ST software will need a hard disk. Is this true, or is my dealer just trying to sell me a bridge? In your Reviews and New Products sections, could you specify whether or not a hard disk is required?

Tom Heath

There appears to have been a serious breakdown in communication between you and your dealer. Leader Board *does not require a hard disk to load or run. In fact, to the best of our knowledge, there is no ST software on the market that requires a hard disk to operate. The only exceptions are the special utilities and boot programs that come with hard disk drives.*

It's also highly unlikely that many future ST programs will require a hard disk, since this would drastically reduce the number of potential customers for a product. Certainly a piece of software with general appeal like a game won't require a hard disk.

Since you bought your computer in December 1985, it's quite possible that you have one of the original 520STs that do not have the Tramiel Operating System (TOS) in read only memory (ROM). Early 520STs required users to load TOS from disk each time they switched on or reset the computer. If this is the case, it may explain why Leader Board *won't load or run on your computer. Access Software says that a special version of the program is required for early 520STs with the disk-loaded TOS. For more information, contact your dealer or Access Software.*

Better yet, have the TOS in ROM chips installed in your ST. This frees up much of the 512K RAM that is consumed by TOS when it's loaded from disk. The upgrade is available at authorized Atari service centers for about $35.

The product reviews published in COMPUTE!'s Atari ST Disk & Magazine are always preceded by a short paragraph describing the system requirements for the product. If a certain type of monitor

or other peripheral is required, it is noted. If no special requirements are listed, the product is compatible with all ST systems.

What Happened To The Memory?

I have an Atari 520ST with TOS in ROM and I'm generally satisfied with it. I use it primarily for spreadsheet work.

In looking at the size of the programs that make up the spreadsheet, compared with the advertised memory of the 520ST, I find a discrepancy of 138,263 bytes. Note that this is with CONTROL.ACC and EMULATOR.ACC turned off and nothing else resident in memory. Loading up BASIC results in a similar discrepancy:

BASIC.PRG	138,944	
BASIC.RSC	4,648	
DESKTOP.INF	507	
FRE(0)	251,060	
Total	395,159	bytes

The advertised memory of the 520ST is 524,288 bytes—129,129 more than the total above.

I also use an IBM AT with 512K memory. I note that free RAM, with *Lotus* 1-2-3 version 2.01 in memory, is about 286,000 bytes, over 200,000 more than I have in the ST spreadsheet. I am curious—what does the ST do with this RAM that makes it unavailable to the program?

E. Jajan

As you've noted, desk accessories take up RAM. And if you have a RAM disk enabled, it too will use memory. But it sounds as if you have neither accessories nor a RAM disk in memory.

The operating system (TOS) and the Graphics Environment Manager (GEM) may be installed in ROM, but they need quite a bit of RAM for various operations. Disk directories remain in memory. Windows also use up a good piece of RAM.

The screen (high-, medium-, or low-resolution) automatically takes 32K away from the system, so that reduces the discrepancy from about 130K to about 100K. It's possible for programs to set up alternate screens, each of which would require an additional 32K. DEGAS Elite, *for example, can have up to eight graphics screens, plus an undo buffer, plus the menu screen. These ten screens take up a total of 320K, above and beyond whatever memory the program itself occupies. The "Snapshot* NEO/DEGAS*" desk accessory which appeared in the February issue is another good example. It uses only 3619 bytes on the disk, but when it's installed in memory it automatically reserves an additional 32K for a copy of the screen.*

If you're interested in seeing how much memory BASIC really uses, run the following program:

```
10 rem File Reader
20 dim d(14)
30 fullw 2: clearw 2
40 open "R",#1,"BASIC.PRG"
50 field #1, 14 as f$
60 get#1,1
70 a$=f$
80 close 1
90 for x = 1 to 14: d(x)=asc(mid$(a$,x,1))
100 print x; d(x)
110 next
120 bin = 1
130 for x = 6 to 3 step -1
140 sc = sc + d(x)*bin
150 sd = sd + d(x+4)*bin
160 sb = sb + d(x+8)*bin
170 bin = bin *256
180 next
190 print "code segment: ";sc
200 print "data segment: ";sd
210 print "bss segment: ";sb
```

The program above appears on this month's disk under the name FILEREAD.BAS. It reads the first 14 bytes from the BASIC.PRG file, prints them out, and then calculates how much memory is used by BASIC. To look at other programs, change the filename in line 40.

The code segment is the program proper (BASIC). The data segment contains string constants (messages and the like). These two sections of BASIC use up 109,444 bytes and 21,992 bytes—a total of 131,436 bytes, which is the bulk of the file size on the disk. BASIC is 138,944 bytes long when you look at a directory. The additional 7K includes file relocation information, which is used once, then discarded. (This data allows BASIC to load anywhere in memory.)

The block storage segment (BSS) is a section of memory containing internal variables that BASIC uses. These variables have no direct connection with the variables you might use in a BASIC program you write. The BSS takes up 26,002 bytes, but it's not stored in the BASIC.PRG file. This memory is allocated when BASIC first runs.

If you add together these three numbers, the result is 157,438 bytes, about 20K more than the file size of 138,944. To find out how much memory your spreadsheet really uses, run the program above and substitute the program name in line 40.

Replacement Disks

What is your magazine's policy about defective disks? What is the correct procedure to follow if someone receives a defective disk?

Joyce Meincke

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457-037

GFA BASIC

George Miller
Assistant Technical Editor

Requirements: Any ST with a color or monochrome monitor.

It doesn't take long for most programmers to realize that the version of BASIC supplied with the ST is inadequate for many programming purposes. ST BASIC provides very few commands to take advantage of the ST's special features, even when those features are supported by the operating system. Would you like to use windows, menus, alerts, and dialog boxes? Or access other GEM features such as the item selector? Or read the mouse and joystick ports?

The only solution to these and other problems is to try a lot of strange POKEs or switch to another language. Many ST owners who would prefer to stick to BASIC have been forced to switch. In part, this accounts for the popularity of such languages as Pascal, C, and Modula-2 on the ST.

If you've grown comfortable with BASIC over a period of several years, however, switching languages is not always easy. And compiled languages, though they execute quickly once compiled, can be tedious to work with. An interpreted language like BASIC is much more interactive—each time you make a change, you can instantly run the program to see how it works.

In late 1986, a hobbyist in the Netherlands entered two programs in our ST programming contest. The programs were written in a German BASIC that we'd never heard of: *GFA BASIC*. The language appeared so interesting that we wrote the German software publisher for a copy to experiment with. We were impressed with the language, but could not review it because it was not yet available outside Europe. At that time, everything was written in German (including the error messages).

Then, at the fall COMDEX in Las Vegas last November, the German publisher linked up with Michigan-based MichTron to distribute an English version. The result: an astonishing language, beyond BASIC in many ways—a combination of power, speed, ease of use, and versatility.

A New Approach

When programmer Frank Ostrowski began developing *GFA BASIC*, his intent was to go beyond writing simply another version of an old language. BASIC has been constantly updated since it was first invented more than 20 years ago. Ostrowski's goal was not just to add a few more minor improvements, but to develop an entirely new form of BASIC.

His requirements for this new BASIC included structured programming statements, similar to those found in Pascal and Modula-2. He also thought it should be easily understood by anyone who has ever programmed in any version of BASIC. Finally, Ostrowski strove to retain the traditional advantages of BASIC—its highly interactive nature and flexible structure.

All these goals were achieved, and more. Perhaps most impressive, *GFA BASIC* is relatively compact. The GFA interpreter uses only about 55K of memory. By comparison, ST BASIC uses about 150K, and Microsoft's Amiga BASIC uses nearly 100K.

Easier Translations

GFA BASIC is quite similar to the latest versions of Microsoft BASIC found on the Commodore Amiga, Apple Macintosh, and IBM PC. For instance, *GFA BASIC* dispenses with line numbers; GOTOs and GOSUBs are routed to line labels instead. (GOTO Exitoption or GOSUB Checkbalance are typical examples.) This helps make programs more readable.

GFA BASIC also contains so many structured programming statements and other commands found in the latest Microsoft BASICs that it's possible to run Amiga and Macintosh programs on the ST with relatively little modification. Even programs written in BASICA for the IBM PC are relatively easy to adapt. In fact, we often referred to Microsoft BASIC manuals whenever additional clarification of commands was required.

This is good news for ST owners. It means that thousands of BASIC programs for these other computers can be converted for use on the ST in a relatively short time by enterprising programmers.

Structured BASIC

Although it's still quite possible to write free-form programs in *GFA BASIC*, the language provides numerous structured commands that make it easy to write neat, organized programs.

In addition to labeled GOTOs and GOSUBs, named subroutines are possible with the PROCEDURE statement. Familiar to Pascal and Modula-2 programmers, procedures support parameter-passing and both global and local variables. (Local variables are unique within a procedure and are not affected by changes to variables of the same name outside the procedure.) Thanks to procedures, programmers can write useful modules which can be included in any *GFA BASIC* program without fear of variable conflicts. In effect, this lets you add your own new commands to the language.

Several varieties of loop structure have also been included. Besides the usual FOR–NEXT, *GFA BASIC* offers DO–LOOP, WHILE–WEND, and REPEAT–UNTIL. Again, these will be familiar to those who have worked with Pascal, Modula-2, and the latest Microsoft BASICs.

To enhance the clarity of program listings and make it easier for the language to interpret program lines, *GFA BASIC* permits only one command per line. Multiple statements separated by colons are not allowed. The full-screen editor is more flexible in other ways, however, permitting commands to be entered in upper- or lowercase. Indenting can also be used to group together a series of related statements.

Runtime Module Required

GFA BASIC is a little different from most BASICs in that it requires a separate runtime module. Unlike programs written in compiled languages, *GFA BASIC* programs cannot be run as stand-alone applications directly from the GEM desktop. But unlike ST BASIC programs, you don't have to run GFA programs from within the BASIC interpreter, either.

Instead, *GFA BASIC* comes with a runtime module that must be used to run a *GFA BASIC* program if you're not in the interpreter. When you click on the runtime module, it loads and presents you with a menu of all *GFA BASIC* programs on the disk. You can then select and run any of these programs (or any *GFA BASIC* programs on another disk). The GFA editor/interpreter is used to run the program only during writing and testing—the runtime module lets you run it without having to load the editor/interpreter.

The runtime module has been placed in the public domain, so anyone can run *GFA BASIC* programs whether or not they own *GFA BASIC*. However, to write or modify programs, you must have a copy of the *GFA BASIC* editor/interpreter, which is not in the public domain.

No Syntax Errors

The editor/interpreter is fairly simple, and although it isn't a GEM application (there's no access to desk accessories), it does provide a comfortable programming environment. It contains most of the commands you'd expect from a decent text editor, including block moves and search-and-replace.

One interesting feature of the editor/interpreter is instant syntax checking. This will make eight-bit Atari BASIC programmers feel right at home. Whenever you make a syntax error in a line, a bell rings, a SYNTAX ERROR message is displayed, and the error must be corrected before moving on to the next line. You don't wait until your program runs to discover you've entered PINT instead of PRINT.

Also, when using a color monitor, the text editor always defaults to medium resolution (80 columns), even if you select low resolution with Set Preferences on the desktop. The only evidence that you're in low resolution is that all GEM windows are displayed on the left half of the screen, and the mouse pointer can't be moved onto the right half of the screen. But the text is much more readable and easier to edit than the 40-column text normally displayed in low resolution.

You're free, of course, to write *GFA BASIC* programs with any other ASCII text editor you may prefer. The resulting file must then be loaded into the *GFA BASIC* editor/interpreter with the Merge function, and then saved in a tokenized executable format for use with the runtime module.

Exceptional Speed

If you've always thought of BASIC—particularly interpreted BASIC—as a sluggish language, prepare to modify your thinking. *GFA BASIC* is shockingly fast. In fact, it's as fast or faster than compiled BASIC and some other compiled languages, such as Pascal and Modula-2. For some tasks, it even approaches the speed of C. An empty FOR–NEXT loop with 10,000 iterations takes less than half a second, even though numeric accuracy is carried out to 11 places.

We've seen an arcade-style action game written in *GFA BASIC* that performs like machine language on an eight-bit computer. It has vertical fine scrolling, simulated multicolor sprites, multiple-object animation, you name it—all at a speed that must be seen to be believed.

Best of all, programs of this caliber are easy to write in *GFA BASIC*. Tasks that would require machine language subroutines on other computers can be accomplished with one or two high-level commands. For instance, there's a single command for screen flipping in *GFA BASIC*. When we placed two of these commands within a loop with no delay inserted between them, the screens flipped back and forth so quickly that they blurred together as one.

Other commands instantly read a whole screen into a string, move blocks of memory anywhere in the computer, simulate sprites, customize the mouse cursor, optimize mathematical functions, and even set up raster-scan interrupts. Some of these commands are un-

heard-of in BASIC or any other high-level interpreted language.

Practically every feature supported by the ST is directly supported by *GFA BASIC*. It's easy to construct and use drop-down menus. Several commands directly support the mouse. And when you need to access the ST's lower-level functions, *GFA BASIC* comes through. The BIOS, GEMDOS, GEMSYS, VDISYS, and XBIOS commands open up the entire operating system and are no more difficult to use than they are in any other high-level language.

More To Come

GFA BASIC includes a few utilities and demos, such as a simple sprite editor (that unfortunately works only in monochrome), and a conversion utility which helps you translate ST BASIC programs into *GFA BASIC*. The conversion utility doesn't do all the work, however; you still have to complete the process by testing and doing some adjusting.

Much more is on the way. If *GFA BASIC* isn't fast enough for your application, MichTron is bringing out a compiler for $79.95. This is supposed to boost execution speeds by 30 to 300 times. That means *GFA BASIC* programs will run at speeds comparable to C. Another advantage of the compiler is that it will produce stand-alone programs which can be run directly from the desktop without the runtime module.

Of course, the compiler does expand the application program somewhat. Still, for maximum speed and the convenience of stand-alone applications, the compiler will be an invaluable tool.

GFA BASIC is a significant advance both in the continuing evolution of BASIC and in development software for the Atari ST. Many people who, up to now, have been unable to write fast programs of exceptional quality for the ST will finally have an opportunity to more fully exploit the power of their computer. If it catches on, *GFA BASIC* could well spark a revolution in new software for the ST. It might even sell some STs to people who have been hesitating because they wanted a machine they could program, but didn't want to learn a completely new language.

GFA BASIC
MichTron
576 S. Telegraph
Pontiac, MI 48053
$79.95

DacEasy Accounting

Thomas M. Castle

Requirements: Atari 1040ST, or a 520ST with double-sided disk drive and either TOS in ROM or one-megabyte memory upgrade; plus a printer capable of 132 characters per line in compressed mode.

Serious business software: That's the overriding factor for many people when deciding whether a computer will ever fly as anything other than a novel home appliance or a teaching aid. The early appearance of spreadsheets and database managers for the Atari ST taxied the new computer onto the runway. Now you can fasten your seat belts for the takeoff, because serious business software for the ST is finally here.

