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DISK INSIDE

COMPUTE!'s Atari ST DISK & MAGAZINE

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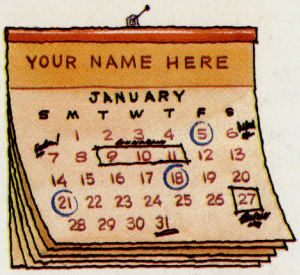
Blue Eyes and Shades
This issue's "Atari Art" feature includes two beautiful portraits by the same artist—drawn without the assistance of a video digitizer.



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Art-ST™
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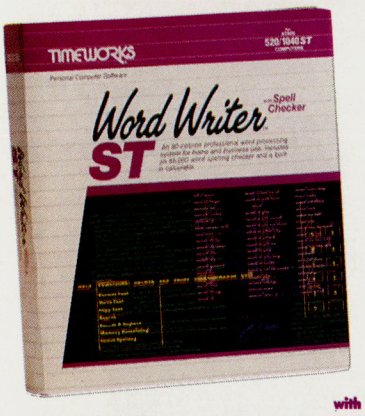

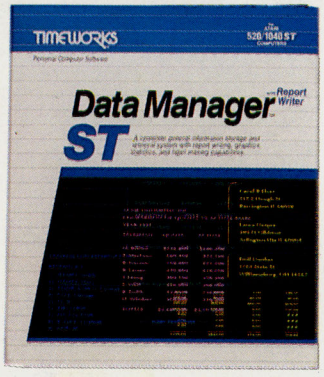

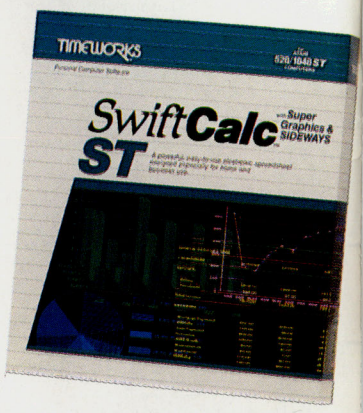

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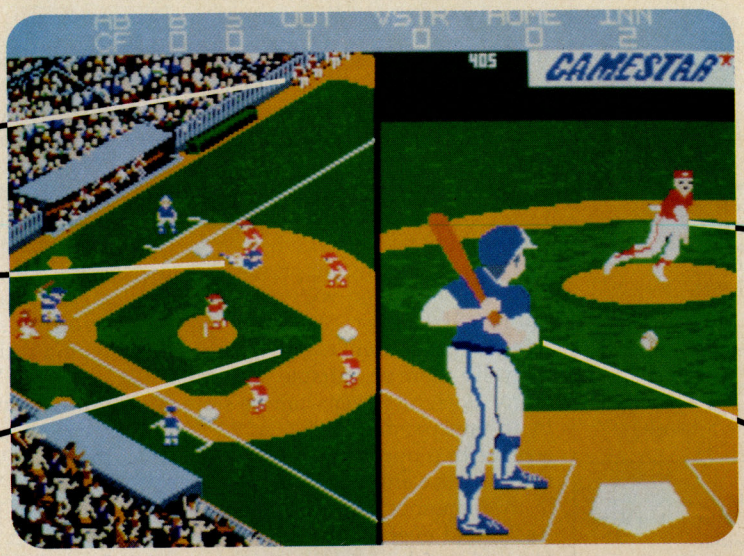

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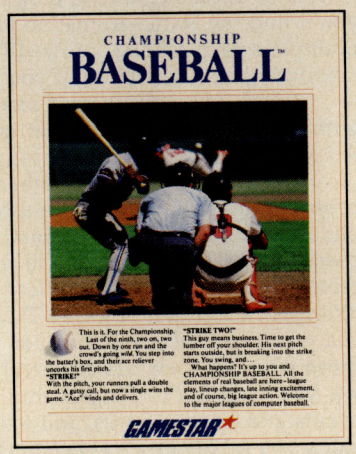

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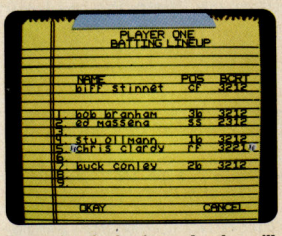
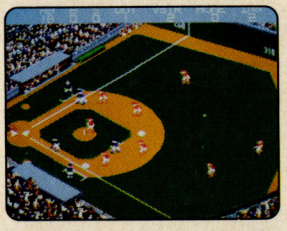


Determine the batting order that will have the best chance against your opponent.



Batting window disappears when the ball's in play, so you can see continuous action.

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The Editor's View

In this issue, we're proud to present the Second Prize winner of our $10,000 ST Programming Contest, Robert M. Birmingham's *Art-ST*™. An excellent full-featured drawing program, *Art-ST* offers something you won't find in similar packages—true frame animation.

Other drawing programs let you simulate animation with color cycling, but *Art-ST* lets you create multiple screens for an animated sequence and then flip them at variable speeds. As many as eight screens can be stored in an unexpanded 520ST, or 24 screens in a one-megabyte ST. You can start the animation at any frame in the sequence, play a sequence endlessly, and even bounce the sequence forward and backward.

Since Atari's *NEOchrome* is no longer included free with the purchase of an ST computer, *Art-ST* is a valuable addition to your software library if you're a new user. And even if you already own a copy of *NEOchrome* or another drawing program, you'll find the frame-animation and multiple-screen features of *Art-ST* a fascinating new capability. If you prefer, you can even create your screens with *DEGAS* and animate them with *Art-ST*.

This issue also includes other contest entries that didn't win a prize, but were good enough to be purchased for publication, and will receive our standard disk royalties. "Personal Calendar," by Guy Davis, is a very practical application for those who use their STs frequently. It lets you keep track of important events and appointments, and even alerts you in advance to upcoming events. If you've ever suffered the embarrassment of forgetting a vital anniversary, birthday, or holiday, you'll welcome Personal Calendar.

"Nodemaster Chess," by Jim Todd, lets you play against your ST. Written in fast, efficient machine language, Nodemaster Chess is a challenging diversion for beginning and intermediate chess players.

Jeff Stillson's "Character Combat" is a game of a different stripe. Here, the object is to zap letters of the alphabet as they zoom across the screen. It's both an action game and a typing drill.

"File Viewer" is another useful utility from Richard Smereka, the most frequently published outside author in *COMPUTE!'s Atari ST Disk & Magazine*. File Viewer is actually two programs in one—a file-viewing utility and an interactive disk editor. Smereka's previous contributions include "ST-Shell," "File Lister," "Extended Formatter," "File Finder," and "XREF Debugger."

And the best is yet to come. In an upcoming issue, we will publish Smereka's latest effort—a revision of ST-Shell so extensive that we thought it deserved a more apt title. "Super-DOS" is a powerful command-driven disk operating system for your ST that incorporates both UNIX commands and many MS-DOS commands. Among the dozens of useful features are input/output redirection, enhanced batch-file processing, and a variety of built-in utilities.

Acts like this are hard to follow, but if you're a programmer, don't be discouraged. All submissions are welcome, and we're always looking for clever, useful applications. If a submission doesn't quite meet our needs, but shows promise, often we'll return it with a detailed list of suggested modifications. Many of the programs which have appeared in these pages are the result of this process. Don't be afraid to try!

—Tom R. Halfhill, Editor

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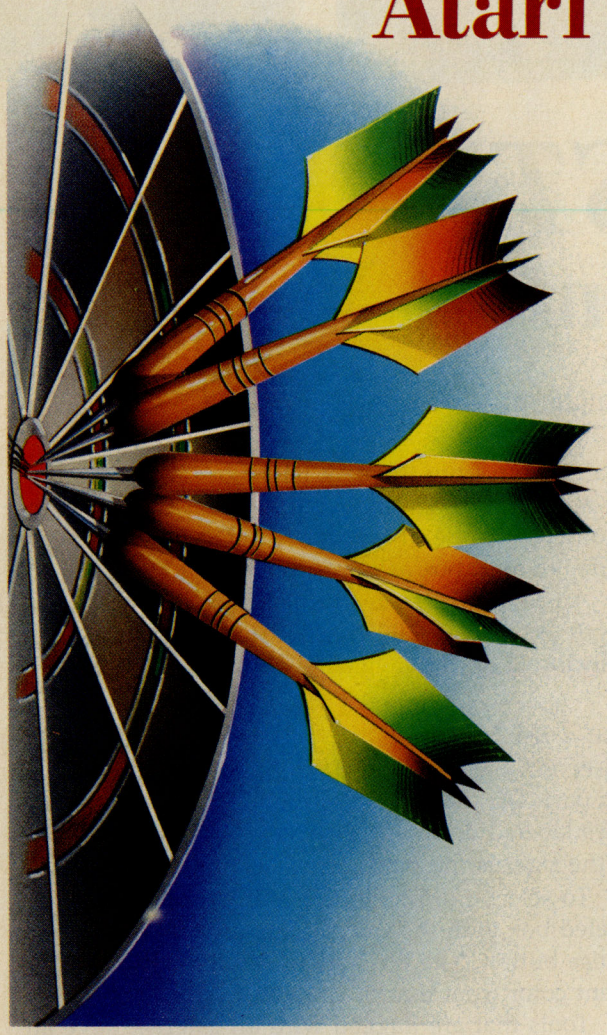

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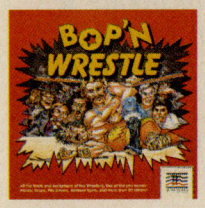

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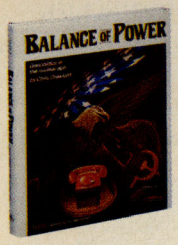

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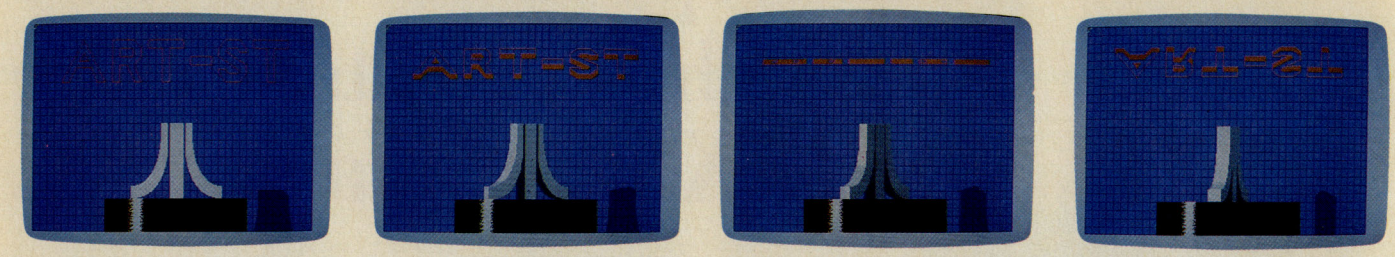


Art-ST™
Second Prize Contest Winner

Robert M. Birmingham

Here's a drawing program with a difference: built-in frame animation. You can create a series of screens and flip them in sequence at any rate from slow motion to high-speed action. The Second Prize winner in our $10,000.00 Atari ST programming contest, Art-ST™ *runs on any ST in the low-resolution color mode.*

Art-ST™ is a general-purpose drawing program that offers all the tools you need to draw elaborate pictures as well as more advanced features that let you create animated slide shows. Since Atari STs sold after late 1986 no longer come with *NEOchrome*, it nicely fills the gap for those who haven't yet purchased a commercial drawing program or aren't quite sure whether they need one.

Although *Art-ST* is a full-fledged drawing program with a wide selection of drawing tools, its most exciting feature is true frame animation. This is much more powerful than the color-cycling animation found in most other drawing programs. Color cycling merely simulates animation by rotating a series of colors; *Art-ST* lets you create cartoonlike action sequences by flipping through a series of screens. The screens can be flipped very slowly or at blinding speed. Animation sequences can consist of as many as eight screens on an unexpanded 520ST or 24 screens on a one-megabyte ST. You can start the animation at any frame in the sequence, play a sequence endlessly, and even bounce the sequence forward and backward.

Because *Art-ST* is compatible with *DEGAS*- and *DEGAS Elite*–format files, you can incorporate existing pictures in your sequences, too.

You'll find the program file for *Art-ST* on this issue's magazine disk under the filename ARTST.PRG. It can be run from the disk menu or GEM desktop like any other program, but only from the low-resolution color mode. If you try running it from another mode, an alert box asks you to change modes.

Art-ST is written in compiled C. Due to its length (more than 200K), the source code could not be included on the magazine disk.

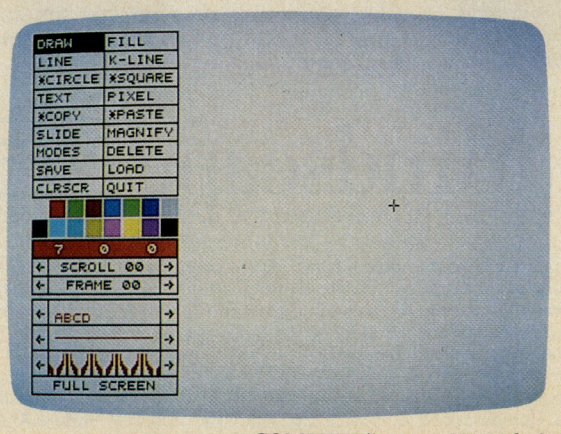
The Tool Menu

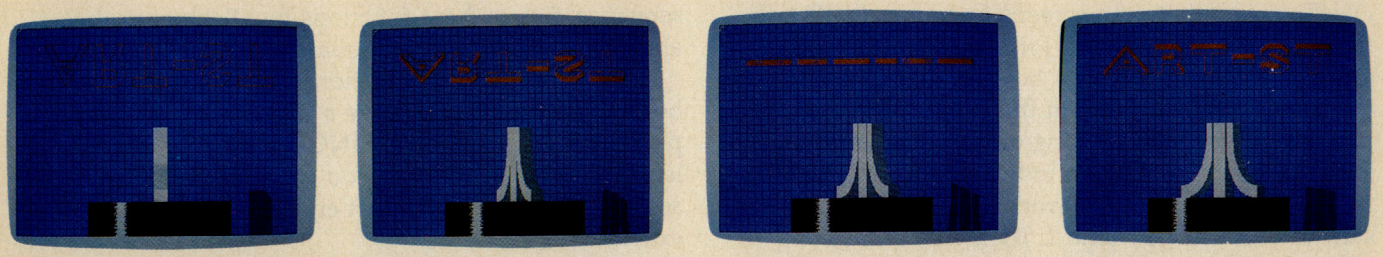
As seen in Figure 1, *Art-ST* divides the screen into two parts. At the left is the menu area, which displays labeled boxes for the drawing tools available. To the right is the work area.

To select a drawing tool, simply point to its labeled box with the mouse cursor and click the left mouse button. The box you select appears in a different color from that of the other boxes.

Tools that are flagged with an asterisk have an alternate function which is usually a slight variation of the tool. For instance, *CIRCLE (which draws a hollow circle) can be switched to *DISC (which draws a filled circle). Similarly, *SQUARE (a hollow

Figure 1: The main screen of *Art-ST* shows the menu area to the left and part of the drawing area to the right.





As seen in this series of eight screens, Art-ST *lets you create sequences for rapid frame animation.*

square) can be switched to *BOX (a filled square). You can switch to the alternate function of a tool by selecting it and then clicking on it a second time. By repeating this action, you can toggle back and forth between the two functions.

When the tools menu is displayed, the work area does not consist of the entire screen. But that doesn't mean you can't draw full-screen pictures. There are two ways to draw on the hidden part of the screen. The first is to click on the SCROLL box arrows to slide the work area horizontally in small increments. By pointing the mouse cursor at a SCROLL arrow and holding down the left mouse button, you can continuously slide the work area in the desired direction.

The second way to work on full-screen pictures is to click on the box labeled FULL SCREEN. This removes the menu area entirely. To bring it back, click the *right* mouse button.

In addition to selecting tools from the menu area, you can also choose a color, fill pattern, line style, and line thickness. To select a different color, click on the color boxes near the bottom of the menu area. *Art-ST* shows the currently selected color in the rectangle above the color boxes along with the RGB (Red, Green, Blue) numbers. To alter the RGB components of the color, click on the number you want to change. The left mouse button increases the RGB values and the right button decreases them. By manipulating these values, you can access all 512 possible colors supported by the ST.

To select fill patterns and line styles, click on the scroll arrows next to the boxes where they are displayed. You can flip forward or backward through 38 different fill patterns and six different line styles. To select line thicknesses, click *inside* the box which displays the line styles. There are seven different line thicknesses to choose from, but only the thickness of the solid line style (not of the broken lines) can be changed.

The Drawing Tools

Let's examine in detail what each of the drawing tools does.

DRAW. With this tool you can draw freehand in the work area by pressing the left mouse button and moving the mouse. DRAW uses the currently selected color, line style, and line thickness. If you hold down the Alternate key while drawing, the paintbrush becomes whatever is in the Clipboard area. (The *Clipboard,* which we'll get to in a moment, is a buffer area used to hold sections of the screen captured with the *COPY and MAGNIFY tools for the *PASTE tool.)

FILL. To fill an enclosed shape with a solid color or pattern, select this tool, point to the area you want to fill, and click the left mouse button. The FILL tool uses the current color, fill pattern, and write mode (see MODES below).

***CIRCLE.** After selecting this tool, point to a spot in the work area that will be the center of the circle and click the left mouse button. A flickering "rubber-band" circle appears on the screen. Control the circle's radius by moving the mouse cursor toward or away from the center point. When you get a circle you like, click the left mouse button again to stamp it down. If you change your mind and don't want to draw a circle, click the right mouse button. *CIRCLE also has an alternate function called *DISC; this lets you draw a circle or ellipsoid filled with the current color or fill pattern in a single step.

***SQUARE.** Click the left mouse button inside the work area to specify the upper left corner of the square. When the rubber-band square appears, move the mouse until the square is the desired size and shape; then click the left mouse button again to stamp it down. The square is drawn using the current color, line style, and line thickness. While the rubber-band square is on the screen, you can abort this function by clicking the right mouse button. *SQUARE also has an alternate function called *BOX; this lets you draw a square filled with the current color and fill pattern in a single step. However, *BOX does not use the current line style and thickness.

LINE. Specify the starting point of the line by clicking the left mouse button. As you move the mouse, a rubber-band line follows the mouse cursor inside the work area. Click the left mouse button again to stamp down the line. LINE uses the current color, line style, line thickness, and write mode (see MODES, below). To abort the LINE function while

Art-ST, you won't need them, anyway.

To switch between screens or frames (we'll use these terms synonymously) in *Art-ST*, click on the arrows next to the FRAME box in the lower half of the menu area. Clicking on the left arrow shows the previous frame, and clicking on the right arrow shows the next frame. An indicator shows which frame is displayed in the work area. Frame numbers start at 00, so 00 is frame 1, 01 is frame 2, 02 is frame 3, and so on.

To create an animated sequence, draw a series of pictures using consecutive frames. Make each picture slightly different from the one before it. The *COPY, *PASTE, and *PASTE+ tools are particularly valuable for this job. You can copy an image from one frame into the Clipboard, switch to the next frame, and paste the image back down again. This saves you the trouble of repeating a lot of tedious work.

Starting The Show

Once you've created a series of frames, *Art-ST* can flip them at variable speeds via the SLIDE function. When you click on SLIDE, an alert box appears. It asks you to specify the beginning frame in the sequence (it doesn't have to be frame 00), and the ending frame in the sequence. Click the left mouse button on the frame number to increase it, or the right mouse button on the frame number to decrease it. You can also choose whether the sequence should endlessly loop around and repeat itself (WRAP ON LIMIT), or reverse direction when the last frame has been reached (REVERSE ON LIMIT). The latter choice bounces the sequence forward and backward.

When you click the START button, the animated slide show begins. By default, the speed is rather slow. To change speeds, click the mouse anywhere on the screen during the animation. When you click toward the left side of the screen, the animation speeds up; when you click toward the right side of the screen, the animation slows down. *Art-ST* is capable of flipping the screens so rapidly that they appear to merge together.

To stop the animation, click the right mouse button. If you selected the SLIDE function by mistake, you can prevent the animation from starting by clicking the QUIT button in the SLIDE alert box.

Even if you never create animated sequences, the multiple-screen capability of *Art-ST* is a valuable feature. You can keep various copies of a work in progress, store frequently used shapes for templates, and use extra screens for experimenting with radical changes. Although other drawing programs have alternate screens, few—if any—offer as many as *Art-ST.*

Disk Functions

Rounding out *Art-ST*'s features are some disk functions for saving, loading, and deleting individual screens or an entire series of frames for an animated sequence. Select these functions by clicking on the appropriate boxes in the menu area.

SAVE. When this function is selected, an alert box asks if you want to save a single screen or multiple frames. If you choose SINGLE, a standard file selector window appears so you can enter a filename as usual. The filename must end with the .PI1 extender.

Important: Art-ST *saves the frame which is currently displayed on the work screen.* In other words, if frame 03 is displayed when you select SAVE, that's the screen which will be saved—not frame 00 or any other frame. To save other individual frames, you must switch to that screen before clicking on SAVE.

Saving an entire sequence of frames one by one would be tiresome, so *Art-ST* offers another option when you select the SAVE function. When you click on MULTIPLE, you'll be asked to specify a *range of frames* to save. To specify the starting and ending frames in the range, point to a frame number and press the left mouse button to increment it or the right mouse button to decrement it. Once you've defined the range, click on the SAVE button. Again, a standard file selector window will appear. Enter a filename that ends with the .MLT extender. Then click the OK button.

Make sure you have plenty of room on the disk, because each screen consumes about 32K. A single-sided disk can hold a multiple-frame sequence of only ten screens.

LOAD. With this function you can load individual screens or multiple-frame sequences from disk. After you've selected LOAD, you're asked if you want to load a single screen or a sequence; click on SINGLE or MULTIPLE. If you pick SINGLE, a file selector window displays all the .PI1 files on the disk. Choose the file you want and click OK. If you pick MULTIPLE, a file selector window displays all the .MLT files on the disk. Again, pick the file you want and click OK.

If there isn't enough memory in your ST to load an entire multiple-frame sequence that was previously saved, *Art-ST* loads as many screens as it can and ignores the rest. This could happen if someone created a sequence with a 1040ST and you're using an unexpanded 520ST, or if you accidentally installed some desk accessories before loading *Art-ST.*

DELETE. This function lets you delete a picture file from a disk. An alert box will ask you for the type of file you want to delete. Choosing the SINGLE option means you can delete a single-screen file from the disk; choosing MULTIPLE allows you to delete a multiple-frame sequence. After you've picked one of these options, a standard GEM file selector window appears, displaying the files on the current drive which match that type (.PI1 or .MLT). Click on the filename you want to delete and click OK. If you change your mind, click CANCEL. **ST**

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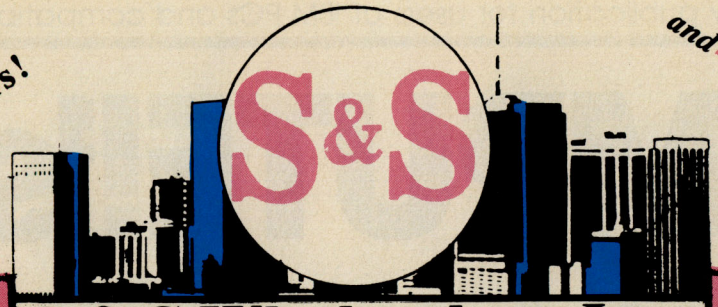

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the rubber-band line is on the screen, click the right mouse button.