Furthermore, the software is coming from a company with a major reputation: DAC Software. DAC shook up the IBM PC business market a couple of years ago when it introduced its *DacEasy* series. DAC managed to produce an accounting package that included a general ledger, accounts receivable, accounts payable, purchase ordering, billing, inventory, and forecasting modules—all bundled together for $69.95. In the IBM market, normally you'd be lucky to find a single one of those modules for $69.95.

Don't get the idea that *DacEasy Accounting* is a stripped-down product. It's a powerful, multilevel, integrated accounting package with full report capability and automatic posting from detail to general accounts. Reportedly, DAC uses this accounting software to manage its own multi-million-dollar operation. *DacEasy Accounting* earned *InfoWorld*'s 1985 Product of the Year award, as you will be constantly reminded by DAC's advertisements and packaging.

Easy To Use

Accountants with very little computer experience might be a bit timid about approaching a computerized accounting system. People with some computer experience, but very little accounting knowledge, might be equally shy. However, DAC Software has put together a combination of understandable documentation and ease of use that should obviate these fears. A tutorial on using the program even includes suggestions for designing an efficient accounting system. And there's a step-by-step guide for transferring existing business records to *DacEasy Accounting*.

The documentation is not an accounting primer, though. If you know nothing about accounting and are just setting up a new business, get help. DAC offers a service contract for $50 which entitles you to 60 minutes of phone consultation with technical or business consultants. You're also eligible for a year's worth of updates at $25 per update. The separate service agreement helps DAC keep the price of the software low and provide costly consultation only to those who need it.

If you've used the IBM PC version of *DacEasy Accounting*, you'll feel right at home on the ST version. In fact, you can put away your mouse, because *DacEasy Accounting* was converted directly from the IBM version and does not use the GEM interface.

Even the manual is virtually identical to the IBM PC version.

Instead of drop-down menus, *DacEasy Accounting* uses regular menus with lists of choices. Overall, this approach works very well, but there are a few flaws. Prompts such as (Y/N) won't accept lowercase responses, and all input on color monitors appears in green, which some people may find hard to read on the white background.

Setting Up A System

Aside from these trivial points, *DacEasy Accounting* does a good job of guiding you through the tough task of setting up an accounting system. I was able to set up systems for both service- and inventory-related businesses with a minimum of discomfort.

Several templates are provided to assist you in constructing the files needed to use the program. The chart-of-accounts file and financial-statements file are the first files needed, and the ones requiring the most thought. Examples illustrating how to construct a multilevel system of general and detail accounts help you set up the general ledger, customer file, vendor file, and product file.

The next file that needs some consideration is the general-ledger interface table. This file is the hub for integrating the various modules. You need to assign the account numbers from the chart of accounts that will be used for automatically posting the detail accounts to the general-ledger journal file.

After this is done, you select your system of costing, then code the purchase orders and invoices. Along the way, DAC's documentation lends tips and warnings.

Using The General Ledger

DacEasy includes a template for entering general-ledger transactions. Several journal registers, such as a check register and cash-receipts journal, can be created in addition to the five preassigned journals: AP (accounts payable), AR (accounts receivable), PO (purchase order), IN (inventory), and BI (billing). The preassigned journals are transported into the general ledger from the other modules.

Only transactions into detail accounts can be registered. If your transaction has more than 18 debits and credits, a clear screen is presented to continue the transaction. *DacEasy* does not allow transactions to be out of balance. A special account #9999 named Voucher Difference will temporarily hold any balance errors while other transactions are recorded. You must then return to the transaction in question and find the missing account or balance error before you can post the entries.

Journals can be printed singly or in combinations. An account-activity detail report lists each account's beginning balance, details of the month's transactions, and the current balance. Once you've posted the transactions, a trial balance can be printed to whatever level of detail you desire. Likewise, the chart of accounts can be printed to any level of detail.

Accounts Receivable/Payable

The accounts-receivable and accounts-payable modules control your transactions for money owed to you and money you owe to others. A data-entry template similar to the general ledger is provided. The accounts-receivable routines let you enter your cash receipts and transactions and generate finance charges against the receivables. The accounts-payable routines let you enter the invoices and other transactions in addition to printing checks. Both modules let you print the journals and post the transactions. The posted transactions are automatically transported to the general ledger.

Transactions affecting vendor balance and customer balance are treated through the purchase-order and billing routines, respectively. Purchase orders can be entered or canceled for inventory or noninventory items. The purchase order can also include all the necessary information, such as shipping data, discount and due information, sales tax, and advance payments. You can generate additional forms for merchandise received and for returns. Billing invoices, returns, and printing sales journals—controlled through the billing routines—have features similar to the purchase-order routines.

DacEasy offers a full set of printing options. You can print all mailing forms on blank paper or on DAC's own Fast Forms. These two-color forms, along with window envelopes, are available from DAC. You can also arrange to have custom checks printed.

The Inventory Module

The inventory routines are particularly easy to use and provide some nice features. A price-assignment routine lets you sort the inventory by price and last cost. A new price can be calculated by percent or flat markup and can be corrected manually.

Physical-inventory count sheets can be generated, sorted by 1 of 5 criteria, and ranked by 1 of 11 criteria. Ranges of inventory can be reported rather than the entire inventory. Once the physical inventory has been recorded, a physical-perpetual inventory comparison can be generated with adjustments carried to the general ledger.

Report Generation

The versatility of generating a report is a strong point of *DacEasy Accounting*. Financial statements can be formatted either to display a year-to-date column with actual data and percentages or to display columns of the current period and the year-to-date; and to display the budget or the last-year figure with the variance percent. You can specify a line-by-line format for any journal.

The accounts-receivable statement can be sorted by code, name, salesperson, or type. You

can also add five custom messages to monthly statements depending on the age of the past-due amounts. You can generate aging reports giving a detailed breakdown of receivable accounts, which you can then customize to your own time increments. A directory of customers, terms, credit limit, and current balance—along with a routine for generating mailing labels—are available.

The accounts-payable statement is treated similarly to the accounts-receivable routines. Records can be sorted by code, alphabetically, by territory, or by type. The aging reports, directory, and mailing-label routines also are similar to those for accounts receivable.

The inventory report forms are quite extensive. The product listing can be sorted by inventory number, description, product type, product bin, or product vendor. There are 11 criteria by which the entries can be ranked, including on-hand units, sales dollars, profit, or turns. A complete price listing, sorted in the same manner, can be generated with a coded cost report. Two other useful reports that can be generated using the same formatting are the inventory activity report and the inventory alert report.

Forecasting

DacEasy Accounting keeps a three-year account history for forecasting general ledger, accounts receivable, accounts payable, and inventory. You can choose from four methods of forecasting.

The simplest method is to use the previous year's data as the forecast. You can also calculate a forecast based on a percentage change from last year's data. A more complex method calculates the difference between the last two years and adds that total to the current year to obtain the forecast. The final choice is a trend-line analysis, which uses the least-square method on the previous three years of data.

The program disk is not copy-protected. This allows you to make backups for safety, and also lets you install *DacEasy* on a hard disk for better performance.

If you're starting a small business or thinking about computerizing your existing bookkeeping and financial planning, *DacEasy Accounting* may be just what you're looking for. This truly impressive package is easy to use and is loaded with features.

DacEasy Accounting
DAC Software
4801 Spring Valley Rd.
Suite 110B
Dallas, TX 75244
$69.95

WordWriter ST

David Plotkin

Requirements: Any Atari ST with a color or monochrome monitor and a compatible printer.

WordWriter ST is a moderately powerful word processor that makes full use of GEM and is very easy to learn and use. It includes such frills as a built-in spelling checker and outliner, but is missing some other features usually found in advanced word processors. Still, it should be suitable for most casual writing.

WordWriter operates much like *1ST Word*, the word processor which was packaged free with the Atari ST during most of 1986. (As of late 1986, STs were no longer being shipped with *1ST Word*, *NEOchrome*, or *DR Logo*.) Like *1ST Word*, *WordWriter* takes advantage of the ST's GEM (Graphics Environment Manager) user interface. This includes up to four resizeable windows (allowing up to four documents onscreen at once), drop-down menus, and full mouse controls.

Another similarity between the two word processors is that *WordWriter* offers keyboard shortcuts in addition to the menu selections. But *WordWriter* goes a step further by offering more of these shortcuts than just the function keys provided in *1ST Word*. In *WordWriter*, for instance, you can simply press Alt-O to open a file. These "speed keys," as they're called, make editing faster because you don't have to remove your hands from the keyboard to grasp the mouse. You can also call the commands by clicking the mouse on the button icon which corresponds to the option you want.

Standard Features

WordWriter contains most of the features you'd expect to find in a good GEM-based word processor for the ST. The cursor keys let you move through your text by character, word, sentence, line, or page; and the scroll bars and sliders let you move anywhere within the document. The default typing mode is Insert, where everything to the right of the cursor is moved over to make room for your new text, but you can switch to Strike-over mode. As with *1ST Word*, though, you have to manually reformat a paragraph after making changes.

A ruler line (which can be turned off) appears at the top of the screen to indicate margins and tab settings, and the page number appears in the left margin. You can reset tabs and margins at any time, and you may also specify where a page should end. You can merge files. You can instantly check on both the number of pages and the number of words you've written, and on the amount of free memory remaining. You can define blocks of text by dragging the mouse or by marking the beginning and end of the block. (The latter method is required for defining blocks larger than a screen.) You can move, cut, or paste blocks of text, search and replace strings of characters, and undo a mistake.

Formatting options include automatic word-wrap (words aren't split at the ends of lines) and right-justification (the right edge of a column lines up, like

the left edge of the typeset columns in this magazine). Headers and footers can't be longer than one line, but can be centered, flushed left, or flushed right.

You can print either the document currently in memory or another one saved on disk. A built-in print spooler does a pretty good job of letting you continue to work on a document while the printing goes on. A print-format page lets you specify the headers and footers, top and bottom margins, and the overall page length. You can also select whether pages should be numbered, the text of the page-number line, which pages to print, and whether to print to the printer or disk.

Onscreen Type Styles

WordWriter takes the WYSIWYG (what you see is what you get) approach to word processing. Type styles such as boldface, underlining, italics, and others appear onscreen just as they will on paper. The display is especially sharp on the monochrome monitor.

Three letters displayed in the upper left corner of the screen indicate the type style currently in use. If your printer has features not directly supported by *WordWriter* (like near-letter quality on my Star SG10), you can embed the escape code sequence directly in the text so it will be sent to the printer. You can even hide the escape codes so they don't foul up your layout.

A wide variety of printer drivers is included on the *WordWriter* disk, with clear instructions for customizing or making your own. For example, my SG10 (like most printers) cannot print the lightface type style which *WordWriter* can display. I customized the printer driver so that lightface prints out as double-width characters—handy for titles and subheadings. The printer drivers even let you send an initialization code, so you can set the printer for a certain mode (such as Near-Letter Quality) before you begin printing.

Spelling Checker

In addition to these features, *WordWriter* includes some nice extras. First is the 85,000-word spelling checker. You can load the dictionary at any time, then unload it when you've finished to reclaim the memory it uses. You can spell-check the entire document at once, or choose realtime checking. In the latter mode, each word you type is instantly checked against the dictionary. The manual warns that the program may slow down a little, but I never experienced any problems.

When the spell-checker finds a word that isn't in its dictionary (either during realtime or whole-document spell-checking), it opens up a window which displays the questionable word along with a list of possible alternatives. The window is situated so you can see your document with the questionable word in context. You can select an alternative word from the list simply by clicking on it, or you can type in the correct spelling yourself.

You can also look further up or down in the dictionary by clicking on the scroll bars. This is helpful because the "correct" spellings suggested by the program sometimes aren't of much use—they're just the words which surround the questionable word in the dictionary. For example, the questionable word *tipo* might bring up *time*, *tine*, and *tip*, when the word you want is *typo*. Some spelling checkers are capable of spotting this.

Outlining

Another nice extra is the outliner. This helps you arrange your thoughts by indenting lines and using letters and numerals to construct an outline. It's not a full-fledged outliner—it doesn't allow subheadings to be hidden, and it won't move a series of subheadings when you relocate the heading they belong to. It's also not happy when you add comments without an index number or letter. However, it does allow you to move headings up and down a level, which can be helpful.

The *WordWriter* manual is, in general, excellent. It consists of a 5 × 9–inch looseleaf binder which is tabbed and indexed. It covers all aspects of the program, and includes general information on word processing as well as a tutorial. Strangely, it stumbles when giving instructions on how to use standard GEM tools like the file selector. In fact, it's totally wrong, but luckily the correct instructions are included in a text file on the disk.

WordWriter is missing some features which keep it from being as powerful as it could be. For one thing, it's not possible to add words to the spelling dictionary—a rather large oversight. TimeWorks says it is working on this for a future revision. Other missing features include table-of-contents compilation (found on some word processors for eight-bit Ataris) and the ability to merge graphics with text. *WordWriter* also seems to have trouble reading files from other word processors, such as *ST Writer* files and ASCII text files transferred from eight-bit Ataris. Finally, when you unload the dictionary to reclaim memory, the change is not always reflected in the free-memory function, so you no longer know how much room you have.

Overall, though, *WordWriter* is a good value. The word processor, spelling checker, outliner, manual, and toll-free customer support line add up to a package which is well worth the price. With a few improvements, this could well become the word processor of choice among ST users. After having used *WordWriter* exclusively for about two months, I can recommend it highly.

WordWriter ST
TimeWorks
444 N. Lake Cook Road
Deerfield, IL 60015
$59.95

ST

Directory Dump

Marcos Zorola

Here's a short, useful utility that helps you keep track of your disk files: It reads the disk directory and sends a formatted copy to a printer, the screen, or another device. It works on any ST in any screen resolution, color or monochrome.

Faced with the question of how to print out a disk directory, many ST owners resort to a rather inelegant solution: Double-click on a disk icon to display the directory window; then press Alt-Help to start a time-consuming graphics screen dump. If the directory is too long to fit on a single screen, several screen dumps are necessary. To complicate matters, there may be folders (subdirectories) on the disk, each of which must be displayed and printed separately. There's no other way to print a disk directory from the GEM desktop.

"Directory Dump" provides a much better alternative. It lets you send a listing of an entire disk directory—as text, not graphics—to a printer or any other legal device or file. Legal devices include the printer, the screen, and even another disk file.

Directory Dump prints out the filenames in the order in which they appear on the disk. In general, this means the files are listed in the order in which they were saved. Deleting a file opens up a slot in the directory, however, so the next file you create appears in the newly available slot.

Folders and their contents are included in the listing, too. The only limitation is that Directory Dump cannot handle disks that have 50 or more folders (including nested folders). In practice, this isn't a severe limitation, even on hard disks up to 20 megabytes in size.

Directory Dump also lets you choose the type of information that is displayed in the directory listing. Coupled with its flexible output, this gives you the ability to customize the listings to suit your requirements.

Running The Program

Directory Dump is on the magazine disk under the filename DIRDUMP.PRG.

You can run Directory Dump directly from the magazine disk menu, or from the GEM desktop in the usual fashion: Double-click on the DIRDUMP.PRG icon or filename. When the program starts, you'll see a screen that looks like the one shown in the figure (facing page).

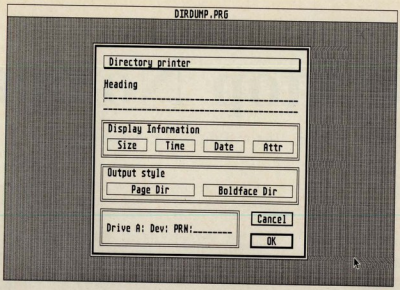
In the Heading field, type a name for the disk whose directory you're printing. Whatever you place there will be printed at the top of each directory and folder listing. It's a good idea to type the name of the disk as it appears on your disk label—"BASIC Programs," for example—so when you're looking through the listings, you can match up disks with their printed directories. You may also want to include the date and whether the disk is formatted for single- or double-sided use.

Customized Listings

Below the Heading field is the Display Information field. The four buttons here control what sort of information is printed. If all four buttons are turned off, the listing contains the filenames only, each printed under the folder in which it's located. By clicking on the buttons, you can select any one (or several) of the following options:

- Size—The size of the file in bytes is listed.
- Time—The time of the file's creation is listed.
- Date—The date of the file's creation is listed.
- Attr—The file's attribute is listed. This may be READ/WRITE or READ ONLY.

If you don't usually use the ST's Control Panel accessory to set the time and date, most files will have very similar date and time stamps, and you'll probably want to omit this information from the directory listing. The READ/WRITE and READ ONLY attributes for a file can be set by selecting Show Info



from the File menu on the GEM desktop. If you never write-protect any of your files, there's no need to print the file attributes.

The second set of options controls the output style:

• Page Dir—Each folder starts printing on a new page.

• Bold Dir—The folder names are printed in boldface.

The Bold Dir option makes the folders stand out when the Page Dir option is not used. Directory Dump sends an escape code for boldface which is recognized by most Epson and Epson-compatible printers. If the boldface feature doesn't work properly with your printer, just ignore this option.

Changing Devices

The Directory Dump window also has two additional fields you can fill in: the Drive field and the Device field. These fields hold default values (drive A and device PRN:) when Directory Dump is first run.

The Drive field specifies which drive will be accessed for the listing. In other words, if the Drive field is set to A, the disk whose directory you want to list should be inserted in drive A. If you use a single-drive system, leave the drive set to A. If you have additional floppy drives or hard drives, you may enter drive specifiers B–P, depending on which drives are currently installed.

It's also possible to use Directory Dump to catalog a RAM disk, although there isn't much point in doing so, since the RAM disk disappears when you turn off the ST.

The Device field lets you specify which device will be used for output. Legal device names are:

PRN:	Printer (the default)
AUX:	RS-232 port
X:FILE.EXT	Disk file on drive *X* (A–P)
CON:	Console (screen)
HSS:	MIDI port

Normally you'll leave this field alone. By typing in a different device name, you can redirect output to any available ST output device shown above. If you change it to CON:, for instance, the output goes to the screen. Note that the colons are a required part of the device names.

Creating A Disk File

By sending the directory listing to a disk file, you could edit it with a word processor or text editor, and perhaps merge a number of listings together to make a catalog. Type the drive identifier, followed by a filename. The filename must be limited to 12 characters, counting the period and the optional extender. For example, to create a file called DIR1.CAT on drive A, type A:DIR1.CAT. The result is an ASCII file containing the directory listing.

To send the listing to a printer attached to the parallel printer port, leave the Device field set to PRN:. If you have a serial (RS-232) printer that has been installed as such with the Install Printer accessory that came with your ST, it should also work with PRN:. If not, change the Device field to AUX:. Theoretically, you could also send the listing to a modem via AUX:, but it would make more sense to create a disk file and then upload it.

The HSS: device lets you send a directory listing to the MIDI (Musical Instrument Digital Interface) port. This capability wasn't included in the program on purpose; it's just a consequence of the ST's device-oriented input/output flexibility. The first person who comes up with a practical reason for sending a directory listing to the MIDI port deserves a medal.

When you've made all the selections described above, make sure your printer is connected and turned on (if you're directing output to that device); then click on the OK button. If you decide to exit the program instead, choose the CANCEL button.

Desktop Notepad

Tim Victor, Editorial Programmer

If you've ever needed to jot down a short note while using your ST, you'll love this desk accessory—a notepad that's instantly available while running any other program. You can write a note, save or load from disk, and print copies without interrupting the main program you're using. It works on any ST in any screen mode, color or monochrome.

"Desktop Notepad" is a handy desk accessory that nearly every ST user needs at one time or another. Often while working with an application program, you'll need to write yourself a quick note, memo, or reminder. Some word processors let you open another window for this purpose, but what if you're using a spreadsheet, database manager, terminal program, text editor, or compiler? Desktop Notepad lets you jot down your note without interrupting whatever main application you're running.

Although it's not a full-featured word processor, Desktop Notepad does support basic word processing functions. You can insert text at any point; delete single characters or entire blocks; move or copy blocks of text from one place to another within a document; search for specified strings of text; search and replace strings; create documents of any size up to the limit of available memory; save and load text on disk; and print out copies of documents on a printer. Desktop Notepad takes full advantage of GEM features, including a movable and resizable notepad window, scroll bars, and a cursor that's controllable with the mouse or the keyboard. And, thanks to its instantaneous word wrapping, you can freely enter text without worries about formatting.

Desktop Notepad will be a significant addition to nearly anyone's software library.

Figure 1: "Desktop Notepad" is available anytime you need to jot down a note—even when running another program.

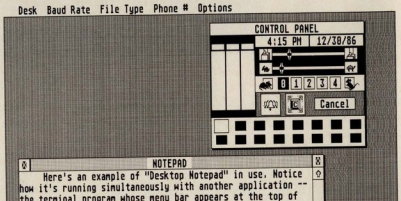
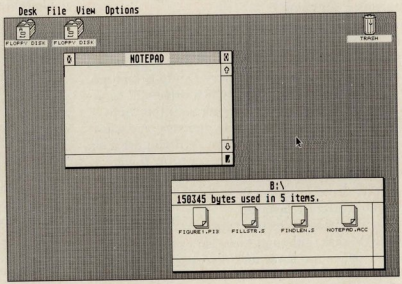


Figure 2: When "Notepad" first appears, its window is a blank slate awaiting input.



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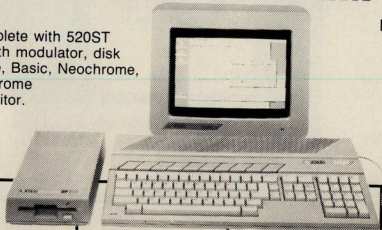

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Installing The Program

Desktop Notepad must be installed as a desk accessory. That means the program is automatically loaded into memory when you turn on your ST, and it waits for you to call it into action by selecting it from the Desk menu. Most programs that support GEM make this menu available at the far left side of the menu bar. (Sometimes the Desk menu is labeled with the Atari logo symbol, as in *1ST Word*.) As long as the Desk menu is available, Desktop Notepad is ready to be called up at the click of a button.

To prepare Desktop Notepad for use, simply copy the file NOTEPAD.AC from the magazine disk to your boot disk (the disk you insert in drive A when you switch on your ST). Then rename the file to NOTEPAD.ACC. The .ACC extender tells the ST's operating system to automatically load Notepad as a desk accessory when the computer is switched on. NOTEPAD.ACC must be on the root (main) directory of your boot disk; do not place it in a folder (subdirectory).

There's one exception to this rule: If you're using a hard disk drive, you may place your desk accessory files on the root directory of disk C.

Special note: If you have an early 520ST without the TOS operating system in read only memory (ROM), you should rename NOTEPAD.AC to DESK5.ACC after copying it to your boot disk. However, Desktop Notepad may not work properly with some applications if your 520ST lacks TOS in ROM. The TOS upgrade costs about $35 at your local Atari dealer and is highly recommended. If you already have a DESK5.ACC file on your boot disk, rename NOTEPAD.AC to DESK*x*.ACC, where *x* is any number less than six.

The current version of TOS allows up to six desk accessories and one primary application program in memory at a time. Note that the Control Panel and VT-52 emulator accessories supplied with your ST count as *two* accessories *each*, placing two options each on the Desk menu. This means that if you install the Control Panel and VT-52 emulator, there's only enough room for two more accessories of your own. Desktop Notepad counts as one accessory.

Figure 3: Word wrapping automatically moves words to the next line rather than breaking them at the right margin.

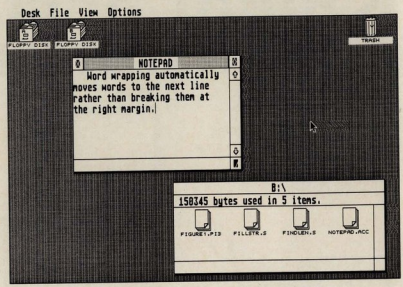
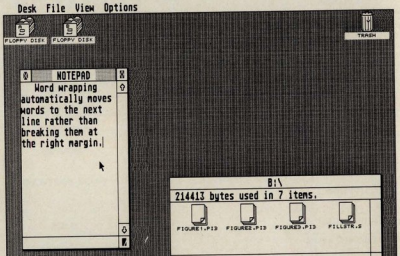


Figure 4: Even when you resize the window, "Notepad" automatically reformats the text so the entire width is visible.



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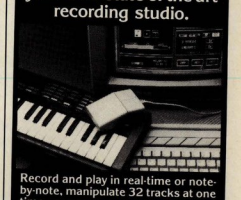

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There is one potential problem when using desk accessories, particularly large ones. Some accessories occasionally interfere with some application programs. If the application you're using is behaving strangely, try disabling all the accessories (perhaps by renaming the extenders from .ACC to .AC) and rebooting the computer. Then try your application again to see if it behaves properly. This shouldn't be a problem with Desktop Notepad, because it's a relatively small accessory. However, it does have the capability of loading very large text files.

After placing NOTEPAD.ACC on your boot disk, insert the disk in drive A and switch on the computer. If it seems that the GEM desktop takes slightly longer to appear than usual, don't be alarmed; it takes a few seconds longer for the computer to load desk accessories into memory. When the desktop appears, confirm that Desktop Notepad is installed by dropping down the Desk menu. You should see a selection called Notepad. You can open the Notepad by clicking on this selection.

Full-Screen Editing

When Desktop Notepad opens, the screen should resemble Figure 2. Try typing a line of text. Notepad works much like *ST Writer* and *1ST Word;* all alphanumeric keys and cursor control keys are active. However, Notepad is permanently locked in insert mode, so whatever you type pushes existing text ahead of it.

Notice that when the cursor reaches the end of a line, the text automatically continues on the next line, and no words are broken at the right margin of the Notepad window. This feature is called *word wrapping* or *parsing* and is found in most word processors. As a result, all text entered into Notepad is flushed against the left screen margin, leaving a ragged right margin.

Notice that the Notepad window is equipped with standard GEM gadgets. By pointing at the window's title bar and pressing the left mouse button, you can drag the window to any position on the screen. By dragging the lower right corner of the window, you can resize the Notepad. By clicking on the

Figure 5: By dragging the mouse, the paragraph highlighted in reverse video has been defined for a block delete, block move, or block copy.

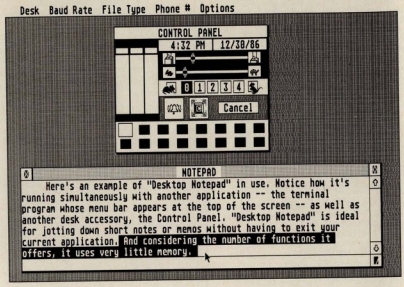

Figure 6: The "Desktop Notepad" special menu appears when you reselect the Notepad item from the Desk menu.

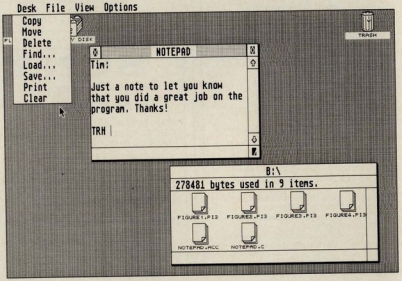

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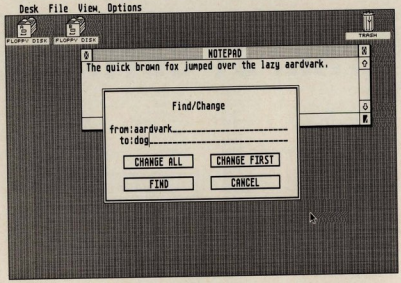
Figure 7: All search and search-and-replace functions are controlled from this dialog box which appears when you select Find from the special menu.



tiny button in the upper right corner, you can expand the Notepad to full-screen size and shrink it back down again. The vertical slider along the right edge of the window lets you scroll through a note that might be too long to fit in a single window.

One interesting feature of Desktop Notepad is that it automatically reformats the word wrapping whenever the window is resized. This makes it unnecessary to use a horizontal slider along the bottom edge of the window. Even some full-blown word processors on the ST lack this feature.

Editing Controls

The keyboard and mouse work much like you'd expect them to. You can move the cursor a character at a time in any direction with the cursor keys, or move it directly to any point in the text by pointing and clicking the mouse. The Backspace key erases the character immediately behind the cursor. The Return key inserts a carriage return and lets you start a new paragraph.

If you want to delete a lot of text, it can be tedious to keep pressing the Backspace key. Instead, define the block to be deleted by holding down the left mouse button and dragging either forward or backward. You can define text which doesn't appear in the window by dragging the mouse above or below the window—this automatically scrolls the text in the window. The defined block appears in reverse video. If you change your mind at this point, you can undefine the block by holding down the Control key while clicking the left mouse button.

Once a block is defined, you can delete it with a single mouse-click. These and other functions are controlled by the special menu seen in Figure 6. The special menu appears whenever you drop down the Desk menu and reselect the Notepad item *while the Desktop Notepad window is already open.* The special menu disappears after you select a function, or when you click the mouse button without selecting a function.

Other items on the special menu let you move or copy defined blocks of text, search and replace strings, save notes on disk, or recall notes that you saved earlier. To move a block of text, first define it as described above. Next, place the cursor at the position within your note where you want to move the block. Then select Move from the special menu. The text block will be deleted from its original position and moved to the new position.

Copying a block of text to another place in your note is just as easy. Define the block to be copied, move the cursor to the position where you want the text inserted, and select Copy from the special menu. The text block will be copied to the new position and left unchanged in the original position.

To find a string of text or search and replace a string, select Find from the special menu. A dialog box opens to present another collection of functions. (See Figure 7.)

To find a string of text, type the string on the FROM: line. Then click on the FIND button. The cursor will move to the next occurrence of that string within your note. Keep in mind that all search operations begin at the current location of the cursor. If you want to search through the entire note, first move the cursor to the beginning of the text.

To search for a string of text and replace it with another string, type the string you're searching for on the FROM: line. Next, type the string you want to replace it with on the TO: line. Then click on the

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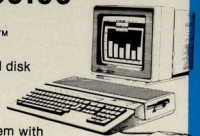

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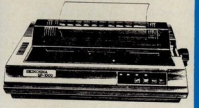

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CHANGE FIRST button to replace only the first occurrence of the string, or CHANGE ALL to replace all occurrences of the string. Again, remember that search-and-replace operations begin at the current location of the text cursor.