K-LINE. This tool is a variation of LINE. K-LINE allows you to draw a series of connected lines by repeatedly clicking the left mouse button. The ending point of one line automatically becomes the starting point of the next line. To stop drawing connected lines, press the right mouse button. Like LINE, K-LINE uses the current color, line style, line thickness, and write mode.

TEXT. After selecting this tool, simply move the mouse cursor into the work area and type the desired text. You can then move the mouse to position the text wherever desired. To stamp it down, click the left mouse button; to abort the function, press the right mouse button. TEXT uses the current color, text style, and text size. To choose a text style, click on the arrows next to the text display box in the lower half of the menu area. You can flip through 32 different text styles. To change the size of the text, move the mouse cursor *inside* the text display box, and click the left mouse button to increase the size, or the right button to decrease the size. You can choose from 21 different text sizes.

PIXELS. This function lets you perform fine detail work on a small section of your picture (*pixels* are the tiny screen dots that make up a video image). The first step is to pick the section you want to edit. After selecting the PIXELS tool, move the mouse cursor into the work area; you'll notice that the cursor changes into a box. (See Figure 2.) Move the box around until it defines the desired area; then click the left mouse button. If it's difficult to see exactly what's inside the box-shaped cursor, refer to the isolated view that temporarily replaces the lower portion of the menu area.

After you've clicked the mouse button, *Art-ST* enlarges the section you defined to full-screen size. The tiny pixels are now easy-to-see squares. (See Figure 3.) You can change these pixels individually, and choose a new color if you like. The isolated view in the lower left corner of the screen shows the enlarged section in actual size. If you make a mistake, you can restore the enlarged area to its original state by pressing the Undo key.

To return to the normal-sized work area, click the right mouse button. The box-shaped cursor remains on the screen so you can define a new section to enlarge. To exit the PIXELS function entirely, select another tool. (Note: While using the PIXELS tool, you cannot select the SLIDE, MODES, SAVE, LOAD, or DELETE functions.)

***COPY.** This tool lets you grab a section of your picture and place it in *Art-ST*'s Clipboard buffer. From there you can stamp it down somewhere else with *PASTE or use it as a paintbrush by selecting the DRAW tool and holding down the Alternate key.

The first step is to grab the section. After selecting *COPY, move the cursor into the work area and click the left mouse button to specify the upper left corner of the section you want to grab. When the rubber-band square appears, move the cursor to specify the lower right corner. Click the left mouse button again to copy that section into the Clipboard. You can abort the function by clicking the right mouse button while the rubber-band square is on the screen.

Figure 2: The square PIXELS cursor shows the area to be enlarged.

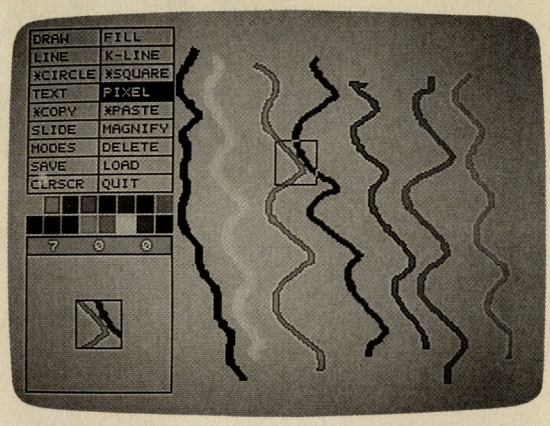
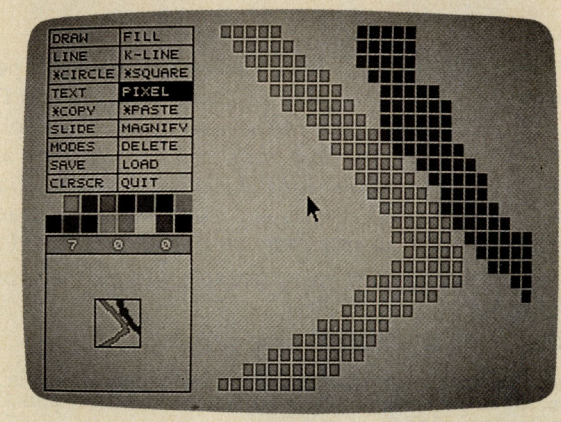


Figure 3: A blown-up view of the area selected in Figure 2. Note the actual-size view at the lower left.



*COPY also has an alternate function called *CUT. This works much like *COPY except that it *erases* the defined section from the screen in addition to copying it into the Clipboard. To replace the section erased by *CUT, you can press the Undo key. This restores the picture without erasing the Clipboard.

***PASTE.** This tool lets you stamp down anywhere on the picture a copy of whatever is in the Clipboard. (Of course, this assumes you've just copied something into the Clipboard with *COPY or *CUT.) After selecting *PASTE, move the mouse cursor into the work area of the screen. You'll notice that the cursor changes into the image of whatever is stored in the Clipboard. Position the image as desired; then click the left mouse button.

*PASTE even lets you move an image from one screen to another (an extremely useful feature when

you're creating frame animation, as we'll see in a moment). Normally, however, it won't use the color palette from the screen it is taken from. Therefore, when you're copying an image from screen to screen, the image may contain "false" colors. To paste an image with its original colors, use the alternate function *PASTE+. You can also change the way *PASTE and *PASTE+ work with the MODES tool, explained below.

MAGNIFY. This tool lets you grab a section of your picture, magnify it, and paste it back down like a rubber stamp. After selecting MAGNIFY, move the cursor into the work area and click the left mouse button to specify the upper left corner of the section you want to grab. When the rubber-band square appears, stretch it out to enclose the desired area, and click the left mouse button again. After this is done, an alert box appears on the screen. It asks you for the degree of magnification desired: 2×, 3×, 4×, 5×, 6×, 7×, 8×, or 9×. You can either select the magnification and click on the OK button, or abort the MAGNIFY function by clicking on the QUIT button.

If you click OK, there will be a delay of several seconds while the program performs the difficult calculations necessary to blow up the image. The delay depends on the degree of magnification and the area magnified, but is usually less than 15 seconds. When the magnified image appears, the *PASTE tool is automatically activated so you can stamp down the image wherever you want.

MODES. This function allows you to change the logic mode used for *PASTE and the other graphics tools. When you select MODES, an alert box appears on the screen and offers two options for both the write mode and text mode: REPLACE and TRANSPARENT. You can change modes by clicking on the appropriate buttons. When REPLACE (the default mode) is chosen, the area overwritten by *PASTE or the other tools will be replaced by the new material. When TRANSPARENT is chosen, any portion of the image that is to be placed in the work area will show the background color as transparent. See Figure 5 for an example of how MODES can affect the TEXT tool.

Undo. You can press the Undo key to fix any mistakes you may commit. *The Undo key reverses only the last operation you performed.* So if you make a mistake, press Undo before doing anything else.

CLRSCR. This function clears the screen which is currently displayed in the work area. If you draw a picture you want to keep, remember to save it on disk before selecting this function. If you wipe out a picture by mistake, you can bring it back with the Undo key.

QUIT. This selection exits *Art-ST* and returns you to the GEM desktop. An alert box requests confirmation in case you selected QUIT by mistake.

Frame Animation

One of the unique features of *Art-ST* is its ability to have several pictures or *frames* in memory at one time and then flip through them at variable speeds. This is the same principle employed in movies—if each frame is slightly different from the one before it, and if the entire sequence is flipped by at a high enough speed, an image can seem to move and come alive. This is much more flexible than color-cycling animation, where only certain colors in an image can be changed.

On an unexpanded 520ST, you can fit eight frames in memory if no desk accessories or RAM disks are installed. On a 1040ST or a 520ST expanded to a full megabyte, you can fit 24 frames in memory if no accessories or RAM disks are present. The best way to free as much memory as possible is to create a separate boot disk for *Art-ST*. Don't put any RAM disks or desk accessory programs (files with the extension .ACC) on this disk. Then insert this disk in drive A and switch on the computer. When you drop down the Desk menu on the GEM desktop, the only item should be Desktop Info. This leaves all the memory in the computer for *Art-ST*. Since you can't call desk accessories from within

Figure 4: With MAGNIFY, you can enlarge portions of the screen from 2× to 9× and paste them back down again.

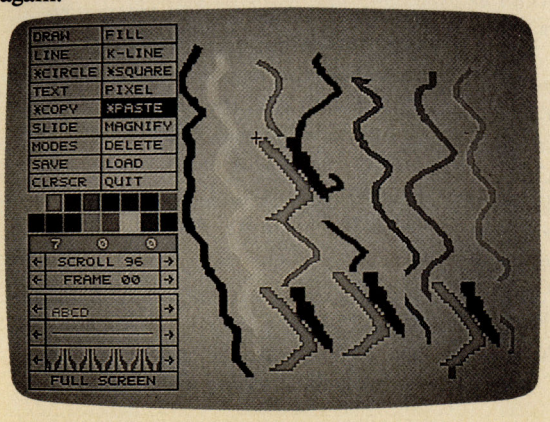
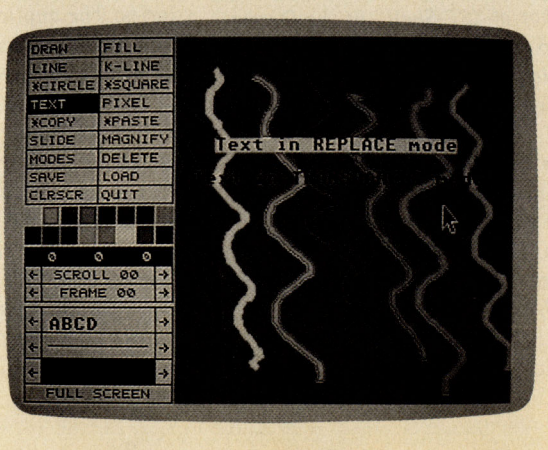


Figure 5: By switching write modes, you can change the way text and other images affect the background graphics.



Readers' Feedback

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

A Hierarchy Of Directories

In your April issue, you discuss GEM's Install Application option. I'm having a problem with this. My word processor *(Word Writer ST)* is in a folder on my hard disk, in drive C. My document files are in other folders on the same disk.

Two problems occur: First, after installing *Word Writer ST*, the program cannot be found if it is not in the same folder as the document. Second, if both are in the same folder, everything works until you attempt to "save as," at which point the file selector opens as disk A, which I don't want to use. Any suggestions?

Kim Emerson

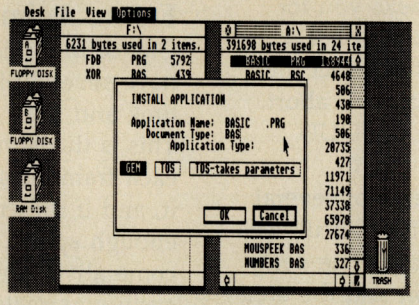
First, a few notes about folders: When you open the directory for your hard disk C, you're looking at the root directory, *the directory at the highest level. It may contain files (programs or data) or folders (also called* subdirectories*). A folder that contains additional folders is a parent directory. The folders inside are its children. GEM limits you to eight levels of folders within folders within folders. (Incidentally, Richard Smereka, the author of "ST-Shell" in the December 1986 issue, reports that a shell program allows you to create folders that are nested more deeply than eight levels.)*

The Install Application option informs GEM that certain files are supposed to be used with a certain program. For example, ST BASIC uses .BAS files—that is, files whose filenames end with the extender .BAS, such as EXAMPLE.BAS. So to install ST BASIC as an application, you would follow these steps:

1. Select the application—in this case, ST BASIC—by clicking once on the STBASIC filename or icon.

2. Drop down the Options menu on the GEM desktop.

3. Pick the Install Application... selection from the menu. A screen like this appears:



4. Type BAS on the Document Type line to match up ST BASIC and .BAS files.

5. Click on the OK button.

From now on, when you double-click on a file with the extender .BAS, the ST knows it should run ST BASIC first and then load the .BAS file into memory. The same can be done with other applications, such as word processors.

There are some limits on the Install Application option, as you've noted. If you've installed BASIC and you then open a program, GEM confines its search to the current path—including the directory containing the .BAS file and its parents (and parents of parents). In other words, the ST knows how it got to the current folder, so it can search the local directory and any parent directories. The application program can't be in a sibling directory, on another disk, or in a child directory.

The solution to your problem is to put Word Writer ST *in a higher-level folder than the text files. For instance, create a folder called WRITER. Copy* Word Writer ST *to that folder. Within that folder, you could have other folders (named LETTERS, STORIES, or whatever) that contain documents. As long as the parent directory contains* Word Writer ST, *you can use it as an installed application.*

The difficulty you're having with the file selector box is easily remedied. There are two lines you can change in a file selector: Directory and Selection. If you click on the Directory line or press the cursor up key, you can change the pathname. To quickly erase the whole line, tap the Escape key. After changing the Directory to something like C:, click inside the box that lists the filenames. The new directory will be read and displayed.

Getting The Blitter

How will Atari handle the blitter chip—installed or add-on?

Kenneth C. Skidmore

As of this writing (late April), the long-awaited blitter chip is still not available. However, Atari has indicated that the blitter—which speeds up graphics and screen printing—will be installed in the new Mega STs, and will be an optional upgrade for current owners of 520STs and 1040STs. The upgrade is expected to cost from $100 to $150. In addition to the blitter chip, the upgrade will include new read only memory (ROM) chips with a version of the TOS operating system specially modified for the blitter. In all other respects, TOS will remain unchanged.

Running TTP Programs

The only way I can get the FIND.TTP program from the April 1987 issue to work (to find a file on a disk) is to copy FIND.TTP to the disk I want searched. When I select FIND.TTP, type the parameters, then insert a new disk, the response is "This application can't find the folder or file you just tried to access." Was this the intent of the author or am I missing a fundamental step? I'm using a 520ST (TOS in ROM) and an SF354 drive.

Frank Mathison

If you're using a single floppy drive, the FIND.TTP program must be on the disk you wish to search. If you're using a system with a second disk drive, it's

possible to run "File Finder" from one disk and search a second disk.

Files that end with the .TTP extension are TOS-Takes-Parameters *programs. Because File Finder falls into this category, the operating system (via GEM) puts a dialog box on the screen before running the program. This allows you to type in the parameters—the name of the file to find, in this case—before the program runs. It's important to remember that, at the time you enter the parameters, the FIND.TTP program has not yet loaded into memory. The second step taken by the operating system, after it gets the information from the user, is to load the FIND.TTP program and pass the parameters to it.*

The error message "This application can't find the file or folder you tried to access" is not part of the File Finder program. It's coming directly from your ST, which has the parameters and is trying to run FIND.TTP. But you've switched disks, so the program can't be loaded into memory. This means that for people who are using a single disk drive, File Finder must be on the same disk it's searching.

There's a solution to this quandary, however. In the June issue of COMPUTE!'S Atari ST Disk & Magazine is a program called "Recoverable RAM Disk," which sets aside a portion of memory to act as if it were a disk drive. If you create a RAM disk, you have, in effect, a second disk drive. You can then run File Finder from the second drive (the RAM disk) and have it search through various floppy disks you insert in drive A.

Adding Linefeeds To "Notepad" Files

About the April issue: A text editor as a desktop accessory—fabulous—"Desktop Notepad" is just what I was looking for. Unfortunately, the files created are not readable when displayed on the screen via the GEM Show option. Instead, the lines overwrite each other. The only fix I've been able to come up with is to add a dummy character at the end of each line and then go back and change it to a linefeed (Control-J). This works, but is too time-consuming. Can you do any better?

Jonathan Corey

"Desktop Notepad" puts a carriage return but no linefeed at the end of paragraphs. As a result, when you Show the file from the desktop, the lines overwrite each other. The carriage return (Control-M or CHR$(13)) sends the cursor to the beginning of the line, but without a linefeed (Control-J or CHR$(10)), the cursor doesn't advance to the next line.

We've included on this issue's disk a program called EOL.TTP (if you use a command-line program such as ST-Shell, rename the file to EOL.PRG). It converts the end of line characters according to parameters you provide.

When you run EOL.TTP, a dialog box appears on the screen. Enter the filename of the text file you wish to modify and one or more of the following options:

-r	*end lines with carriage return only*
-l	*end lines with linefeed only*
-rl	*end lines with both CR and LF*
-o filename	*send output to the given filename*
-p	*don't pause for keypress*

For example, if you type the following parameters in the dialog box:

test.asc -o test2.asc -rl

EOL.TTP would take a file named TEST .ASC, copy it to a new file called TEST2 .ASC, and put carriage returns plus linefeeds at the end of each line. This would convert a Desktop Notepad file to an ASCII file like those created by 1ST Word.

If you don't include an output filename, EOL.TTP simply prints the file on the screen. The no-pause feature is included for people who use EOL from a shell program.

For those who are interested in studying how this program works, the source code (written in Megamax C*) is also included on this issue's disk in the file EOL.C.*

All The Combinations

I am writing a program in ST BASIC that finds all the possible ways there are to add up eleven numbers, some with decimal places. There can be from two to eleven numbers added together from the list, as long as the number is not used more than once. What is the solution?

Steve Meierhofer

Given a list of eleven numbers, each of which might or might not be added to the total, the number of possible sums is two to the eleventh power (2048). Included in that list is one case where no numbers are added and eleven cases where only one number is added. So, subtract 12, and the number of possibilities is 2036.

The following program will print out the 2036 combinations of eleven numbers, with at least two numbers as part of each sum:

```
10 dim a(10),b(10)
20 for j = 0 to 10: read a(j): next
22 for j = 0 to 10: b(j) = 2^j: next
30 for j = 1 to 2047
40 total = 0: n = 0
50 for k = 0 to 10
60 if j and b(k) then total = total + a(k):
   n = n + 1
70 next k
80 if n > 1 then print total
90 next j
100 data
1.1,2.1,3.2,5.3,8.5,13.8,22.3,36.1,58.4,94.5,
  152.9
```

If you want to print out the results, change the PRINT statement in line 80 to LPRINT and make sure you have enough paper in the printer. You might want to add a semicolon after the variable TOTAL in that line, too. For another set of numbers, change the DATA statements in line 100.

Note that the example program doesn't check for duplicate totals. There might be two ways to calculate a sum of 13.8, for example. Also, if you wanted to display the numbers in order, you'd have to store them in an array and use a sorting routine. One more note: Due to the limitations of floating-point precision in ST BASIC, you'll occasionally see a number like 20.1999, which should be 20.2, but has succumbed to an accumulation of rounding errors.

More About DESKTOP.INF

In the April issue, the article "Customizing The GEM Desktop" appears to be in error. It says the Control Panel accessory can be omitted when the DESKTOP.INF file has stored the relevant information. I determined this is wrong by trying it (the scientific method of experimentation). If the Control Panel is *not* present, then the colors in DESKTOP.INF are *not* accessed by the computer.

I am somewhat dismayed by this characteristic of the operating system. Without the Control Panel, the key click delay and key repeat speed are uncontrollable. But with the Control Panel, date- and time-setting programs in the AUTO folder are useless, because accessories are loaded *after* the AUTO programs are run and the Control Panel resets the date and time when it is loaded.

Jeremy F. Brown

You're right about DESKTOP.INF and the Control Panel. The article was incorrect. The color information in DESKTOP.INF is not accessed unless the Control Panel accessory is active.

We haven't seen the problem with setting the time and date, however. There are a variety of time/date programs available in the public domain. They run from the AUTO folder, ask the user to input the time and date, and use that information to set the internal clock. They work with or without the Control Panel accessory in memory. We've never seen the Control Panel reset the clock after the time has been set by an AUTO program.

To demonstrate, we've written a time- and date-setting program in GFA BASIC. *The compiled program is on the magazine disk in the file DATETIME.PRG. For programmers, the source code is in the file DATETIME.LST.*

```
  If Rez<>2
    Print Chr$(27)+"b"+"1"
  Endif
  Print At(14,20);
  Form Input 8,In_time$
  Nu_time$=In_time$
  If In_time$=""
    Nu_time$=Time$
  Endif
  Settime Nu_time$,Nu_date$
  Cls
  Return

Procedure Header
  Cls
  Print Chr$(27)+"p"
  If Rez<>2
    Print Chr$(27)+"b"+"4"
  Endif
  Print At(5,2);" COMPUTE!'s Atari ST Disk & Magazine "
  Print At(8,3);" Vol. 2, No. 4 August 1987 "
  Print At(11,4);" By George Miller "
  Print Chr$(27)+"q"
  If Rez<>2
    Print Chr$(27)+"b"+"8"
  Endif
Return
```

```
' Procedure to check and set clock
'
Gosub Check_date_time
'
End
'
Procedure Check_date_time
  Date:
  Rez=Xbios(4)
  Nu_date$=Date$
  Header
  Print At(3,6);"Date presently set to: ";
  If Rez<>2
    Print Chr$(27)+"b"+"1";Nu_date$
    Print Chr$(27)+"b"+"8"
  Endif
  If Rez=2
    Print Nu_date$
  Endif
  Print At(3,8);"Press <Return> to use this date or"
  Print At(3,10);"Enter new date (mm/dd/yy) ";
  Print At(3,12);"(Be sure to include the '/')"
  If Rez<>2
    Print Chr$(27)+"b"+"1"
  Endif
  Print At(14,20);
  Form Input 8,In_date$
  If In_date$=""
    Goto Time
  Endif
  If Asc(In_date$)<48 Or Asc(In_date$)>57
    Goto Date
  Endif
  Nu_date$=In_date$
  Time:
  Header
  Print At(3,6);"Present time is ";
  If Rez<>2
    Print Chr$(27)+"b"+"1";Time$
    Print Chr$(27)+"b"+"8"
  Endif
  If Rez=2
    Print Time$
  Endif
  Print At(3,8);"Press <Return> to accept time or"
  Print At(3,10);"Enter new time (hh:mm:ss) ";
  Print At(3,12);"(Use Military [24 hour] format)"
```

Writing A BBS Program

I am interested in writing a bulletin board system (BBS) program in ST BASIC, but the BASIC manual doesn't include any instructions on how to send commands to my Hayes-compatible modem. For instance, how do I tell the modem to answer or hang up the phone?

Jeffrey D. Beaubien

Hayes commands have become the standard for microcomputer modems. Most terminal software is written to support Hayes compatibility and most modem manufacturers build in some degree of compatibility with the Hayes command set.

Telling the modem to hang up the phone requires a succession of commands. First, since the computer running the BBS program would be communicating with another computer, it's necessary to tell the modem that a command follows. This alert signal consists of three plus signs (+++). Next, send the attention code (AT) followed by the desired command. Note that commands are always sent as uppercase letters. The command to hang up the phone is H0. The command to pick up the phone is A. The command to answer the phone after one ring is S0=1.