If you selected the Find function by accident or changed your mind, click on the CANCEL button to exit the dialog box and return to the Notepad window.

Saving And Loading

To save or load a note, select the Save or Load functions from the special menu. Desktop Notepad saves all notes in a format known as ASCII (American Standard Code for Information Interchange). That is, the note is saved as a block of text with no special imbedded characters. In this form, the text can be uploaded to another computer via modem or loaded into a word processor or text editor that handles ASCII files. Likewise, Desktop Notepad can load a text file that has been saved in ASCII format by another word processor or text editor.

One note, however. Many word processors and text editors on the ST save ASCII files a little differently than similar programs on other computers. ASCII files on the ST often have a carriage return character and a linefeed character at the end of every line of text. The carriage return character is invisible but makes it appear that Desktop Notepad's automatic word wrapping isn't working; the text breaks in strange places along the right margin of the Notepad window. The linefeed character may appear on the screen as a bell character. Similarly, tab characters inserted by some word processors may appear on the screen as clock characters.

You can ignore these characters when editing the document with Desktop Notepad, especially if you plan to load the file later into the word processor or text editor that originally created it. Alternatively, you can delete all of the carriage return, linefeed, and tab characters with Desktop Notepad's search and replace function. To do this, select Find from Notepad's special menu. To enter the search string on the FROM: line, type Control-M for the carriage return character, Control-J for the linefeed character, or Control-I for the clock character. Don't type anything on the TO: line. When you click on the CHANGE ALL button, the character specified on the TO: line will be deleted throughout the document.

This operation may take quite some time with a long document. To speed it up, make the Notepad window very small before beginning the search and replace. This reduces the amount of reformatting the program must do each time it deletes a character.

Remember that if you delete all of the carriage returns or linefeeds in this manner, you may have trouble reformatting the document if you load it back into the word processor or text editor that originally created it. Experiment first before altering an important document.

The File Selector

When you select the Save or Load functions from Desktop Notepad's special menu, a standard GEM file selector window opens up to prompt you for a filename. This works like all file selectors on the Atari ST. Simply enter any standard ST filename (up to eight characters with an optional three-character extender), and press Return or click on the OK button. Click on Cancel to abort.

To change a pathname, click on the dotted line at the top of the file selector window. Press Backspace or Esc to erase the old pathname, type the new pathname, and click on the directory box to display the new directory. For example, if you need to load a text file on drive B, type B: on the pathname line. Consult the manual that came with your ST if you need further information on using file selectors and pathnames.

Desktop Notepad's special menu also lets you print the text currently loaded into the Notepad window. Make sure your printer is powered up, connected, and online; then select the Print function. The note will be printed as it appears in the Notepad window, including line breaks. The entire note is printed even if it doesn't fit inside the Notepad window.

Closing And Reopening

As you're writing a note, you may find that you need to check an item in the application you're working with, or you may just want to continue with the application. If so, you can close the Notepad without losing the note it contains.

When you click on the close button in the upper left corner of the Notepad window, the Notepad window goes away. The next time you reopen the Notepad window by selecting Notepad from the Desk menu, it reappears with the text intact. If you want to erase the contents of the Notepad, select the Clear function on the special menu. This lets you start a new note if desired.

If you're interested in C programming, you may want to examine Desktop Notepad's source code. It's stored on the magazine disk under the filename NOTEPAD.C. Notepad was written with the *Alcyon C* compiler that comes with Atari's development system, but the source code is compatible with other C compilers with little or no modification.

If you want to modify the program, you'll need two other files on the magazine disk during the linking process. These are named FILLSTR.S and FINDLEN.S and are source code files for machine language subroutines. The NOTEPAD.C file contains compiling and linking instructions at the beginning of the source code.

ST

Customizing The GEM Desktop

McKendre Haynes

Have you ever wondered about the meaning of all those numbers in the DESKTOP.INF file? Wonder no longer. This in-depth article takes the mystery out of customizing and saving the GEM desktop. The techniques apply to all STs, color and monochrome.

If you're a relatively new ST owner, you may indulge in a power-on ritual that goes something like this: First, after the GEM desktop appears, you drop down the Options menu and select Set Preferences to set the screen resolution to medium (if you have a color monitor) instead of low resolution. Then, perhaps you use the same menu to turn off confirmation of copies or deletes. Next, you drop down the View menu and select Show as Text to replace the file icons with filenames. Moving over to the Desk menu, you open the Control Panel and change the screen background color to something easier on the eyes than fluorescent green. Perhaps you open the Install Printer accessory and adjust the printer parameters, too.

Finally, after dragging the trash can to the lower right-hand corner of the screen, you double-click on the Floppy Drive A icon, resize the directory window, and reposition it slightly. Now the desktop looks the way you want it to look.

Arranging the desktop to suit your taste takes time. And what happens when you turn off the ST? It forgets everything. The next time you turn it on, you have to rearrange everything all over again.

It doesn't have to be that way. After moving things around and setting your preferences, you can drop down the Options menu and select Save Desktop. This writes a file called DESKTOP.INF on drive A. When you next turn on your ST, be sure this disk is in drive A. The computer reads the file and automatically reconstructs the GEM desktop just as you left it.

Exploring DESKTOP.INF

Not too long ago, I read an article which described how to change the labels of the desktop icons. In the process of modifying the file, I became curious as to what all those other numbers in DESKTOP.INF meant.

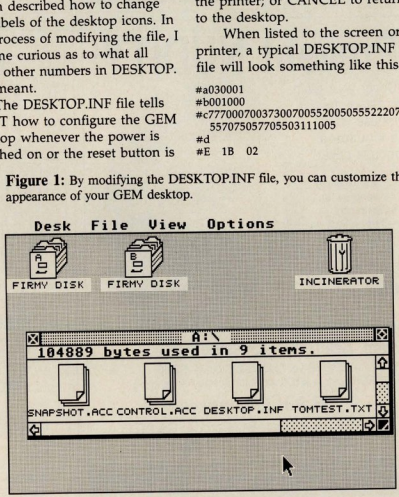
The DESKTOP.INF file tells the ST how to configure the GEM desktop whenever the power is switched on or the reset button is pressed. The ST continually monitors the GEM desktop, so it's always ready to save the various values on disk whenever Save Desktop is selected.

To view the contents of the DESKTOP.INF file, double-click on its icon or filename in a directory window. An alert box pops open to offer three options: SHOW, PRINT, and CANCEL. Click on the SHOW button to display the DESKTOP.INF file on the screen; PRINT to send a copy to the printer; or CANCEL to return to the desktop.

When listed to the screen or printer, a typical DESKTOP.INF file will look something like this:

```
#a030001
#b001000
#c777000700373007005520050555222077055707505770550311005
#d
#E 1B 02
```

Figure 1: By modifying the DESKTOP.INF file, you can customize the appearance of your GEM desktop.



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```
#W 00 00 00 05 50 14 07 B:\*.*@
#W 00 00 0C 04 50 0E 00 @
#W 00 00 0E 09 2A 0B 00 @
#W 00 00 0F 0A 2A 0B 00 @
#M 00 00 00 FF A FLOPPY DISK@ @
#M 01 00 00 FF B FLOPPY DISK@ @
#T 07 00 02 FF    TRASH@ @
#F FF 04 @ *.*@
#D FF 01 @ *.*@
#G 03 FF *.APP@ @
#G 03 FF *.PRG@ @
#F 03 04 *.TOS@ @
#P 03 04 *.TTP@ @
```

Yours will probably look slightly different, depending on how you've configured your desktop.

By changing the data in this file, you can customize your desktop. Changing the data is easy if you load DESKTOP.INF into a text editor or word processor that can save files in plain ASCII format (for instance, *1ST Word* with word processor mode turned off). However, it's also easy to mess up the DESKTOP.INF file if you don't know exactly what you're doing. If you're not sure how to go about this, you need to read this article.

How It Works

Each line in the DESKTOP.INF file contains a series of hexadecimal (base 16) numbers, and some lines contain additional symbols. Let's take a look at what these lines do.

The first line in DESKTOP .INF contains values describing the configuration of the RS-232 port:

Digit	Meaning	
1st:	0 = Full duplex	1 = Half duplex
2nd:	0 = 9600 bps	1 = 4800 bps
	2 = 1200 bps	3 = 300 bps
3rd:	0 = No parity	1 = Odd parity
	2 = Even parity	
4th:	0 = 8 bits/char	1 = 7 bits/char
	2 = 6 bits/char	3 = 5 bits/char
5th:	0 = X OFF, Rts/Cts OFF	
	1 = X ON, Rts/Cts OFF	
	2 = X OFF, Rts/Cts ON	
	3 = X ON, Rts/Cts ON	
6th:	0 = Strip bit ON	
	1 = Strip bit OFF	

So, for example, since the first line in the sample DESKTOP .INF file above is #a030001, the RS-232 port will be configured as follows: full duplex, 300 bps (bits per second), no parity, 8 bits per character, X OFF, Rts/Cts OFF, and strip bit OFF.

The next line in DESKTOP .INF contains the printer information you've entered with the Install Printer accessory. The numbers represent the following settings:

Digit	Meaning
1st:	0 = Dot-matrix
	1 = Daisywheel
2nd:	0 = Black & white
	1 = Color
3rd:	0 = 1280 pixels/line
	1 = 960 pixels/line
4th:	0 = Draft quality
	1 = Final quality
5th:	0 = Printer port
	1 = Modem port
6th:	0 = Continuous feed
	1 = Single sheet feed

In our example DESKTOP .INF file, the second line is #b001000, so the printer settings are: dot-matrix, black & white, 960 pixels per line, draft quality, printer (parallel) port, and continuous feed. This is a typical setup for many Epson-compatible printers.

The Control Panel

The third line in DESKTOP.INF contains the values from the Control Panel accessory when the desktop was saved. In our example file, this line is:

```
#c777 000 700 373 007 005 520 050 555
  222 077 055 707 505 770 550 3111005
```

Note: For illustrative purposes, the first 48 numbers are arranged in groups of three, separated by spaces. This is *not* the way you would normally see it in the DESKTOP.INF file, where the numbers run together.

The first 48 numbers are the colors set by the Control Panel. Since the ST can display a maximum of 16 colors at any one time, each color is represented by three numbers (48/16=3). Each of the three numbers corresponds to the number displayed under R, G, and B on the Control Panel color selector. R is the red value; G is the green value; and B is the blue value. All 512 colors possible on the ST can be created by combining the various RGB values.

The last seven numbers in this line, 3111005 in the example, are also set by the Control Panel:

Digit	Meaning
1st:	Mouse button response (0–4)
2nd:	0 = Keyclick off
	1 = Keyclick on
3rd:	0 = Bell off
	1 = Bell on
4th & 5th:	Keyboard response (0–46)
6th & 7th:	Character repeat delay (0–21)

Again, looking at our example file, you can see that 3111005 stands for a mouse button response of 3 (thus requiring fairly rapid double-clicks); keyclick on; bell on; a keyboard response of 10 (fairly fast); and a character repeat delay of 05 (a very short delay for fast repeats).

The following line in DESKTOP.INF, labeled #d, does not seem to be used yet. Most likely it's reserved for future use by a new version of the ST.

Icons And Screens

The next line in the file, #E 1B 02 in our example, performs two functions. The first hexadecimal number determines how files are arranged in the directory and if confirmation should be requested before copying or deleting files. The 32 possible values (not all of which are listed here) depend on how four options are chosen. For example:

- 1B = View as Icons; Sort by Name; Confirm Deletes; Confirm Copies
- 03 = View as Icons; Sort by Name; No Confirm Deletes; No Confirm Copies
- 9B = View as Text; Sort by Name; Confirm Deletes; Confirm Copies

The first two options—View as Icons or View as Text and Sort by Name, Date, Size, or Type—are found under the View menu. The last two—Confirm Deletes and Confirm Copies—can be set when you choose Set Preferences from the Options menu. All of these settings are encoded as bits in the hexadecimal number. Bit 7 is icons/text; bits 6 and 5 are sort by name, date, size, or type; bit 4 is for confirming deletions, and bit 3 is for confirming copies.

The second number in the #E line, 02 in our example, indicates the screen resolution to which the GEM desktop will default. Low resolution is 01, medium is 02, and high is 03.

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Window Info

The next four lines represent the four windows that may be opened (*W* apparently stands for *window*). GEM permits only four windows to be open simultaneously:

```
#W 00 00 00 05 50 14 07 B:\*.*@
#W 00 00 0C 04 50 0E 00 @
#W 00 00 0E 09 2A 0B 00 @
#W 00 00 0F 0A 2A 0B 00 @
```

These hexadecimal values are continuously updated in memory as windows are opened, resized, and repositioned on the desktop. (This is why, when you close a window, the next window opened will appear in its former location and size.) When you select Save Desktop, the current arrangement is saved on disk. The next time you boot up the computer or press the reset button, the window (or windows) will reopen and position itself exactly as it appeared when you selected Save Desktop.

For each line and each window, the first two bytes are related to the slider bar positions, the next two determine the window's desktop location, and the third pair define the window's size. In the first line of our example above, these pairs of bytes are 00 00, 00 05, and 50 14.

The use of the next byte is uncertain, but it appears to be used as a window handle by GEM. This byte is always a value between $07 and $0A, with $07 the first value assigned to a window. The values of this byte seem to vary from ST to ST.

In the first window line, the symbols B: *.*@ represent the pathname of the open window: It is the root directory (not a folder) of disk drive B, and all files will be displayed. If a window had been opened for a folder in drive B, the line would end like this: B:\FOLDER*.*@, where FOLDER is the folder name. As each successive folder is opened, the latest folder name is added to the line.

The windows are opened in the order listed, so if you have A listed before B, the directory for B will be opened last and will come up as the currently active window. Changing the pathname allows you to customize the directory that appears. For example, if you make B:*.*@ into B:*.BAS@, only BASIC programs will be listed in the directory window for drive B when you boot or reset your ST. Closing and reopening the window restores the normal directory.

Disk Drives And Trash Cans

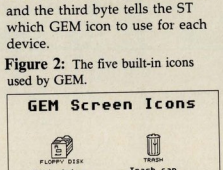
The next three lines in DESKTOP.INF list information about the disk drive and trash can icons:

```
#M 00 00 00 FF A FLOPPY DISK@ @
#M 01 00 00 FF B FLOPPY DISK@ @
#T 07 00 02 FF TRASH@ @
```

The M and T lines tell the ST where to locate the icons on the desktop, what the icons should look like, and how the icons should be labeled.

The first byte in each line is the horizontal location of the icon; the second is the vertical location; and the third byte tells the ST which GEM icon to use for each device.

Figure 2: The five built-in icons used by GEM.



There are five icons built into the ST, numbered as follows:

00 = File drawer
01 = Folder
02 = Trash can
03 = Program
04 = File

You can change the icon numbers for the disk drives and trash can to any of the above values, but the results will likely be confusing. (A trash can that's disguised to look like a disk drive could be hazardous to the health of your files.) If an icon specifier greater than 04 is used, the system will not boot.

The text portions of the lines which appear after the FF delimiter are the desktop icon labels. These, too, can be edited. I've relabeled my disk drive icons to STIFFY DISKS since the 3½-inch floppies are not really very floppy, and I've renamed the trash can icon to INCINERATOR, since—unlike the Macintosh and Amiga—the ST provides no simple way to recover a discarded file. The resulting lines in my DESKTOP.INF file appear like this:

```
#M 00 00 00 FF A STIFFY DISK@ @
#M 01 00 00 FF B STIFFY DISK@ @
#T 07 00 02 FF INCINERATOR@ @
```

Some people with two-drive 1040ST systems change their icon labels to read INTERNAL for drive A and EXTERNAL for drive B, since the 1040ST has a built-in floppy drive.

By the way, there's an easier method of changing a disk drive icon than by editing the DESKTOP.INF file with a text editor or word processor. Simply click once on the icon to highlight it, drop down the Options menu, and select Install Disk Drive. The dialog box that appears lets you change the drive identifier and the icon label. You shouldn't mess with the drive identifier (this is for installing a RAM disk or hard disk on your system), but you can change the label quite easily. Press the Tab key to move the cursor to the line with the label, and then press the Esc key to erase the line. Now you can type in any new label you want (up to 12 characters). Click on the INSTALL button to effect the change, or the CANCEL button to restore the original label.

File Icons

The rest of the DESKTOP.INF file tells the ST which icons to use for different types of files within windows and how to deal with those types of files. The example above looks like this:

```
#F FF 04 @ *.*@
#D FF 01 @ *.*@
#G 03 FF *.APP@ @
#G 03 FF *.PRG@ @
#F 03 04 *.TOS@ @
#P 03 04 *.TTP@ @
```

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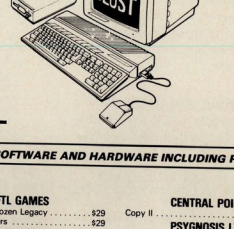

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The #F and #D lines may represent folders and disks; their function is uncertain. The next four lines describe the four types of programs that can run. Here, G files run under the Graphics Environment Manager (GEM), and F and P files are Tramiel Operating System (TOS) programs which run with or without parameters.

There's no useful purpose to modifying these lines, and they should be left untouched to avoid problems.

Installing Applications

Occasionally you'll see a DESKTOP.INF file that has lines like this:

```
#G 03 04  BASIC.PRG@ *.BAS@
#G 03 04  1ST_WORD.PRG@ *.DOC@
```

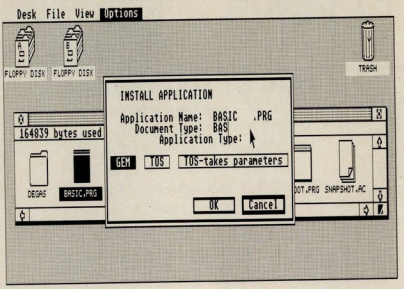
These indicate applications that have been installed. In GEM desktop parlance, *installing an application* has a special meaning. Usually when you double-click on a file represented by a file (04) icon—such as an ST BASIC program or a *1ST Word* file—an alert box tells you that you can only SHOW or PRINT the file; it's not an executable program. In the case of BASIC programs and *1ST Word* documents, the files are identified with the filename extensions .BAS and .DOC, respectively.

But by installing the application, you can run the application program merely by clicking on one of its nonexecutable files. For example, let's say you want to install *1ST Word*. Click once on the *program icon* for *1ST Word* (the icon you'd double-click to run the program). When it's highlighted, drop down the Options menu and select Install Application. A dialog box appears and asks you for a Document Type. Enter DOC as the document type, then click the OK button.

Now you can load and run *1ST Word* just by double-clicking on any *1ST Word* document file (that ends with the filename extension .DOC). Not only is *1ST Word* loaded, but the text file you click on is automatically loaded, too. Of course, the *1ST Word* program file must be on the same disk as the document file for this to work.

If you reboot or reset the ST, the application will be uninstalled. To keep from having to install it each time you use the computer, simply Save Desktop.

Figure 3: Installing an application from the desktop.



Saving Room For Accessories

A desk accessory is a special type of program that automatically loads into memory when an ST is booted, then waits "in the background" until selected from the Desk menu. At that point it runs instantly, since it doesn't have to be loaded from disk like other programs. Also, a desk accessory can be called any time the Desk menu is available, even when running another application program. (Sometimes, as in *1ST Word*, the Desk menu is represented by the Atari logo symbol.)

Desk accessory files end with the .ACC extension and must be located on the root directory in order to load. Normally, they'll load from drive A. If you have a hard disk, accessories load from drive C. The most common desk accessory is the Control Panel (CONTROL.ACC) that comes with every ST system. Another free accessory is the VT52 emulator (EMULATOR.ACC).

Accessories can be useful, but they consume memory and lengthen the time required for the computer to boot up. Also, the current version of TOS limits the ST to a maximum of six accessories that may be installed at one time. The Control Panel, although it is a single accessory, uses up two of these slots because it includes the Install Printer program.

If you want to free up some memory or some slots on the Desk menu for other accessories, you can Save Desktop after configuring your system with the Control Panel, Install Printer, and VT52 emulator. Then you can prevent these accessories from loading in the future by deleting them from your boot disk or renaming them CONTROL.AC and EMULATOR.AC. Since all the information supplied to your ST by these accessories is preserved in the DESKTOP.INF file when the desktop is saved to disk, it's not really necessary to keep them around.

The only function you might miss is the system clock on the Control Panel. Several programs are available both commercially and in the public domain which let you set the clock during bootup. This could eliminate your need for the Control Panel/Install Printer accessory, freeing up those two slots for more important accessories. **ST**

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The C Programming Environment

For the person who has no prior C programming experience, the prospect of learning the language on the ST can be quite intimidating. Naturally, there's the problem of learning the syntax of the language. But at the same time, the programmer also must become familiar with the ins and outs of the various parts of the ST operating system—the GEM AES, VDI, GEMDOS, BIOS, and XBIOS. Calls to these collections of routines are necessary to implement the friendly icon and menu interface that GEM provides, since this kind of interface goes beyond the scope of the traditional C input/output scheme.

As difficult as these hurdles appear, the prospective C programmer faces an even more fundamental problem. He must first learn the mechanics of writing a C program, compiling it, and getting it to run. To someone coming from a BASIC programming background, this may sound strange. After all, if you want to write a BASIC program that puts the words "My program works!" up on the screen, you simply load up BASIC, enter the program line

```
10 PRINT "My program works!"
```

and then type RUN. In fact, you don't even have to enter a program. You can just type

```
? "My program works!"
```

in direct mode, and the words will appear on the screen. The advantage of an interpreted language like BASIC is that it's highly interactive. The program source code (the text that makes up the program) stays in memory at all times, there's always a text editor available for changing the source code, and when you want to see the result of the changes, all you have to do is type RUN.

Delayed Gratification

C, on the other hand, is a compiled language. It produces standalone programs that don't need an interpreter in memory in order to run. Such programs run much more quickly than interpreted BASIC programs, but generally take longer to develop.

Unlike BASIC, the program text editor and the means of making the program executable aren't part of the same cozy program development environment. Instead, the programmer must create a source code file with a text editor, and then run a series of programs that create a working program out of that file. If approached properly, this process can be almost as quick and easy as programming in BASIC. But if you concentrate only on learning the rules of C programming, and don't spend the time required to set up a convenient programming environment, you may find that creating the simplest C program can be quite a chore.

Let's go through the steps required to create a C program which, like the BASIC program above, just prints the statement "My program works!" on the screen. The first step is to create a text file that contains the program source code. To do this, you'll need to run a text editing program.

Many C compilers include such a program. Atari, for example, includes Mark Williams's *MicroEMACS* editor with the *Alcyon* C compiler in its development package. The *Lattice C* compiler comes with MetaCom-Co's *ED* program, and the *Megamax* C compiler has a GEM-style editor with windows, drop-down menus, and a mouse-controlled cursor. There are also a number of public domain text editors, including variations on the *MicroEMACS* editor, that may be downloaded from bulletin boards and information services.

It may also be possible to create source code files with your favorite word processor. The file that's produced must be straight ASCII text, with no embedded printer-control characters. And unlike most documents produced with a word processor, there should be a carriage return at the end of every line. *1ST Word* meets these requirements when the word processor mode is switched off, but other word processors may require some maneuvering. With *ST Writer*, for example, you must print the text to a disk file.

Compiling The Source Code

Once you've started your editor from the GEM desktop, you must type in the text of the program. For our modest example, all you have to type is:

```
main()
{
    puts("My program works! \n");
}
```

This program creates a function called main( ) which contains a single statement, the purpose of which is to print a string of text on the screen. After you've finished typing it in, you must save the source code on disk. TEST.C will be the name of this file. (Most C compilers require that the name of source code files end with the .C extender.)

Sheldon Leemon

The next step is to compile the source code into object code. This process involves running a compiler program (or programs). The compiler reads the source code file, translates the C commands into equivalent machine language instructions, and creates another disk file to store these instructions.

The simplest case is that of a single-pass compiler, like *Megamax C*, which requires only one program to convert the source code to object code. To compile the test program with *Megamax*, you would run the program MMCC.TTP (for *Megamax C* compiler). This is a TOS Takes Parameters type of program, which means that when you start it from the desktop, a dialog box appears with a dotted line for entering parameters. In this case, the parameters are instructions which tell the program what source code file to compile. With some compilers, these parameters may include optional instructions as to how the source code should be compiled, what the output file should be named, and so on.

For this example, we'll enter the name of the source file, TEST.C, as the sole parameter. This means that we want the compiler program to use the source file TEST.C as input, and create the object code file TEST.O as output.

The Missing Link

Assuming that the program compiles successfully, we can go on to the final stage. (If it doesn't successfully compile, go back to step 1 with the text editor.) Some beginning C programmers find the next step a bit puzzling. For, if the compiler has already converted the program into machine language, why can't it be run?

The answer is that the object code file isn't a complete program. It's missing certain preparatory routines that perform housekeeping functions—setting up a program stack and certain pointers, and directing program execution to the function named main( ), which is where every C program starts. The program may also require the addition of some standard subroutines which aren't part of the C language proper.

For example, our sample program uses an input/ output function called puts( ). This function is not an integral part of the C language. Like all other I/O functions in C, it is actually implemented as a separate program. A number of such programs are collected into an object code file (or files) known as the standard C library. Whenever a C program refers to an external function like puts( ), the compiler can only note its usage in the object code file, since it doesn't know the machine code instructions needed to perform the function. It's up to a program called the *linker* to pull those external programs out of the system library and join them with the object code, along with the startup code, to create an executable program. For this reason, we say that the job of the linker is *resolving external references.*

To link our *Megamax* object code file, we need to run a program called MMLINK.TOS. The parameter line we enter in the dialog box is

```
TEST.O -O TEST.PRG
```

which tells the linker to use the TEST.O file for input and to create the program file TEST.PRG as output. Since the only external routines needed for this program are located in the SYSLIB file, which the linker automatically checks, we don't have to include the name of any other object code files or library files with which to link TEST.O.

If the link process succeeds, we end up with the program file TEST.PRG, which can be run from the desktop by double-clicking its icon. This program prints the message "My program works!" briefly at the top of the screen before ending. At that point, you may wish to delete the intermediate file TEST.O.

Multipass Compilers

This may seem a lot of work for such a small program, but the Megamax compiler is actually the simplest to use. The most complex, the *Alcyon C* compiler that comes with Atari's developer's kit, requires several additional steps.

First of all, it is a three-pass compiler, which means that three separate programs are needed to process the source code. After having created the original source code file, you must run a program called CP68.PRG, which is the C preprocessor. Since all of the *Alcyon C* programs have the .PRG extender, you must install them as TOS Takes Parameters applications from the desktop to add a command line. After doing so, you can run CP68 with the command line TEST.C TEST.I.

After creating the TEST.I file, you run the parser program, C068.PRG, with the command line TEST.I TEST.1 TEST.2 TEST.3. This takes the TEST.I file and creates two more intermediate files, PRINT.1 and TEST.2. Next you run the code generator, C168.PRG, with the command line TEST.1 TEST.2 TEST.S. Unlike *Megamax C*, the *Alcyon C* compiler does not turn the C source code directly into machine language instructions. Instead, it creates an assembly language source code file—in this case, TEST.S, which must be run through an assembler to be converted into machine code.

So the next step is to run the assembler, AS68.PRG, with the command line -L -U TEST.S, which creates the object code file TEST.O.

This brings us to the linking stage. Run the linker, LINK68 .PRG, with the command line [U] TEST.68K=GEMSTART, TEST.O, GEMLIB. This creates a file called TEST.68K using the startup code from the file GEMSTART, our program code from TEST.O, and the C library code from the file GEMLIB. Unlike *Megamax C*, which uses only one large library file for all of the C libraries, *Al-*

cyon C breaks them down into files like GEMLIB, VDIBIND, AESBIND, OSBIND, and LIBF. Which of these you must include in your link depends on which kinds of functions (GEM AES, GEM VDI, and so on) you use in your program.

It may seem that once we've performed the link we should be done, but there's one more step. The linker provided with *Alcyon C* creates a relocatable load file in a format that is incompatible with the ST. This load file must be modified with a program called RELMOD.PRG. In this case, we'll run RELMOD with the command line TEST, which means that it takes the file called TEST.68K as input and produces a file called TEST.PRG.

It is TEST.PRG that we finally run to print our little message briefly on the screen. Once we've done that, we'll probably want to clean up all of the intermediate files that we've left lying around—TEST.I, TEST.1, TEST.2, TEST.S, TEST.O, and TEST.68K.

Menu-Driven Shells

As you can see, if you had to run each of these programs from the desktop and remember the proper command line to enter for each, you might soon lose your enthusiasm for C altogether. Fortunately, there are programs which allow you to delegate these boring, repetitive tasks to the computer.

The first type is a menu-driven shell program. Both the *Megamax C* and *Lattice C* compilers include this type of program, and the shell, *Menu+*, packaged with the latter is also available separately. These programs allow you to associate the various programs used in the development process with menu items on the shell window. Then, when you want to run one of the programs, all you have to do is select the menu item.

When you run the compiler from the *Megamax* shell, a file-selector window pops up which lets you click on the name of the source code file to compile. You may also set up default command lines. The *Megamax* shell lets you use a simple *make* facility, in which the compilation and linking processes are run according to a script that you save in a file. For example, the script file