Therefore, to instruct the modem to hang up the phone, send:

```
+++
ATH0
```

The modem will respond with an OK, meaning it received and understood

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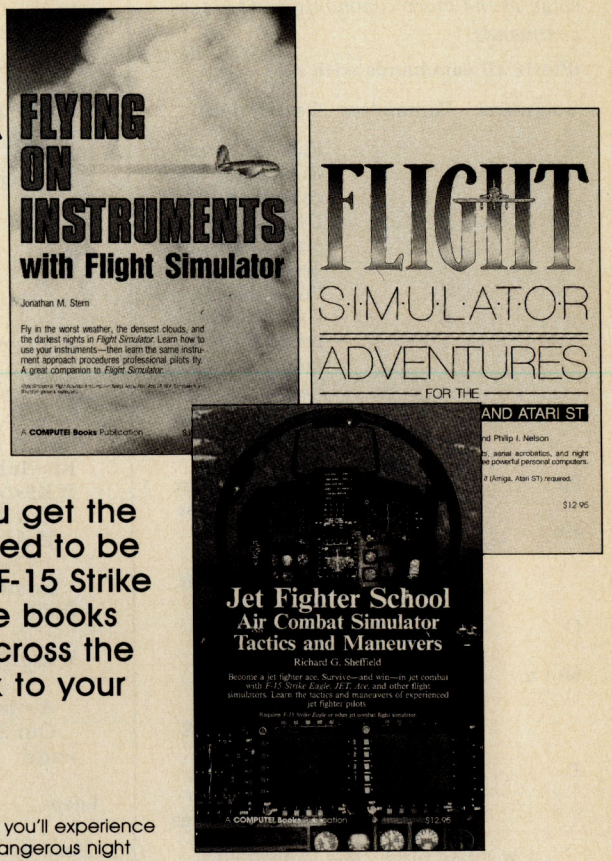

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the instruction you sent. Here's a list of some of the more commonly used Hayes commands:

(Prefix all commands with AT)

Command	Parameters	Description
A		Pick up phone
A/		Repeat last command line
Dn	n=0...9	Dial a telephone number
	T	Tone dialing
	P	Pulse dialing
	R	Call originate mode (reverse mode)
	,	Pause
	;	Return to command state after dialing
Fn	0,1	0=Half duplex 1=Full duplex
Hn	0,1,2	0= Hang up 1= Off hook 2= Special off hook
O		Return to online state
S0=n	0–255	Number of rings to wait before picking up phone.
Z		Reset modem parameters to default settings

For other commands, consult the manual that came with your modem.

Frankly, it would be quite difficult to write a useful BBS program in ST BASIC. At present, many valuable routines for communications programs which are in GEMDOS, BIOS, and XBIOS simply cannot be accessed via ST BASIC. There is also some doubt as to whether a BBS program written in ST BASIC could keep pace with communications at 1200 bits per second (bps). A faster language is probably required.

To demonstrate the fundamental techniques, we've written a short terminal program in GFA BASIC *which allows you to send commands to a modem and communicate with most popular BBSs, information services, and other computers. Note that the other computer's modem must be in answer mode. The program configures the RS-232 port for 300 bps, 7 bits, even parity, and 1 stop bit. Changing the value of the variable BAUD from 9 to 7 will permit communications at 1200 bps, but you might have difficulty reading the screen as it quickly scrolls by.*

Since this terminal program is very simple, it has no provisions for downloading (transferring files from the remote computer). Also, the screen is not buffered; once text scrolls off the screen, it's gone forever. However, the program could form the shell for a much more powerful communications package. The compiled version is on disk as TERMINAL.PRG. The source code is in the file TERMINAL.LST.

```
Cls
'
' Configure RS-232 using XBIOS #15, rsconf
'
Rsconf=15
Baud=9          ! 300 bps
Flow=0
Ucr=&X10101110    ! decimal 174
Rsr=-1
Tsr=-1
Scr=-1
'
Void Xbios(Rsconf,Baud,Flow,Ucr,Rsr,Tsr,Scr)
'
Open "U",#1,"AUX:" ! Open modem as file for I/O
'
Do
  '
  Exit If Asc(K$)=27 ! Escape Key pressed
  K$=Inkey$
  If K$<>""
    Out 1,Asc(K$)
    If Asc(K$)=13       ! Carriage return?
      Out 2,10        ! Then send line feed to screen
    Endif
  Endif
  '
  If Inp?(1)          ! Anything received at port?
    '
    A=Inp(1)
    Out 2,A           ! Ok, then show it.
  Endif
  '
Loop
'
Close #1
```

Printouts In C

I have recently purchased the *Lattice* C compiler and am also learning C using the Kernighan and Ritchie (K & R) book. I haven't been able to discover how to send stuff to the printer in C. I am looking to do the same thing that LPRINT does in BASIC. I know this aspect of C is machine-dependent. Please enlighten me.

Larry Kirkpatrick, Jr.

As you might have guessed, there are several different ways to get at the printer in C. At the lowest level, the BIOS routine Bconout( ) *can send a single character to the ST's parallel or serial port (or the screen or the MIDI port). It's defined in the* osbind.h *include file, and it takes two parameters: the port number—0 = parallel, 1 = RS-232, 2 = console, 3 = MIDI—and the character to print.*

The next higher level of access, and maybe the best method, involves the use of the GEMDOS Cprnout( ) *function, also defined in* osbind.h. *It prints a single character to either the RS-232 or parallel port—whichever has the printer attached. (You can set this either with the Install Printer accessory or the* Setprt( ) *XBIOS call.)*

Here's a simple program that demonstrates this method. Although it's not really needed here, the sprintf( ) *function, from* stdio.h, *is used to demonstrate printing to a string. If you're printing the contents of numeric variables, or the printer output has to be formatted, the* sprintf( ) *function is quite useful.*

```
#include <stdio.h>
#include <osbind.h>

main()
{
    char buffer[256];
    int count;

    sprintf(buffer, "Hello printer./n");
    for (count = 0; count < strlen(buffer);
    Cprnout(buffer[count++]);
}
```

The Lattice C *and* Mark Williams C *compilers also let you access the printer as if it were a file. This approach is more consistent with the Unix*

operating system (the birthplace of C and the de facto standard for C programming), which makes no visible distinction between files and input/output devices. The next example illustrates this approach.

```
#include <stdio.h>

char *pname = "LST:"; /* Lattice name,
use "prn:" for Mark Williams C */

main()
{
    FILE *fp;

    if ((fp = fopen(pname, "w")) !=
    NULL)
    {
      fprintf(fp, "Hello printer./n");
      fclose(fp);
    }
}
```

Learning Machine Language

I have a 1040ST and would like to do some assembly language programming. I have experience writing assembly language on an IBM mainframe computer, so I believe that I would have little difficulty learning to program on my ST if only I could find a good book. In addition, I need some advice about buying an assembler. I want one with these features:

1. It must support all MC68000 instructions.

2. It must support macros that I create.

3. It must allow me to put the assembler, linker, and other software tools in a RAM disk. All necessary work files should be in the RAM disk, as well.

4. I want to assemble and link the program with just one command, like ASMLK MYPROG.

5. The package must fully support GEM calls, line A commands, and so on.

I realize that you probably don't recommend specific packages, but I would appreciate any guidance you might give me.

Paul Riche

You shouldn't have any difficulty satisfying your first two requirements. Every ST assembler that we've seen supports all the MC68000 opcodes and allows macros. Similarly, any assembler that works from a floppy ought to run from a RAM disk, or from a hard drive, for that matter. Whether you can fit everything you need into a RAM disk depends on the nature of your program and the amount of memory in your computer. If you're writing a simple TOS application, which is limited to GEMDOS, BIOS, and XBIOS calls, you may be able to fit the source code, all of your software tools, and even a small text editor into a RAM disk on a 1040ST. However, the linking libraries needed for a GEM application would require additional RAM, and, as the program grows in size, you may have more difficulty making it all fit.

If you run the assembler and linker from a batch processor program, or from a command-line program such as ST-Shell, it is certainly possible to assemble and link a program with just one command. For instance, this batch file assembles and links a simple assembly language program using the Atari development system software:

```
as68 -l -u %1.s link68 [u] %1.68k=
  %1.o,osbind,aesbind,vdibind relmod
  %1.68k %1.prg rm %1.o rm %1.68k wait
```

Using BATCH.TTP, the batch processor supplied with the Atari development system, you would invoke this batch file, supplying the name of the source file you want to assemble and link. For example, if this batch file is named ASMLNK and your source file is named SAMPLE.S, you could invoke the batch process with the command ASMLNK SAMPLE. Executing each line of the batch file in turn, BATCH.TTP substitutes your filename wherever %1 appears in the preceding file, taking the file all the way through assembly, linking, and the final "fixup" done by RELMOD.PRG, which gives the file the ST-specific header and other information needed for it to run in the ST environment. The files OSBIND, VDIBIND, and AESBIND are linking libraries for TOS and GEM system calls.

Other assembler packages have similar capabilities; if you find one that includes a GEM shell, you may be able to start the process with the mouse, rather than typing in filenames.

Every 68000 assembler supports GEM and TOS in the sense that it can assemble the TRAP opcodes and line A exceptions used to make system calls on the ST. However, that ability is useless unless you have documentation which describes in detail how to use the hundreds of system routines that make up GEM and TOS. Unfortunately, at this writing, there is no single source of documentation that explains all of this information from the viewpoint of a machine language programmer. The documentation supplied with the Atari development system contains all the information you need, but this material is uneven in quality. For example, some of it refers to GEM programming on the IBM PC.

There are several books on the market which describe various parts of the system software that makes up TOS and GEM. At this time, the Atari development system is the only single source that contains all of that information. As a practical matter, most ST programmers end up buying several ST references.

Whichever assembler package you choose, make sure that its linking libraries use the "official" Atari names for all system routines and follow Atari's parameter-passing conventions. It's hard enough to become familiar with dozens (or more likely, hundreds) of system routine names, without having to remember a second, nonstandard set of names and translate between them.

Be careful about buying any assembler that's included as part of another language package. The AS68 assembler included with the Atari development system is a fully functional macro assembler, as are some third-party assemblers. Some C development packages include an in-line assembly feature, but those assemblers are designed for writing short assembly routines to be called from C programs. As a result, they lack many features needed to write stand-alone ST applications.

In addition to an assembler and linker, you'll probably need a resource editor *of some sort. Like the Apple Macintosh, the ST uses special data structures called* resources *to support interactive graphics objects such as menus and windows. On the ST, these are stored in a separate file (ending with the extension .RSC) which an application loads as needed. A resource editor lets you rapidly design and test resources, a task that's tedious and difficult without this specialized tool. A development system should also include a symbolic debugger and an archive or librarian utility. The first tool is invaluable for testing and debugging programs, while the second allows you to create your own linking libraries.*

The last requirement is a good text editor. One of the most popular editors among programmers is MicroEmacs, a public domain editor that has been adapted to many different mini- and microcomputers. MicroEmacs is included with some language packages and also can be found on many BBSs. **ST**

Batteries Still Included

When Electronic Arts announced its acquisition of Batteries Included last spring—after several weeks of conflicting rumors and confusion—many ST users took to bulletin boards and information services to express dismay. Few software companies had supported Atari computers over the years as strongly as had Batteries Included. With ST hits like *DEGAS*, *DEGAS Elite*, and *Thunder!*, and with eight-bit computer software like *PaperClip*, *Homepak*, and *B/Graph*, Batteries Included had earned a solid reputation for high-quality software, fair prices, and good customer support.