```
TEST.C
MMLINK TEST.C -O TEST.PRG
```

gives the shell instructions to compile and link our test program in just one step. And if there were an error in the compilation process, the shell would automatically switch back to the editor program and load both the source file and the error file showing what the compiler problems were.

Batch-Processing Shells

The Atari development package takes a slightly different approach. It includes a program called BATCH.TTP that emulates the batch-processing capabilities of operating systems like MS-DOS. Batch processing means that you can put a batch of command lines in a text file, and the operating system executes them one after the other automatically. It also includes the concept of parameter substitution. This means that you can type in filenames on the command line of the batch program, and these names may be substituted for parameters in the batch file.

The advantage of parameter substitution is that the same batch file can be used to perform the same general operation on different input files. When you want to specify that a name should be substituted by one that is entered on the command line, you place a percent sign followed by a number in the batch file.

For example, if you put the command CP68 %1.C %1.I in the batch file, the %1 parameter is replaced by the first parameter on the batch file command line. If the batch file is called C and the input file you want compiled is MYPROG, you use the command line C MYPROG, and the batch program will read the line CP68 %1.C %1.I as CP68 MYPROG.C MYPROG.I. If the command line is changed to C YOURPROG, the batch program interprets it as CP68 YOURPROG.C YOURPROG.I.

In this way, you can build up generalized command files. For example, the following CC.BAT file contains all of the steps needed to compile and link a C program:

```
CP68 %1.C %1.I
C068 %1.I %1.1 %1.2 %1.3
RM %1.I
C168 %1.1 %1.2 %1.S
RM %1.1
RM %1.2
AS68 -L -U %1.S
RM %1.S
LINK68 [U] %1.68K=GEMSTART,%1,
  VDIBIND,OSBIND,AESBIND,LIBF,
  GEMLIB
RM %1.o
RELMOD %1
RM %1.68K
```

If we run the BATCH.TTP program with the command line CC TEST, it automatically creates a TEST.PRG file from our TEST.C source file. The RM commands refer to a program that ReMoves (deletes) the unwanted intermediate files after the compiler has finished with them.

Command-Line Shells

From a batch-processing program, you're just a short step to using a command line shell. Such a program provides the type of command line interface found in UNIX or MS-DOS. Instead of clicking on files to run them, you type their names. Instead of dragging files to the trash can to delete them, you type in a command like RM or DEL.

Command shells generally include batch file processing, so if you type a filename that ends in the extender .BAT, the shell automatically executes the commands contained in that text file. For example, if you have commands in a file CC.BAT, you type CC to execute them. If the batch file uses parameter substitution, you add the command line to the end of the filename (for example, CC FILE1 FILE2).

There are many such command shells available, both commercially and in the public domain. In fact, if you are a

steady reader of this magazine, you already have one: "ST-Shell," which appeared in the December 1986 issue of COMPUTE!'s Atari ST Disk & Magazine. The CC.BAT file shown above would work well with ST-Shell, since it contains its own version of the RM command.

Optimizing For Speed

Another important part of setting up a C programming environment is organizing your work disks. At the very least, you should try to set up your work disks so that all the programs you need are on one floppy disk. This avoids time-consuming disk swaps. But for real efficiency, put all of the necessary programs on a hard disk or RAM disk.

A hard disk offers a lot of speed and convenience, but it also requires the outlay of a fair amount of cash, something not everyone can afford. But with the ST's large amount of memory, everyone should be able to use a RAM disk. This is a program which makes the computer think that a section of its random access memory is a disk drive. Since a RAM disk isn't subject to the mechanical limitations of a real disk drive, it's very fast—as fast as, or faster than, the best hard disks.

RAM disk programs are available both commercially and in the public domain. The next issue of COMPUTE!'s Atari ST Disk & Magazine will contain an outstanding example of a RAM disk program that won Third Prize in our ST programming contest. One feature which sets this RAM disk apart from others is that it survives—with its files intact—most system crashes and resets. This makes it ideal for programmers who are writing and debugging programs.

Even with 512K of RAM, you should have enough memory for a fair-sized RAM disk. But with a one-megabyte 1040ST or an expanded 520ST, you should have enough room to put all of your files in RAM. This can make a huge difference when you're compiling and linking programs.

Keep in mind, though, that a RAM disk disappears when you pull the plug. Try to set up your batch file to write a copy of your finished program, as well as any altered source files, to floppy disk just in case.

As we've seen, compiling a C program can be a laborious, time-consuming process that involves running many programs and entering many command lines by hand. Or, it can be a matter of typing a single command that sets a series of events in motion at lightning speed. It's all a matter of how you set up your programming environment. So don't be in such a hurry to start writing code that you doom yourself to needless drudgery. Take the time needed to arrange things so that each compile takes the least time and the least effort possible. Each second you knock off the compile process through careful planning will be saved hundreds of times over as you program in the coming months. **ST**

SpriteMaker

Mark S. Swanson

This utility greatly eases the task of designing multicolored shapes for simulating sprite animation on the ST. After drawing the shapes on a magnified sketchpad, you can move them around the screen and experiment with multiple-shape animation. Although the utility is intended for advanced programmers working with machine language or compilers, the article also shows how the shapes can be displayed with a simple ST BASIC program. For any ST in the medium-resolution color mode.

Unlike earlier Atari computers, the ST-series machines lack any special hardware for displaying sprites—the movable screen objects which are known as player/missile graphics on the older Ataris. Without sprites, the ST's animation capabilities would seem to be limited. But on a computer as fast as the ST, sprites are generally deemed unnecessary. The ST's 68000 microprocessor can move blocks of memory so quickly that objects can be animated merely by moving their bitmapped patterns through screen memory. In fact, this is usually how animation is achieved on other computers which lack sprites, such as the Apple II and IBM PC, which are considerably slower than the ST. Although the Commodore Amiga does have sprite hardware, it's rarely used for anything but the mouse pointer.

The power of the 68000 does not mean that animation on the ST is easy to achieve, however Neither language included with the computer—ST BASIC or Logo—has any commands for creating or animating shapes. For the most part, simulating sprite animation is a job for advanced programmers working with machine language or

sophisticated compilers. Even if you are such a programmer, designing shapes without a utility is a trauma on the ST.

Enter "SpriteMaker." It's a utility that makes it much easier to design single-colored and multicolored bitmapped objects. You just draw the object by setting pixels on a magnified sketchpad, and then save the resulting bitmap data on disk. You can design objects in three different sizes, ranging from 16 × 8 pixels to 48 × 24 pixels. SpriteMaker also lets you test the shape by moving it around the screen with the mouse, and you can try out another form of animation by rapidly flipping through a series of up to 13 shapes in sequence.

If your programming experience on the ST is limited to BASIC, you can still experiment with SpriteMaker. It even generates DATA statements which can be merged with a short BASIC program to display a shape on the screen. Although ST BASIC isn't fast enough to move a bitmapped shape at a useful speed, we'll discuss how a machine language subroutine could add much-needed animation capabilities to BASIC.

Preparing SpriteMaker

SpriteMaker works only in the medium-resolution color mode. You'll find it on the magazine disk under the filename SPRITE.PRG.

SpriteMaker requires three storage files on disk to record the sprites for later recall and animation. One of the files, 2BIT.SAV, is included on the magazine disk for demonstration purposes. The demos discussed in this article require this file, so you should not alter or delete it before familiarizing yourself with the operation of the program.

The other two storage files—BIT.SAV and 3BIT.SAV—are automatically created by SpriteMaker if they do not already exist on the disk. In order for SpriteMaker to access previously stored objects, these storage files must be on the disk from which SpriteMaker is run. If they aren't present, an alert box gives you the option of aborting the program or allowing SpriteMaker to create the missing files.

It's a good idea to copy SPRITE.PRG and 2BIT.SAV to another disk before running SpriteMaker for the first time. Although it can be run from the magazine disk, it's safer to keep the original copy as a backup. Also, SpriteMaker may crash if there isn't enough free space on the disk.

Designing Objects

When you run SpriteMaker, a dialog box offers three options. You can select Draw (create a new sprite or modify an old sprite); Animate (move a sprite or sequence of sprites on the screen); or Quit (exit to the desktop).

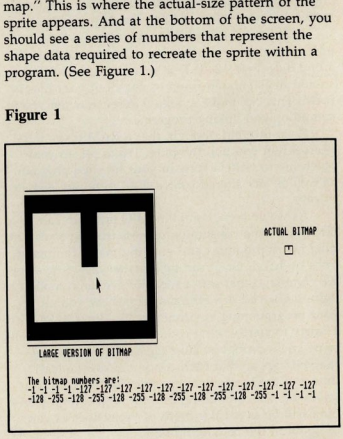
Let's start by designing a sprite from scratch. When you click on the Draw button, another dialog box appears. Labeled "Select bitmap to develop," it offers three more options: New map (create a new bitmapped sprite); Old map (modify an existing bitmapped sprite); or Quit (exit to the previous dialog box). Since we want to design a new sprite at this point, click on the New map button.

Whenever you click on either the New map or Old map buttons, a box labeled "Select size of bitmap" asks you to specify the size of the sprite you want to work with. A 1 × 1 sprite is the basic size, measuring 16 pixels wide by 8 pixels high. A 2 × 2 sprite is as wide as two basic sprites and as tall as two basic sprites—that is, 32 pixels wide by 16 pixels tall. A 3 × 3 sprite, in turn, is as wide and as tall as three basic sprites—48 pixels wide by 24 pixels tall.

To keep things simple for now, click on the button for a basic 1 × 1 sprite. The dialog box disappears and you'll see a blank sketchpad on the left side of the screen, labeled "Large Version of Bitmap." This is a magnified view of the 1 × 1 area of the sprite's bitmap. To set a pixel in the bitmap, point the mouse cursor anywhere inside the sketchpad and click the left mouse button. A colored rectangle should appear. (The color depends on the palette you've previously selected with the Control Panel desk accessory. If you haven't changed the default screen colors, the rectangle should be red.)

The colored rectangle represents a magnified view of a pixel in the actual sprite. You should be able to see this pixel if you look very closely at the right side of the screen under the label "Actual Bitmap." This is where the actual-size pattern of the sprite appears. And at the bottom of the screen, you should see a series of numbers that represent the shape data required to recreate the sprite within a program. (See Figure 1.)

Figure 1



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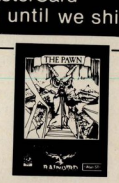

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Changing Colors

You can continue setting pixels by pointing to the desired area of the sketchpad and clicking the left mouse button. Each pixel is mirrored in its actual size on the right side of the screen.

Designing multicolored objects is just as easy. To change the color of a pixel, point to the magnified pixel on the sketchpad and click the left mouse button again. Each time you click the mouse button, the pixel changes color, cycling through the four colors available in the medium-resolution screen mode. Of course, you can modify these colors with the Control Panel before running SpriteMaker.

When you're done designing a sprite, click the *right* mouse button. An alert box pops open and asks you to confirm your choice by clicking on Quit (exit the sketchpad mode) or Continue (return to the sketchpad mode). If you select Continue, you can resume designing the same sprite.

If you choose Quit, another box appears and offers three options: Discard (erase the sketchpad without saving the shape); Store (save the shape on disk); and Data (save the shape on disk in the form of DATA statements which can be merged with an ST BASIC program).

Saving Shapes

Clicking on either Store or Data will bring up a prompt that asks you to specify a *storage number* for the sprite. The sprite's bitmap is stored in one of the three storage files mentioned above, all of which have filenames ending with the extender .SAV. The three storage files are for each of the three different sprite sizes: BIT.SAV for 1 × 1 bitmaps, 2BIT.SAV for 2 × 2 bitmaps, and 3BIT.SAV for 3 × 3 bitmaps.

The bitmaps you design are stored sequentially in the files, which is why you must specify a storage number when saving a sprite. In other words, if you specify a storage number of 1, that bitmap is saved as the first sprite in the file; if you specify a storage number of 2, the bitmap is saved as the second sprite in the file; and so on. As we'll see in a moment, this sequence becomes important when you're using SpriteMaker's shape-flipping animation feature.

The storage numbers are also important for reloading a previously saved sprite that you want to modify later. When you click on the Old map button mentioned above, SpriteMaker asks you for the storage number of the existing bitmap you want to edit.

It's up to you to record or remember which sprites are stored under which storage numbers. If you enter a number that is too large or too small, a warning appears. If you're saving a sprite and enter a number that coincides with an existing bitmap, the program warns you of this, too, and gives you the option of choosing another storage number or overwriting the existing bitmap.

Because the larger bitmaps require more storage area, not as many can be saved in the storage files. Up to 200 of the 1 × 1 sprites—but only 50 of the 2 × 2 sprites and 22 of the 3 × 3 sprites—can be saved. Therefore, SpriteMaker won't accept storage numbers larger than these limits.

If you choose the Data option when saving a sprite, the bitmap is stored on disk in the form of BASIC DATA statements. After SpriteMaker requests a filename, it asks you to specify the starting line number for the DATA statements. Pick any line number from 0 to 100000. The resulting file can be merged with an ST BASIC program, and the sprite can be displayed with a short routine that POKEs the bitmap into screen memory. We'll cover this in more detail below.

Designing Large Sprites

The procedure for designing 2 × 2 or 3 × 3 sprites is a little different, because only part of the bitmap can be displayed at one time on the magnified sketchpad.

To begin designing a larger sprite, click on the 2 × 2 or 3 × 3 button that appears after you select New map or Old map as described above. The sketchpad screen looks and works the same as it does when you're designing a 1 × 1 sprite, but there's a subtle difference—the sketchpad itself continues to show a magnified view of 16 × 8 pixels, even though the actual size of the bitmap is either 32 × 16 or 48 × 24 pixels. In other words, the sketchpad shows only a 1 × 1 portion of the 2 × 2 or 3 × 3 bitmap. To work with other portions of the bitmap, you have to specify which 1 × 1 portion you wish to view.

Since this concept is hard to explain, we've included an example on the magazine disk. The storage file 2BIT.SAV contains three 2 × 2 sprites shaped like an insect. To load one of these sprites, follow these steps:

1. Copy the files SPRITE.PRG and 2BIT.SAV from the magazine disk to a work disk. Although you can run the demo from the magazine disk, we recommend keeping the original as a backup.

2. Run SpriteMaker (SPRITE.PRG) and choose the Draw option.

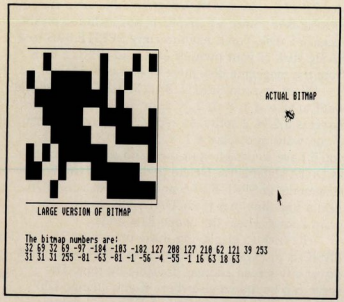
3. When SpriteMaker says, "Select bitmap to develop," click on the Old map button.

4. When SpriteMaker says, "Select size of bitmap," click on the 2 × 2 button.

5. The next prompt reads, "Type the bitmap number and strike Return." Enter the number 1 and press the Return key.

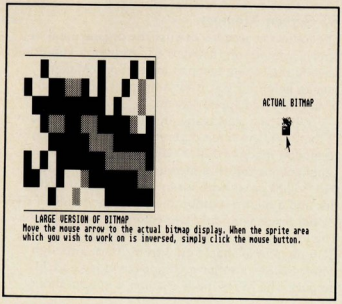
SpriteMaker should load the 2 × 2 sprite and display it onscreen. The actual-size bitmap is visible at the right side of the screen, and the 1 × 1 magnified portion is visible on the sketchpad. (See Figure 2.)

Figure 2



The magnified portion is the upper left part of the bitmap. If you want to work on a different part, click the *right* mouse button, and then click on the Change button which appears. (This button is available only when you're manipulating larger sprites.) After clicking on Change, you'll notice that the current portion of the actual-size bitmap displayed on the sketchpad is highlighted in inverse video. By moving the mouse pointer over the actual-size bitmap, you can select which 1 × 1 portion of the 2 × 2 sprite should be displayed on the sketchpad. (See Figure 3.) Click the left mouse button to make your choice.

Figure 3



Designing a 3 × 3 sprite is exactly the same; the sketchpad shows a magnified view of a 1 × 1 portion of the bitmap.

The 2 × 2 and 3 × 3 bitmaps can be saved on disk as BASIC DATA statements, too. The numbers in the DATA statements define horizontal rows of 1 × 1 blocks starting at the upper left corner of the bitmap. The BASIC program which POKEs the sprite into screen memory must be modified to handle the larger bitmaps, as described below.

Animating Sprites

SpriteMaker lets you experiment with sprite animation in two ways. You can move a sprite freely around the screen with the mouse, and automatically flip through a series of sprite shapes in sequence at various speeds. Both of these features help you visualize how your sprites will actually look when animated in your own programs.

To see how the animation features work, you can try the following demo:

1. If you haven't already done so, copy SPRITE.PRG and 2BIT.SAV from the magazine disk to a work disk. Again, you can run this demo from the magazine disk, but it's better to keep the originals as backups.

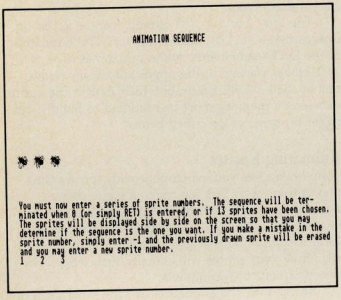
2. Run SpriteMaker (SPRITE.PRG) and click on the Animate button when it appears in the dialog box. (If you already have SpriteMaker up and running, you can move backward to this point by clicking on the various Quit buttons.)

3. SpriteMaker prompts you for the size of the bitmaps to animate. For this demo, click on the 2 × 2 button. You should notice disk activity as SpriteMaker loads the previously defined bitmaps in the 2BIT.SAV storage file.

4. After SpriteMaker loads the bitmaps into memory, it asks you to specify which shapes should be flipped in sequence. Up to 13 sprites can be flipped in a sequence, and they can be any 13 bitmaps that you've designed in that size. You can even use the same bitmap more than once in a sequence. For this demo, we'll use the three 2 × 2 insect shapes. They're numbered 1, 2, and 3. One at a time, enter each number and press Return. Each time you press Return, you should see the corresponding sprite appear on the screen. (See Figure 4.) If you mistakenly type a wrong number, simply enter −1 to remove the previous sprite from the screen. You can type −1 as many times as necessary to back up and correct your mistake.

5. After all three sprites are visible, enter 0 and press Return, or simply press Return without entering a number. This marks the end of the sequence. (If you enter the maximum number of 13 shapes, SpriteMaker automatically ends the sequence for you.)

Figure 4



6. Now you can choose how fast the sequence should be animated. At this prompt, enter a number from zero to ten. The higher the number, the faster the shapes will be flipped. For this demo, try a speed in the range of four to seven.

7. Next, a dialog box offers you the option of placing stationary sprites around the screen. You can skip this feature for the purposes of this demo. But if you want to try it out, enter the bitmap number of each sprite you want to display, press Return, and click the mouse at the desired position. When you're done, enter zero and press Return.

8. Finally, to begin the animation sequence, click on the OK button which appears. Notice how the insect seems to be flying as its wings flap, legs squirm, and antennae wiggle. To achieve this illusion, SpriteMaker is rapidly flipping through the sequence of the three bitmaps you specified, much like frames in a cartoon. You can also move the animated sprite around the screen with the mouse. If you placed stationary sprites on the screen with the option mentioned in step 7, notice how the animated sprite moves nondestructively over the stationary ones.

9. To stop the animation, click the left mouse button. A dialog box offers you the choice of continuing the animation or returning to the sequencing screen.

Sprites In BASIC

As mentioned above, SpriteMaker gives you the option of saving sprite shapes in the form of BASIC DATA statements. You can display these sprites on the screen with a relatively simple program, but ST BASIC simply isn't fast enough to animate them at any useful speed. It is an interesting effect, however.

We've included an ST BASIC program on the magazine disk which displays one of the insect shapes on the screen; the program's filename is SPRITE.BAS. Since ST BASIC is not included on the magazine disk, you'll have to copy SPRITE.BAS to a BASIC disk of your own, or else load SPRITE.BAS from the magazine disk after having run BASIC.

When you run SPRITE.BAS, it asks whether you want to view a 1 × 1, 2 × 2, or 3 × 3 sprite. The insect is a 2 × 2 sprite, so type 2 and press Return. If you want to display a 1 × 1 or a 3 × 3 sprite, you'll have to design your own and save the shape as DATA statements. Delete the existing DATA statements in SPRITE.BAS and merge in your own. Add a final line that reads DATA 999 so the program knows where the shape data ends.

The trick to displaying these objects in ST BASIC is to POKE the bitmap data into screen memory at any screen address divisible by four. The sprite can be drawn elsewhere if you change DEF SEG to any multiple of four. A DEF SEG value which is not a multiple of four will result in a scrambled version of the sprite. This is because the medium-resolution mode organizes screen memory in four-byte groups, and these groups begin at screen addresses which are multiples of four.

To POKE a 2 × 2 or 3 × 3 sprite into screen memory, SPRITE.BAS changes the DEF SEG value to correctly position each 1 × 1 block. For example, the DEF SEG value is increased by four to move one block to the right from the current position, and DEF SEG is increased by 1280 to move one block down from the current position.

Although ST BASIC is not fast enough to repeatedly POKE a sprite into screen memory to achieve animation, it is possible (but not easy) to write a machine language subroutine for this purpose. In effect, this would add sprite animation commands to ST BASIC. Perhaps this will be the subject of a future article.

ST Screen Memory

The following sections discuss the organization of screen memory on the Atari ST. Although you don't have to read these sections to use SpriteMaker, they're helpful if you want a deeper understanding of the ST's bitmapped screens.

When you start using an ST, you quickly discover that there are three different screen modes: a low-resolution mode of 320 × 200 pixels with up to 16 simultaneous colors; a medium-resolution mode of 640 × 200 pixels with up to four simultaneous colors; and a high-resolution monochrome mode of 640 × 400 pixels with only two colors—black and white. The low- and medium-res modes require an analog RGB monitor available only from Atari, although newer 520STs also have composite video and TV outputs. The hi-res mode requires a special mono-

chrome monitor available only from Atari.

The differences between these modes arise from the way screen memory is read by two of the ST's special chips, the *MMU* (memory management unit) and the *shifter*. You might be surprised to learn that all three modes consume exactly the same amount of memory—32,000 bytes. The starting address of this screen memory is stored in the four bytes beginning at location 1102. You can read this address in ST BASIC with these statements:

```
10 DEFDBL X
20 X=1102
30 DEF SEG=0
40 SCREENADDRESS=PEEK(X)
```

The result is always a multiple of 256.

What the computer displays after reading this area of memory depends on the screen mode. For instance, in medium- and low-res, each screen line is determined from 160 consecutive bytes of memory—the first line starting at the screen address determined above, and each line following in consecutive groups of 160 bytes until all 200 lines have been generated. Thus, 200 lines times 160 bytes per line gives the 32,000 bytes necessary for screen memory.

Bit Planes

In medium-res the 160 bytes are broken into 40 groups of 4 bytes, which, in turn, should be thought of as 2 groups of 2 bytes each. These make up the *bit planes* you may have heard about. In each group of 4 bytes, the first 2 bytes are called *video plane zero*, and the second 2 bytes are *video plane one*. Each of the 2 groups contains 16 bits of information, and they are then combined to form 16 pixels on the screen with one of the four basic colors. This is done by overlaying the two planes to obtain 2 bits at each pixel, thus giving a binary number from zero to three. Here's an example:

	Low Byte								High Byte								
Plane Zero	1	0	1	0	0	0	1	1	0	1	0	0	1	1	1	1	= 16 bits
Plane One	0	0	1	1	0	1	0	1	1	1	0	1	0	0	1	0	= 16 bits
Pixel Color	1	0	3	2	0	2	1	3	2	3	0	2	1	1	3	1	= 16 pixels

The 16 pixels derived from each group of four bytes are displayed sequentially along the screen line until the whole line is complete.

In low-res, the 160 bytes are broken into 40 consecutive groups of 4 bytes, with each individual byte forming a bit plane. The first byte is plane zero, with the following bytes numbered consecutively. The eight bits from each plane are overlaid to obtain a binary number from 0 to 15 in the following manner:

Plane Zero	1	0	1	0	0	0	1	1	= 8 bits
Plane One	0	0	1	0	1	0	0	0	= 8 bits
Plane Two	0	1	0	0	0	1	0	1	= 8 bits
Plane Three	1	1	0	1	1	0	0	1	= 8 bits
Pixel Color	9	12	3	8	10	4	1	13	= 8 pixels

Thus, medium-res has 16 × 40 = 640 pixels per line, while low-res has 8 × 40 = 320 pixels per line.

In hi-res, each line is obtained from 80 bytes, with only one bit plane. Thus, each bit corresponds to either zero or one, either lighting the pixel or not, leaving each line with 8 × 80, or 640, pixels per line.

Graphics images (which include text, since the ST has no true text modes) are displayed by copying numbers into screen memory to set the appropriate bits. These numbers make up the bitmap. Since medium res has a higher density of pixels horizontally than it does vertically, a screen area which appears square actually has twice as many pixels horizontally than vertically. That's why a 1 × 1 sprite created with SpriteMaker is 16 pixels wide and 8 pixels high, but nevertheless looks square to the eye. **ST**

File Finder

Richard Smereka

Use this utility when you need to discover the whereabouts of a file on a crowded disk. Simply tell "File Finder" the name of the file you're looking for, and, like a bloodhound, it sniffs out every occurrence in every folder on a given disk. It's a must if you own a hard disk drive. The program works on all STs in any screen resolution, color or monochrome.

What do you do when you've forgotten where a certain file is stored? If you have 20 disks, each containing an average of 10 folders, you have 200 folders you might have to look through. If you're lucky, you may find the misplaced program after a few tries. If not, well, you'll have to open a lot of folders.

"File Finder" quickly locates a particular file on a crowded disk. It's very handy for those times when you know the name of the file but have forgotten which folder it resides in. File Finder searches the entire disk, whether it's single-sided, double-sided, a RAM disk, or a hard disk. It reports all occurrences of the specified filename on the disk. At your option, File Finder can also search for just the first occurrence of the file on the disk.

Another use for File Finder is to root out redundant files on a disk. Search for every occurrence of a given filename; if it shows up more than once, you may have identical copies of the same file which can be deleted to conserve space. This is especially useful on hard disk systems, where multiple copies of files tend to propagate.

File Finder can be run directly from the GEM desktop as a TTP (TOS Takes Parameters) program, or from the command line of "ST-Shell," the disk operating system shell published in the December 1986 issue of COMPUTE'S Atari ST Disk & Magazine.

Starting A Search

File Finder is called FIND.TTP on this issue's disk. For programmers who are interested in studying how the program works, the *Megamax C* source code is also included under the filename FIND.C.

Important: If you plan to use File Finder from ST-Shell, rename the FIND.TTP file to FIND.PRG. Don't rename the file if you plan to use it from the GEM desktop.

To run File Finder from the GEM desktop, open or double-click on FIND.TTP. A dialog box pops up with a dotted line. At this point you should type the name of the file you're looking for, in this format, on the dotted line:

[options] [x:]filename

The command line syntax in ST-Shell is similar:

FIND ***[options] [x:]filename***

The square brackets indicate optional arguments; do not type the brackets. There are two options, $-f$ and $-t$, discussed below. The *x:* represents the optional disk drive identifier (from A: to P:), and *filename* is the name of the file you're searching for.

Each parameter on the command line must be separated by at least one space. It is illegal in this utility to supply a pathname, since the purpose of the program is to search all folders on the disk.

File Finder searches only one disk drive at a time. It has been my experience that I usually have a good idea which disk the file is on, but have forgotten which folder it occupies.

The complete filename must be given without any wildcard symbols (such as question marks or asterisks). This restriction stems from a problem within the GEMDOS function *Pexec( )*. When a new process is created and wildcard symbols are part of the command tail, *Pexec( )* tries to expand the command tail. This usually results in the new process not executing properly.

If the optional disk drive identifier is present in the command line, the disk in that drive is searched. If you don't include a drive identifier, the search operates on the current disk drive—the one from which you loaded File Finder.

The program prints a reminder of the proper syntax if you make a typing mistake or do not enter a filename. You can then try again.

Optional Parameters

You may include two options on the command line:

−*f* Search for the first occurrence of the file (default = off)
−*t* TTP program pause after execution (default = off)

When you include the −*f* option, File Finder searches for the first occurrence of the file. Once it finds the file, the program ends. Note that if you're searching a disk with a lot of nested folders, you can decrease the processing time by giving the −*f* option.

Whether you use this option or not depends on whether you want all occurrences of a file, or just the first. If you're sure that there isn't another file on the disk with the same name, you can use the −*f* option. On the other hand, if you want to check to see how many occurrences of a particular file there are on the disk, omit the −*f* option.

The option −*t* is used when executing File Finder as a TTP application from the GEM desktop. When you include −*t* on the command line, the program pauses and asks you to press a key before exiting back to the desktop. This allows you to examine the program's output, including any error messages that are generated. This option usually isn't needed when executing File Finder from ST-Shell, because the ST-Shell command prompt reappears immediately after the program's output—there is no return to the desktop.

Note that these two options are like switches that assume an off position by default. By putting them on the command line, you reverse their position. (You turn them on.)

The options may appear on the command line in any order, and you may include one or the other, or both. Remember, though, that all parameters on the command line must be separated by at least one space.

A Few Examples

Following are some examples of how to use File Finder.

TTP example: **−t TEST.C**
ST-Shell example: **FIND TEST.C**

File Finder searches for the file TEST.C on the current drive (because no drive identifier is present). File Finder lists all occurrences of TEST.C. The −*t* parameter in the TTP example makes sure the output will be visible when the program finishes.

TTP example: **−t −f D:CMP.PRG**
ST-Shell example: **FIND −f D:CMP.PRG**

File Finder searches drive D for the file CMP.PRG. Because the −*f* option is included, File Finder lists only the first occurrence of CMP.PRG on drive D.

File Finder's output is fairly straightforward, but let's examine a sample. First, here's the command line:

TTP example: **−t AUTOLOG.BAT**
ST-Shell example: **FIND AUTOLOG.BAT**

This searches for all occurrences of the file AUTOLOG.BAT on the current drive. Here is how the output from that search might appear:

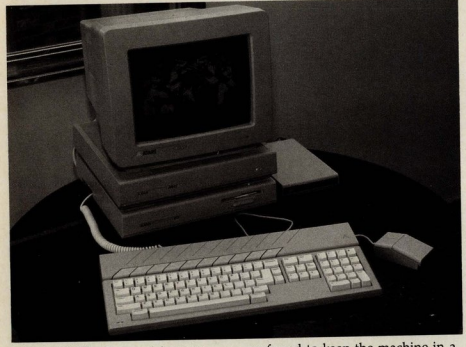
```
FILE FINDER Version 1.0
Stand by....Searching for AUTOLOG.BAT
Found AUTOLOG.BAT
Path: Root
Path: \STSHELL.SYS
Path: \STSHELL.SYS \BACKUPS \BATFILES \AUTOBATS
```

In this example, File Finder discovered three occurrences of the file AUTOLOG.BAT on the disk (one for each Path: statement). The first copy of AUTOLOG.BAT is on the root level (the main directory), the second is inside the folder STSHELL.SYS, and the third is nested four levels below the root directory inside the folder AUTOBATS.

As you can see, File Finder is a valuable utility if you tend to organize your most crowded disks with lots of nested folders.

ST

Atari Ponders A More Businesslike ST



LAS VEGAS—Some visitors to the COMDEX/Fall computer trade show in November were disappointed that Atari didn't exhibit any new computers. Except for a blitter-equipped 1040ST and a prototype of the SX212 modem, the show floor was devoid of any new Atari hardware. Long-awaited U.S. debuts of the two-megabyte 2080ST, four-megabyte 4160ST, and low-cost laser printer were postponed until early or mid-1987. Instead, the big news of the show was the continuing explosion of Atari ST software from independent developers. As usual, the Atari exhibit was packed with developers who subleased small booths to demonstrate their products to eager crowds.

But there *was* a new Atari computer at Las Vegas—it just wasn't exhibited at the show. Atari preferred to keep the machine in a private hotel room at Caesar's Palace, where it could be viewed by invited dealers and journalists.

COMPUTE!'s Atari ST Disk & Magazine got a peek at the computer and even took a few pictures. The new machine is interesting, but more evolutionary than revolutionary.

As the photo shows, it's basically a reconfigured 1040ST. It still has one megabyte of random access memory (RAM) and a double-sided 3½-inch disk drive. The main difference is the detached keyboard and separate system unit.

The flat box at the bottom of the stack contains all of the main circuitry: the motherboard, memory, disk drive, and interface ports. The chief innovation is some provision for internal expansion. The system bus is extended to a row of pins which can accept a plug-in module or connector. An expansion board could be mounted inside the box, or a ribbon cable could lead to an external expansion box. There's also a battery backup realtime clock, and an internal socket for the blitter chip, which will be included if it's ready in time for the computer's release.

The detached keyboard plugs into the system unit via a coiled phone cord, and the mouse controller plugs into the keyboard. The keyboard shown in the photo is from a 1040ST, but Atari says the computer will actually come with an improved keyboard when released. The key layout will change little if at all, but the keys will have a more solid, businesslike feel.

And that's the whole point of this new configuration, according to Atari: a more businesslike ST that will be more desirable to corporate buyers. One of Atari's goals for 1987 is to carve inroads into the tough Fortune 1000 market, and former software chief Sigmund Hartmann has been reassigned to guide the effort.

To further create a more professional appearance, Atari has come up with a redesigned 20-megabyte hard disk drive to match the new ST's system unit. The drive is visible in the photo, sandwiched between the system unit and the monitor. As before, the hard disk is an optional addition to the system.

Another improvement is that the computer can now be booted directly from the hard disk. Current STs must be booted from a floppy disk in drive A, although desk accessories can be loaded from the hard disk's drive C.

Aside from these minor changes, the new computer works exactly the same as a standard 1040ST. Of course, further

Arlan R. Levitan & The Editors

changes are possible before the machine is actually released on the market.