On the other hand, there has been some animosity between ST users and Electronic Arts. Many ST users were upset over EA's early support of the Commodore Amiga instead of the ST, and over remarks by EA President Trip Hawkins that software development was easier on the Amiga than on the ST. Hawkins patched things up a bit by introducing some ST software, but many ST users still viewed EA's acquisition of BI with trepidation. Would the deal mean the loss of a strong software booster for the ST?

Fortunately, it appears that EA is committed both to keeping BI's existing software available and to bringing out the new products which were under development at the time of the acquisition. There are two reasons for this commitment: The most important asset that EA acquired in the deal is BI's product line, so it doesn't make sense to kill the products; and EA is welcoming BI's productivity software in order to broaden its own game-oriented line in anticipation of a public stock offering in late 1987 or early 1988.

"This is going to be a real strong move for us," says Charlotte Taylor, EA's public relations manager. "We're considering going public, maybe by the end of the year, although no date has been set. From a strategic standpoint, this definitely strengthens our position in the marketplace. It was certainly a good move on our part."

Hawkins, in a prepared statement, said: "Batteries Included has always had an excellent reputation. We knew that their home productivity and Atari ST-compatible software would be complementary to our own products. . . . Based on demand, we will take a number of existing quality products to market immediately. And we are currently conducting work sessions with the artists from Batteries Included to complete products already under development."

Basically, what EA bought was a warehouse full of software, BI's name and trademarks, and contracts with freelance programmers. BI had about 35 employees when the deal with EA was inked, but Taylor says only a handful will probably be hired by EA—mostly customer service personnel. BI had no staff programmers, relying instead on contract programmers for software development. Those contracts have been picked up by EA, and Taylor says EA is evaluating the projects to determine whether work should continue. BI's main office in Richmond Hill, Ontario, has been closed, and all operations have been consolidated at EA's headquarters in San Mateo, California.

One BI program under development that has been long awaited by ST users is the *PaperClip Elite* word processor. An early version was shown at a computer industry trade show in January, but BI postponed the release date several times. Taylor says that work on *PaperClip Elite* ground to a halt for about three months during the transition period when EA took over BI. Work has now resumed, and *PaperClip Elite* is expected to be released in a few months.

The Amiga version of *PaperClip Elite*, incidentally, is apparently a dead project. "It was a rumored product, and then other rumors started spreading that it was vaporware—and that's something that's true, as it turns out," says Taylor. "There isn't an Amiga *PaperClip* and there never was."

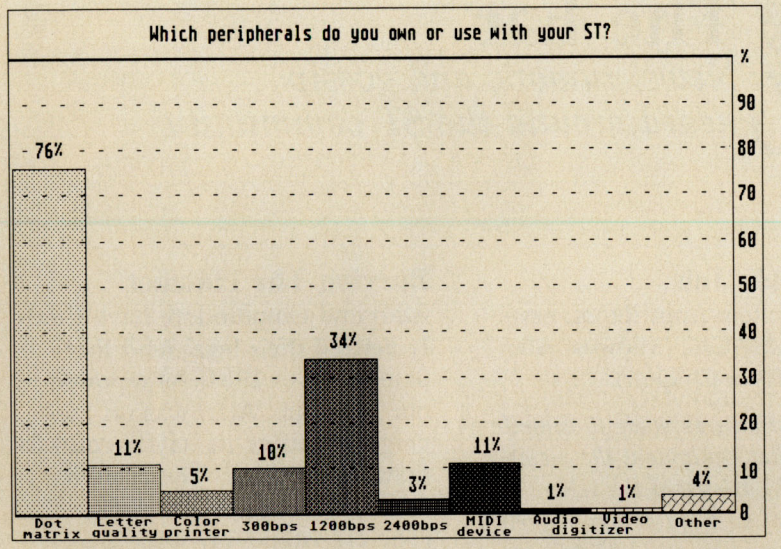
Taylor says that EA will continue to sell all 35 products acquired in the BI deal as long as there is sufficient demand. Existing BI packaging will be used, with the addition of a sticker that says "Electronic Arts." When the supply of BI packaging is exhausted, Taylor says EA will design new packaging that retains the BI name. "Batteries Included will become a line of Electronic Arts software," she says. "We wanted to retain the name because Batteries Included has a real strong name in the marketplace, especially with regard to productivity software."

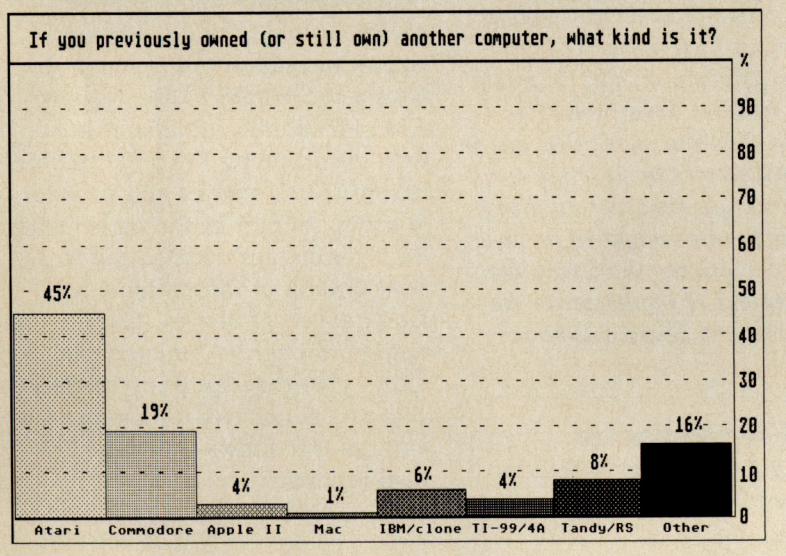
Rumors of EA's public offering have been circulating for months, and were renewed recently when Brøderbund Software announced it is going public. Another home software company expected to go public soon is Epyx.

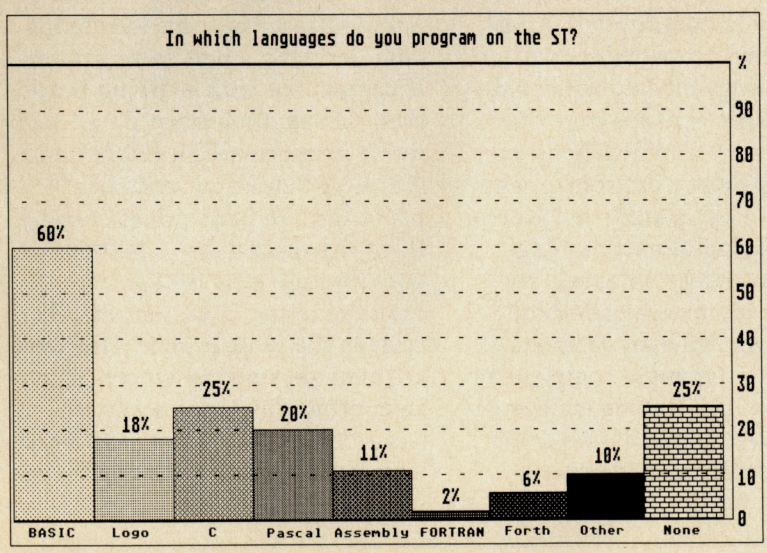
The Editors

Readership Survey Results

In the December 1986 issue of COMPUTE!'s Atari ST Disk & Magazine, we ran a full-page questionnaire for readers to clip and mail. Hundreds of forms were received, and the answers have now been tabulated. Although this was not a scientific survey, we think the results are both interesting and a fairly accurate barometer of the Atari ST community.







According to the survey, our average reader has an Atari 520ST with TOS in ROM, a single-sided floppy disk drive, an RGB color monitor, and a dot-matrix printer. The ST is not his or her first computer; the previous machine was most likely an eight-bit Atari 400, 800, XL, or XE. Our average reader's software library includes a few games, a graphics-design program, and a word processor. The average reader programs in BASIC but avoids most other languages. Readers like to find source code and an Atari Art picture in each issue of COMPUTE!'s Atari ST Disk & Magazine.

Of course, this is a composite sketch of our *average* reader. As any pollster will tell you, the offbeat responses which fall into the "Other" categories are often the most fascinating aspect of a survey, even though they aren't indicative of the majority. For instance, in response to the question about previously owned computers, readers reported owning everything from the Exidy Sorcerer (a micro from the late 1970s) to a PDP-11 minicomputer.

Following is a summary of the responses we received. Some percentages total more than 100 percent because of multiple answers or rounding.

• Which ST do you own or use?

Atari 520ST: 68%
Atari 1040ST: 35%
Don't own or use an ST yet: 2%

• If you own an ST, is it your first computer?

Yes: 26%
No: 74%

• If you previously owned (or still own) another computer, what kind is it?

Atari 400, 800, XL, or XE: 45%

Commodore PET, VIC-20, 64, 128, Plus/4, or 16: 19%
TRS-80/Tandy/Radio Shack: 8%
IBM PC, PC XT, PCjr, AT, or compatible: 6%
Texas Instruments TI-99/4A: 4%
Apple II, II+, IIe, IIc: 4%
Apple Macintosh: 1%
Other: 16%

• Which ST monitor do you own or use?

RGB color: 75%
Monochrome: 32%
TV: 7%
Composite color: 3%

• Which ST disk drives do you own or use?

Single-sided floppy: 53%
Double-sided floppy: 49%
Two or more disk drives: 38%
Hard disk: 8%

• Which peripherals do you own or use with your ST?

Dot-matrix printer: 76%
Letter-quality printer: 11%
Color printer: 5%
Laser printer: 0%
300-bps modem: 10%
1200-bps modem: 34%
2400-bps modem: 3%
MIDI synthesizer: 11%
Audio digitizer: 1%
Video digitizer: 1%
Other: 4%

• Which types of ST software have you purchased?

Games: 70%
Graphics design: 60%
Word processor: 58%
Programming language: 45%
Business applications: 44%
Telecommunications: 40%
Educational: 16%
Other: 21%
None: 2%

• In which languages do you program on the ST?

BASIC: 60%
C: 25%
Pascal: 20%
Logo: 18%
Machine language: 11%
Forth: 6%
FORTRAN: 2%
Other: 10%
I don't program on the ST: 25%

The Ear

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

An Inside Job

A recent item from *Runes*, newsletter of MAGIC (Midwest Atari Group, Iowa Chapter):

A suggestion was made to compile a list of what equipment the members owned. Al discussed the inherent dangers of such an action, namely that it would be an ideal "shopping list" for criminal elements—and as we are away from home the first Thursday of every month, we would provide an ideal opportunity for such acts. Someone noted that many of our spouses are home while we're at the meetings. However, in many cases, the spouses might be inclined to assist the thieves in moving the equipment out of the house, so that was no comfort. There will be no list.

Good Fortune Cookie

The trade battles raging between the US and Japan over microchip dumping, import tariffs, and plunging dollar/yen exchange rates have apparently **left Atari unscathed**—according to Neil Harris, Atari's media relations director. Harris explains that Atari computers are completely assembled in **Taiwan** from components bought in that country and **Korea.** "We're buying almost nothing from Japan now," he says, "so we're not in any way affected." Other computer manufacturers that rely on Japanese components weren't so lucky; some makers of laptops were slapped with a **100 percent tariff** on computers imported to the US.