Atari officials at the trade show weren't sure how much the machine will cost, when it will be available, or even what it will be called. One spokesman speculated that it will debut in February or March for a couple of hundred dollars more than a 1040ST (currently $999 with a monochrome monitor and $1,199 with a color monitor). Some people have been referring to this computer as the STI, for "ST Integrated"—although it's actually less integrated than a regular 1040ST, since the keyboard is now a separate unit. It's unlikely to replace the 1040ST, becoming instead a third model in the ST line.

Atari Stays Profitable

Basking in the glow of its initial public stock offering last November, Atari finished the third quarter of 1986 solidly in the black. A $9.1 million profit—up substantially from a loss of $2.5 million for the same period in 1985—has industry financial analysts nodding in approval. Sales for the quarter were $59.9 million, up 107 percent from 1985's $29 million figure. It was Atari's third consecutive profitable quarter.

Atari reported a net profit of $21.5 million for the first nine months of 1986, compared with a loss of $29.2 million for the same period in 1985. Sales for the first three quarters of 1986 rose 116 percent to $165.4 million, up from $76.6 million in 1985. Since going public, Atari's stock has not dropped below the initial asking price, and has fluctuated as high as $15 a share.

"Consumer acceptance and retail takeaway continue to be extremely strong," says Atari President Sam Tramiel. "Demand for the Atari videogame and the 16/32-bit ST computers exceeded our expectations. Atari Corporation is now aggressively pursuing its leadership role in the personal computer industry from a position of strength—that is, we are virtually debt-free and have a solid equity base on which to build the company's future."

Online Inflation

The Federal Communications Commission (FCC) is considering reregulating packet-switching networks. Among the changes being considered is the elimination of free local telephone access to those networks. This could increase the costs of accessing information services and bulletin boards for hobbyists and business people.

Under the new rules, packet switchers would have to pay access fees to local telephone companies. A similar arrangement currently in place requires long distance networks such as AT&T, MCI, and Sprint to pay access charges for connection to local phone networks.

"If this occurs, it might eventually double or triple the costs to those using packet-switching networks to access commercial online databases and information services, and triple or quadruple the costs to those using Telenet's PC Pursuit," says Philip M. Walker, vice president and regulatory counsel for Telenet Communications Corporation.

"In terms of cost impact," Walker says, "if we had to pay local access charges, it would cost us about $3.60 an hour at the originating end for calls made by users to online databases and information services like CompuServe and The Source."

Therefore, if the packet switchers pass the costs along to consumers—a logical expectation—phone bills for telecomputerists would increase at least $3.60 an hour.

According to Walker, FCC approval of changes being considered under the reregulation initiative (called Computer III by the FCC) "would really have a major impact on anyone using a packet-switching service to access online bulletin boards, databases, or information services aimed at the residential user."

Software Emulation: Power Without The Speed

Atari's release in late 1986 of a software-based CP/M emulator underscored a long-held theorem about emulators: *Any computer can emulate any other computer as long as speed is not a consideration.*

The CP/M emulator is a typical example. Although it lets an ST run almost any program written for the Z80-based CP/M operating system, the speed is comparable to that of a two-megahertz Z80. Most eight-bit Z80s run at speeds of four megahertz or better.

Commodore Amiga users learned about this, too, when the *IBM Transformer* was released for their computer last year. Although the software-based *Transformer* makes it possible to run some MS-DOS programs on the Amiga, one Amiga expert quips that the programs do more walking than running.

Now some companies are bringing out software-based MS-DOS emulators for the Atari ST. One product that is sparking interest among ST users is the *Soft Coprocessor* announced at COMDEX/Fall last November by Phoenix Technologies (Norwood, Massachusetts). Since Phoenix is the leading manufacturer of BIOS ROMs in IBM PC-compatible clones, people have high hopes for the *Soft Coprocessor*, which is a software-based MS-DOS emulator for 68000 systems.

Much of the excitement over the *Soft Coprocessor* is premature, however. First, even Phoenix admits that it can't emulate an IBM PC at full speed on a 68000. And second, Phoenix currently has no plans to market the *Soft Coprocessor* itself. Instead, it is offering the emulator to other companies who will handle all of the marketing. Whether any companies will sign deals to bring the *Soft Coprocessor* to the ST world is still unknown.

"To us, anything slower than a PC or XT is not suitable for the market," says Steven Parker, a spokesman for Phoenix. Parker explains that the 16/32-bit 68000—though a very powerful chip—just doesn't have quite enough horsepower to emulate an 8088/8086 at full speed entirely in software. So Phoenix is aiming the *Soft Coprocessor* at machines with the 68020 chip, an upward-compatible 32-bit cousin of the 68000. The 68020, Parker says, *can* emulate an MS-DOS computer at full speed. "Basically, the advances in processors have gotten to the point where we can overcome the overhead of the emulation. It's just the raw power of the 32-bit processors."

At present, the 68020 is found mainly in advanced workstations such as those sold by Sun Microsystems, Apollo, and Hewlett-Packard. Apple is expected to introduce a 68020-based Macintosh or workstation in early 1987, and both Atari and Commodore are rumored to be working on 68020-based computers for release later this year.

Until then, a full-speed MS-DOS emulator for the ST will most likely require some hardware, including an outboard 8088 or 8086 chip. At this writing (late December), Atari still hasn't announced a firm release date for the hardware-based MS-DOS emulator it exhibited in prototype form at computer shows in mid-1986.

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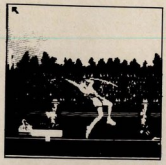

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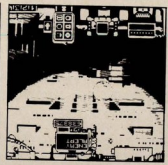

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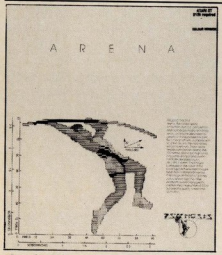

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The Ear

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

Upping The Ante

Strengthened by its first consecutive profitable quarters in more than a year, Commodore is readying a new, more powerful Amiga for release in late February. It will definitely present a challenge to Atari in the ongoing Amiga-versus-ST competition. Known as the Amiga 2000, the computer will include one megabyte of RAM, expandable to nine megabytes; seven internal expansion slots; an enlarged, 94-key detached keyboard; a built-in 3½-inch disk drive with internal provision for additional 3½- and 5¼-inch floppy drives and hard drives; 256K of ROM for the operating system, which up to now has been disk-based; a battery backup realtime clock; and a 200-watt power supply which is beefy enough to handle a full load of expansion boards.

The internal slots are perhaps the Amiga 2000's most fascinating feature. Commodore is planning a whole slew of add-on boards, including a 14-megahertz 68020 accelerator; an IBM PC emulator; and an IBM AT emulator. Two of the slots accept PC-compatible expansion boards (including hard disk cards), and two slots accept AT boards. Watch for the Amiga 2000 to be priced at $1,295 to $1,495, and for the current Amiga 1000 to drop below $1,000.

Videogames: Still Alive And Beeping

Surprised by the continued strength of VCS 2600 sales, Atari is said to be closely watching the fate of the heavily promoted Sega and Nintendo home entertainment systems in the U.S. market. Featuring high-quality, arcade-style graphics, the two Japanese videogame machines are smash hits back in Nippon. If the units fare well here, an Atari super home game machine (*not* the 7800) may be launched in early 1988. The new machine that Atari has waiting in the wings is supposedly a leftover from the old Atari.

Parts Is Parts

Beset by complaints from dealers who have been unable to obtain spare parts to repair broken STs, Atari has reportedly dropped its insistence on dealers executing repair at the component level and is now providing complete board swaps to authorized repair centers at a reasonable cost. Dealer cost for 520ST and 1040ST logic board swaps is pegged at about $50 and $80, respectively. The new policy is intended to clear a backlog of ailing STs, some of which it is said have been gathering dust awaiting repair parts for months.

Hard Drives Get The Boot

Tired of booting your hard drive from a floppy? Relief is on the way. A device which allows system startup (including the execution of programs in AUTO folders) directly from a hard disk is in use internally at Atari, and may be released by the end of the second quarter if some minor packaging/implementation bugs can be worked out.

Unable To Cable, Part 3

In our October and December 1986 issues, we related the woeful results of attempts to mate ST computers with the Sony KV1311-CR color monitor. Even Sony engineers threw their hands up. Well, two Atari users have succeeded in building an interface that adapts the ST's nonstandard video signal to the Sony. Assembling the interface, however, calls for a reasonable degree of expertise in handling electronic components—modifications inside the monitor are required, and the high voltages that dwell there should be enough to discourage anyone but a pro. Still, if you're interested, you can get more information by contacting interface designers Henry Katzmarak and Dave Young via CompuServe's electronic mail. Address inquiries to user ID number 70735,664.

Whisper To The Ear

Got something you want to get off your chest? ***The Ear wants to hear.*** *Mail missives to The Ear, c/o* COMPUTE!'s Atari ST Disk & Magazine, *P.O. Box 5406, Greensboro, NC 27403. Or send electronic mail to CompuServe ID 70675,463, Delphi ARLANL, or The Source TCT987. All sources treated confidentially.*

ST

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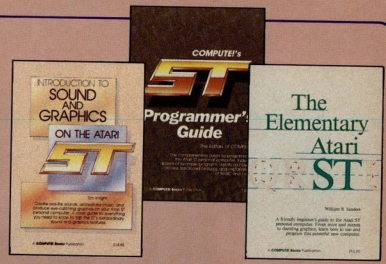

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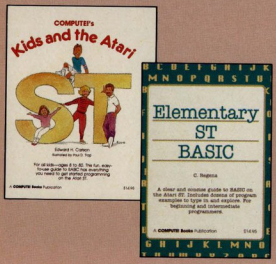

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RITA 9/88

Waterhole

Rita Plukss

Each issue, COMPUTE!'s Atari ST Disk & Magazine features a screen of computer artwork contributed by an ST artist. The screen is on the magazine disk in NEOchrome *format under the filename ART.NEO. It can be loaded into any graphics-design program compatible with* NEOchrome *files. If you want 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. Please include a paragraph or two of text describing the artwork and any special techniques employed. We pay $100 plus disk royalties for each screen accepted for publication. Artwork accepted for publication becomes the property of COMPUTE! Publications, Inc.*

Notes On The Artist

Rita Plukks lives in Eltham, Victoria, in southeastern Australia, and is president of the Melbourne Atari Computer Enthusiasts. "Waterhole" was created after a recent trip into central Australia.

"I don't draw; I paint," says Plukks. "I used to paint landscapes in oils. Now I try to combine the medium of the computer with painting-style art. I use this painting technique as one would use a paintbrush. I've been experimenting with different types of styles, from watercolors to oils. I have about 60 or 70 screens in similar styles. I think it's very expressive, but a computer can be rather intimidating to paint with. Sometimes I work with *DEGAS*, sometimes with *NEOchrome*. For 'Waterhole' I used *NEOchrome*. I'm never sure how the coloring will appear [to other people with color monitors] because I use a color TV with my computer, not a color monitor."

ST

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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 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.

DISKMENU.PRG displays a directory of files on the disk, one screen at a time. 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 is 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 explanation; 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, according to the volume of sales, we ask that you respect the copyright.

Special Note

The "SpriteMaker" program on this issue's disk was to be accompanied by a sample data file containing some sprite shapes of an insect. Although the data file 2BIT.SAV is on the disk, it contains no shapes. Because of this, you won't be able to try the flying-insect demo explained in the article. (You might say that we made a mistake by accidentally *leaving out* a bug.) The SpriteMaker program is not affected, however, and works as described. If there is room on next issue's disk, we will include the correct SpriteMaker demo file.

Before running SpriteMaker for the first time, we recommend copying it to another disk as suggested in the article. The data files it creates are each about 8K long, and this issue's disk has no room for additional data files.

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