Burying The Hatchet

Atari and Commodore have **finally settled** their legal feud that dates back to 1984. As reported in our last issue, Atari was on the verge of getting its day in court to fight over rights to the custom chip technology in the Amiga. (The old Atari—pre–Jack Tramiel—originally had a license agreement with Amiga for the chips.) Instead of going forward with a **courtroom battle,** however, Atari accepted a settlement in return for dropping the $150 million lawsuit and a related suit in federal court. As part of the agreement, both companies decided **not to reveal details** of the settlement. Don't expect to see an **Atari Amiga,** though—Commodore didn't give that up. If any money changed hands, we'll have to wait and see if it shows up in the annual reports.

The Missing Link

Some folks have been wondering whether Atari's new laser printer is compatible with **existing hard disk drives.** Both must plug into a direct memory access (DMA) port, but the ST has only one such port. And the hard drives currently on the market don't have a pass-through port for daisy-chaining other DMA peripherals, such as the laser printer. However, Atari says **not to worry.** The laser printer includes a DMA pass-through that allows the hard disk to be the **last link** in the daisy chain.

PageMaker ST?

Rumors have been circulating that Aldus Corp., which makes the excellent *PageMaker* desktop publishing program for the Macintosh and IBM, is working on a version for the Atari ST. If so, it would be formidable competition for SoftLogik's *Publishing Partner*, the only other desktop publishing program now available for the ST in the US. But Aldus says it's not so.

Ahl In The Family

Ignore the rumors and published reports going around that Atari has sold its house magazine, the *Atari Explorer*, to former *Creative Computing* publisher **David Ahl.** As noted in the October 1986 issue, Ahl has been putting out the *Explorer* as an employee of Atari, and Atari says that relationship hasn't changed.

Mega-Mania

Have you been going crazy while waiting for a **Mega ST?** Are you turning blue while holding your breath for an **Atari PC?** And what about that under-$1500 **Atari laser printer,** anyway? All were supposed to be available in March or April but were then postponed to late summer. Now Atari says the new computers could start shipping **as early as June;** the laser printer, in **May.** But Atari still hasn't announced firm prices for the Mega STs, even though costs for the critical one-megabit memory chips have fallen faster than anticipated. The latest talk pegs prices for the Mega ST-1 (one megabyte) at around $1100, the Mega ST-2 (two megabytes) at about $1500, and the Mega ST-4 (you guessed it—four megabytes) at under $2000.

The Burning Of Atlanta

Hardware manufacturers, software publishers, and journalists are **miffed** at the sponsors of the two biggest industry trade shows, the Consumer Electronics Show (CES) and the Computer Dealers Exposition (COMDEX). Customarily, Spring COMDEX is held every May in Atlanta, and Summer CES is every June in Chicago. But this year the huge shows overlapped—**they were both during the same week** in late May. This forced manufacturers and publishers to either skip one show, or to deploy twice the materiel and personnel to exhibit at both shows simultaneously. Journalists were upset because they had to **shuttle back and forth** between Chicago and Atlanta.

Some companies opted for CES, the bigger show, so **Atlanta got burned.** Atari, for instance, decided to set up its major exhibit at CES and to limit its usually large COMDEX presence to a hotel suite. To make up for the missed action at COMDEX—which is mostly business-oriented—Atari dispatched a team to tour the country and **entice potential dealers** into carrying Atari products.

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. All sources treated confidentially.*

Atari On The Prowl

Fattened with $75 million recently borrowed from investors, Atari is hunting for smaller companies to acquire and other companies to invest in. One goal: "vertical integration" to reduce manufacturing costs.

Atari successfully borrowed the $75 million in April by selling bonds in Europe, shortly after canceling plans to borrow the money in the US. Atari is said to have decided there was more demand among European investors than among US investors. (Atari says that at least half of all ST sales have been in Europe, mostly in West Germany.) Although Atari raised about $50 million by going public last fall, much of that money was paid to Warner Communications to complete Jack Tramiel's purchase of Atari from Warner. To raise additional funds, therefore, Atari offered $75 million in Eurobonds at 5¼ percent interest.

The money will be used "for acquisitions in general," says Neil Harris, Atari media relations director. By acquiring or investing in companies which supply components, Atari hopes to reduce its manufacturing costs. This kind of vertical integration, as it's called, was a familiar strategy during Jack Tramiel's years at the helm of Commodore. It became a major factor during the home computer war of 1983–84, when Tramiel repeatedly slashed prices of the VIC-20 and Commodore 64 to severely wound his competitors—including the old Atari.

"It worked for Jack then," says Harris. "Why not again?"

Although Atari won't reveal its acquisition plans in detail, it did recently invest in NSI, a small chip and board manufacturer based in Marlborough, Massachusetts. NSI supplies chips for Atari computers as well as components for IBM PC compatibles.

ST

Hello, GEM!

Last time around, we looked at the standard first C program, "Hello, World!":

```
main()
{
  printf("Hello, World! \n");
}
```

This time, we're going to examine "Hello, GEM!," a simple ST-specific equivalent. When I say simple, I mean simple in function, since all it really does is print a phrase on the screen. But as you'll soon see, this task isn't quite as simple when you use GEM, the Graphics Environment Manager:

```
/* ****************************************** */
/*                                            */
/* HELLOGEM.C—Output a simple bit of text */
/*          using GEM VDI routines.           */
/*                                            */
/* ****************************************** */
/* Global variables—For use by VDI library routines. */
int contrl[12],
    intin[128],
    ptsin[128],
    intout[128],
    ptsout[128];
/* Our program starts executing here */
main()
{
  int handle, x, nul, button=0;
  int work_in[12],
      work_out[57];
/* Initialize the GEM application */
  appl_init();
/* Initialize input array, get the physical workstation */
/* handle, and open the Virtual Screen Workstation */
  for (x=0, work_in[10]=2; x<10; work_in[x++]=1);
  handle = graf_handle(&nul, &nul, &nul, &nul);
  v_opnvwk (work_in, &handle, work_out);
  v_clrwk(handle);
/* Output our line of text */
  v_gtext(handle,32,32,"Hello, GEM!");
/* Wait until the mouse button is pushed, */
/* then close the virtual workstation, */
/* and exit from the application */
  while(button==0)
    vq_mouse(handle,&button,&nul,&nul);
  v_clsvwk(handle);
  appl_exit();
}
/* ************ End of HELLOGEM.C ************ */
```

Obviously, there's quite a difference between this program and the simple "Hello, World!" program in the last issue. The reason for this is that the standard C environment uses very simple forms of input and output—simple for the programmer, at least, if not for the user. There's a standard input device called *stdin,* and a standard output device called *stdout.* These usually take the form of an alphanumeric terminal. Stdin is a keyboard, and stdout is a monitor screen which displays text characters in a continuous stream, one after the other.

But GEM's input/output arrangement is a lot more complicated. Its input comes from a keyboard that includes function keys and cursor keys, and from a mouse with one or more mouse buttons. Its output goes to a bit-mapped graphics display or some other graphics device whose pixel resolutions and color capabilities may vary. Rather than displaying neat lines of text, the GEM screen can contain overlapping windows, icons, and drop-down menus. The GEM user interface is designed to make life much easier for the user, but it can really complicate things for the programmer.

Learning to program in C on the Atari ST, therefore, is a double challenge. First, there's the matter of learning the C keywords, syntax, and compiler directives, along with peculiarities of the compiler and linker programs. And, as if that weren't enough, there's a huge amount of ST-specific information to learn: subjects ranging from GEM graphics to windows, dialog boxes, icons, menus, and input from the keyboard and mouse.

Fortunately, it's possible to do some useful programming without becoming an expert on every one

Sheldon Leemon

of these subjects. But the only way to get started is to dive in. So let's examine the sample program to see which parts are pure C and which parts are specific to the ST.

Plenty Of Comments

Hello, GEM! starts out with its title and purpose printed as comments. In C, comments start with the characters /* and end with the characters */. Comments, like other C statements, can stretch over a number of lines, so it's important to make sure that your beginning /* matches up with the ending */. Because C allows you to create complex statements and expressions that perform a lot of work in a compact space, C source code can be dense and almost impossible to read. So while including plenty of comments is always good programming practice, it's especially important with C.

In addition to allowing a lot of comments, C lets you format the source code very flexibly. It's customary to use formatting conventions such as single-statement lines and indentation to keep conditional blocks and loops grouped together, thus increasing the readability of your program.

Immediately following the opening comments in Hello, GEM! are some global-variable declarations. In C, before you use a variable, you've got to declare what type it is. This tells the compiler how much space to set aside for each variable. C variables come in several sizes—*char* (a single character), *short* (a short integer), *int* (an integer), *long* (a long integer), *float* (floating point), and *double* (double-precision floating point).

The exact sizes of these data types depend on the C compiler you use. For example, the *Megamax* compiler uses a 16-bit word for shorts and ints, while the *Lattice* compiler uses 32 bits for ints and longs. The only rule that a compiler must follow is that each category must be the same size as or larger than the preceding one. An int must be as large as or larger than a short, and a long must be as large as or larger than an int.

Declaring Variables

Normally, you declare each variable that will be used by a function at the beginning of that function. However, variables that are declared within a function are, by default, *local* in scope. This means that they only exist within that function and cannot be used by other functions. To create variables that are *global* in scope—that can be used by all functions in the program—you must declare them to be of the type *extern.*

One way of doing this is to declare the variables outside of any function. In Hello, GEM!, we declare a number of global variable arrays. These arrays are like the subscripted arrays in BASIC, except that in C, the length of the array appears in brackets instead of parentheses. The declaration *int contrl[12]* means that the compiler should set aside 12 sixteen-bit words for an array of integers called *contrl.*

This array can be used by any function in the program, including functions in the library files that are bound in with the linker. In fact, you may notice that none of the functions in our program use the global variables. The reason that we have to declare these arrays is that they're used by the VDI library routines. Those routines don't declare the arrays themselves, so we can decide how much space to allocate for them.

Declaring Functions

After the global declarations comes the function called *main( ).* As you may remember from our last column, main( ) is the function which executes first in any C program. In this case, it's also the only function we declare.

We start off the function definition by declaring the variables that we're going to use. These include some integers and some integer arrays. Notice that one declaration states *int button = 0.* This is an example of initializing an integer variable as part of its declaration. This single declaration does two things: It sets aside space for the button variable, and it sets the initial value of that variable to zero.

Next comes the function call *appl_init( ).* Although this looks like a typical C function call, it really calls a GEM function. C programs make GEM function calls by way of the GEM libraries that are linked in with the program object files. These libraries are also called *bindings,* because they tie in C code with the machine language code required to make GEM function calls.

At the machine language level, you make GEM calls by placing input parameters in specified arrays and issuing a TRAP instruction. The GEM bindings receive the input parameters from the C function parameter list, place them in the proper arrays, and make the GEM function call for you. This makes GEM function calls appear to be part of the C language. But even an expert C programmer wouldn't necessarily know what *appl_init( )* does. It's a specific GEM function that's used to register an application with the GEM application environment services (AES).

Opening A Workstation

Since Hello, GEM! uses GEM's graphics capabilities, we must first open a *graphics workstation.* This allocates space for keeping track of the various graphics settings like pen color, fill pattern, and so on. It also enables output to the screen device. Since several programs can share the screen device, we use what's called a *virtual screen workstation.* This kind of workstation lets us use the screen as if we had it to ourselves, even if we're really sharing it with another program (such as a desk accessory). We open this workstation with the call *v_opnvwk( ).* First, however, we've got to set up some input parameters for the call.

Most of the input parameters are stored in the array *work_in*. We initialize this array with a loop. This is similar to a BASIC FOR-NEXT loop, but it's also different. The C loop uses three sets of conditions within parentheses which follow the keyword *for*. These conditions are separated by semicolons.

The first is the starting condition. In our example, there are two starting conditions, separated by a comma. We set loop counter *x* equal to 0, and we set the last element in work_in equal to 2.

After the starting conditions comes the terminating condition. This is a statement that's tested during each pass through the loop. If the statement is true, the loop continues to execute. If it's false, the loop ends. In this case, the terminating condition is that *x* must be less than 10. If the value of *x* is 10 or greater, the loop ends.

The last condition is a statement that executes at the end of every pass through the loop. This allows us to increment the loop counter, *x*. In this case, we combine the increment with an assignment statement. The statement *work_in[x++] = 1* is equivalent to the statements *work_in[x] = 1* and *x = x+1*. Thus, in its ten passes through the loop, this statement sets work_in[0] through work_in[9] to a value of 1, and work_in[10] to a value of 2.

Finishing The Call

The other input parameter we need to initialize is *handle*. This is the device ID number of the screen device. We initialize handle with the call *graf_handle( )*. This call shows two different ways in which a function can return information.

The first way is by assigning a variable to the value returned by the function. If *handle = graf_handle( )*, then handle receives whatever value is passed back by the graf_handle call, using the *return( )* function.

The second way is by using a pointer. The graf_handle( ) function uses the expression *&nul* as an input parameter. That expression gives the address of the variable nul. That way, the graf_handle function can store return values directly to that address. Since we don't really want the other information graf_handle returns, we make all four pointers the same.

Now that we've initialized work_in and handle, we can call v_opnvwk( ). Note that we passed a pointer to handle, so that v_opnvwk could use the value of the screen device ID and return the value of the virtual workstation ID in the same variable. We'll use the virtual workstation handle in the rest of our VDI calls, such as v_clrwk( ), which clears the screen.

Printing The Message

The next section of Hello, GEM! actually prints our phrase on the screen. Since GEM uses a bit-mapped screen (as opposed to a character-oriented screen), even text is considered to be graphics. Therefore, in addition to the text phrase to print, we must include the graphics workstation handle and information about the position of the text in our *v_gtext( )* call. I picked position 32,32 because it prints the text within the boundaries of the screen in any resolution mode. A more complex program, however, would take into account the screen resolution being used in order to position graphics objects and text.

Now that we've got the text on screen, we want to give the viewer a chance to read it before the program exits to the GEM desktop. Therefore, we'll use the VDI function *vq_mouse( )* to read the mouse button in a *while* loop. This is another kind of C loop which keeps executing as long as the statement in the parentheses following the keyword *while* is true. In this case, the statement following *while* is *button == 0*, which means that button must remain equal to zero for the loop to keep executing. (The statement *button = 0* is always true, since it assigns the value of zero to button.) Button == 0 remains true until one or both of the mouse buttons is pushed.

When that happens, the loop stops executing and the program executes the last two statements, which close the virtual workstation and unregister the application with GEM. This points out another difference between GEM and normal C functions. While C functions normally allocate and deallocate memory space automatically, GEM functions such as appl_init( ) and v_opnvwk( ), which allocate resources, usually have corresponding calls such as *appl_exit( )* and *v_clsvwk( )* to return these resources to the system. It's very important to remember to perform these corresponding calls before your program ends, because otherwise the system might not recover.

One of the reasons why C is so popular on the ST is that, as you've seen, the language easily integrates GEM system calls within its own framework. But programming with GEM adds yet another level of complexity to learning C. Though the sample program here is much more complex than its pure C counterpart, it is by no means a full GEM implementation. For instance, it does not open and manage a window.

Fortunately, C language implementations are very flexible in this regard. If you want to, you can use the standard character-oriented I/O traditionally associated with C, so you can follow the example programs in a standard C textbook. But if you want to get right down to creating full ST-style applications, you must take the plunge and use C and GEM calls together, expanding your programming horizons to the limit. **ST**

File Viewer

Richard Smereka

With this utility, you can view the contents of a disk file in hexadecimal and ASCII form, edit the file, and save the changes. Output can be directed to the screen, a printer, or another disk file. It runs on any ST in the medium-resolution color and high-resolution monochrome screens. Recommended for intermediate to advanced users.

When you open a nonexecutable file on the GEM desktop, one that's not a program, an alert box offers you the Show, Print, or Cancel menu. You can display the file on the screen or send output to a printer. But anything other than a text file shows up as garbage characters, and there's no way to edit the file while it's displayed. A general-purpose file viewer/printer/editor would be a useful utility to have around.

That's the reason behind "File Viewer." Like the GEM desktop, it lets you display the contents of a disk file on the screen or generate hardcopy on a printer. But it has many other features as well. First, it works not just with text files, but with all types of files—object files, source files, data files, picture files. File Viewer also lets you direct output to another disk file in addition to sending output to the screen or a printer. It displays or prints each byte in the file in both ASCII and hexadecimal form, which is invaluable when analyzing a non-ASCII file. Additionally, this program lets you edit the file and save your changes on disk. File Viewer also has many options for controlling the input and output. And finally, it has a complete command-driven interactive mode that lets you supply a new display address during a file dump.

In effect, File Viewer is actually two programs in one: a view utility and a disk editor. Two separate programs could be written for these functions, but File Viewer conveniently includes the disk editor as part of the view utility itself.

One caution is in order: Since File Viewer lets you manipulate the contents of disk files on a byte-by-byte basis, it's not something to play around with haphazardly. If you're not careful, you can scramble a file or even a whole disk, perhaps irretrievably. Unless you know exactly what you're doing, don't edit any file you care about. If you do need to edit a file, a safe precaution is to copy the file to a blank disk and experiment with the copy.

Command Syntax

File Viewer is on this issue's magazine disk under the filename VIEW.TTP. In this form it can be run from the GEM desktop, but not from the magazine disk menu. To run it from a command-oriented interface such as "ST-Shell" (COMPUTE!'s Atari ST Disk & Magazine, December 1986), rename the file VIEW.PRG.

The command syntax of this utility can be rather complex, so read the following sections very carefully. Later, we'll show some actual examples of File Viewer in use.

When you run File Viewer from the GEM desktop, a dialog box labeled *TOS-Takes Parameters* appears after you double-click on the VIEW.TTP icon or filename. (See Figure 1.) You must enter the command parameters on the dotted line using this format:

[*options*] [*x:*][*pathname* \\]*infile* [[*x:*][*pathname* \\]*outfile*]

Parameters enclosed in brackets are optional; do not type the brackets. Separate options and parameters from each other with a space. We'll cover all these parameters in a moment.

When running File Viewer from a command-line interface such as ST-Shell, use this format:

VIEW [*options*] [*x:*][*pathname* \\]*infile* [[*x:*]
[*pathname* \\]*outfile*]

For both formats, *options* represents one or more options discussed below; *x:* is the disk drive identifier (A–P); *pathname* is the disk pathname, including names of folders (subdirectories) if any are used; *infile* is the filename of the disk file you want to view;

Figure 1: When you run "File Viewer" from the GEM desktop, it opens this dialog box to accept parameters

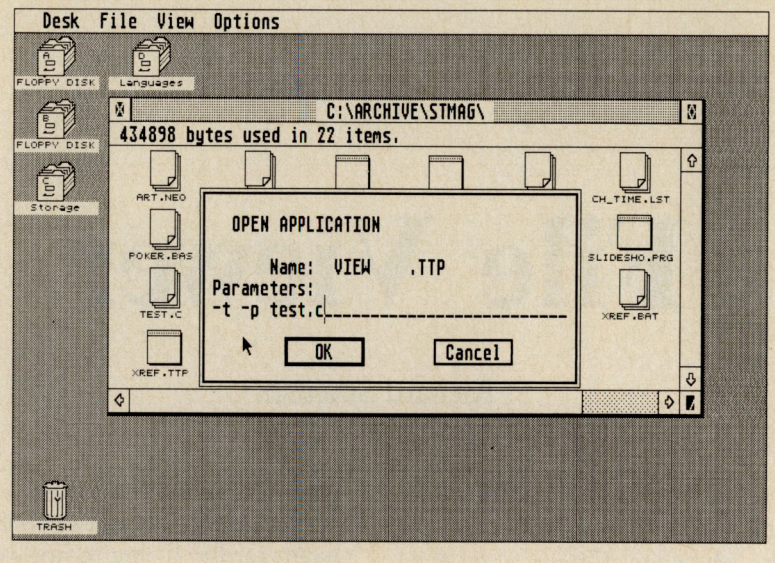


Figure 2: Sample output generated with "File Viewer."

```
                        FILE VIEWER

                COMPUTE!'s Atari ST Disk & Magazine
                    August 1987  Vol. 2 - No. 4

            Copyright 1987 COMPUTE! Publications, Inc.
                    All Rights Reserved

Page 1                      Dump of File: TEST.C

00000 000000   2369 6E63 6C75 6465 203C 7361 6D70 6C65  #include <sample
00010 000016   312E 683E 0D0A 0D0A 6368 6172 2061 7272  1.h>....char arr
00020 000032   6179 5B4D 4158 5349 5A45 5D3B 0D0A 0D0A  ay[MAXSIZE];....
00030 000048   6D61 696E 2829 0D0A 7B0D 0A20 2020 2020  main()..{..
00040 000064   7265 6769 7374 6572 2069 3B0D 0A20 2020  register i;..
00050 000080   2020 0D0A 2020 2020 2070 7269 6E74 6628    ..     printf(
00060 000096   2225 735C 6E22 2C53 3153 5452 494E 4729  "%s\n",S1STRING)
00070 000112   3B0D 0A20 2020 2020 7072 696E 7466 2822  ;..     printf("
00080 000128   2573 5C6E 222C 5332 5354 5249 4E47 293B  %s\n",S2STRING);
00090 000144   0D0A 0D0A 2020 2020 2066 6F72 2869 203D  ....     for(i =
000A0 000160   2030 3B20 693C 204D 4158 5349 5A45 3B20   0; i< MAXSIZE;
000B0 000176   692B 2B29 0D0A 2020 2020 2020 2020 2020  i++)..
000C0 000192   6966 2028 6172 7261 795B 695D 203D 3D20  if (array[i] ==
000D0 000208   5354 4F50 290D 0A20 2020 2020 2020 2020  STOP)..
000E0 000224   2020 2020 2020 6272 6561 6B3B 0D0A 2020        break;..
000F0 000240   2020 2020 2020 2020 656C 7365 0D0A 2020          else..
00100 000256   2020 2020 2020 2020 2020 2020 2062 6C61                bla
00110 000272   6E6B 5F61 7272 6179 2869 290D 0A7D 0D0A  nk_array(i)..}..
00120 000288   0D0A 626C 616E 6B5F 6172 7261 7928 6B29  ..blank_array(k)
00130 000304   0D0A 7265 6769 7374 6572 206B 3B0D 0A7B  ..register k;..{
00140 000320   0D0A 2020 2020 2061 7272 6179 5B6B 5D20  ..     array[k]
00150 000336   3D20 4E55 4C4C 3B0D 0A7D 0D0A 0D0A       = NULL;..}....
```

and *outfile* is the filename of the optional output file.

If you can't remember the syntax, run File Viewer with no parameters; it will display the proper format on the screen.

File Viewer Options

There are six options you can include in the *[options]* position on the command line:

- **−s** screen output (default = on)
- **−p** printer output (default = off)
- **−d** disk file output (default = off)
- **−t** TTP program pause after execution (default = off)
- **−o** offset into file (default offset = zero)
- **−w** screen wait (default = on)

The options are like switches that assume a position by default. When you include an option on the command line, you reverse the switch's position. In other words, if an option's default setting is *on*, then including that option on the command line turns it *off*, and vice versa.

You may type the options on the command line in any order using upper- or lowercase letters, and any number of options may be present. Be aware, however, that some options are affected by the state of other options. For instance, if you turn off screen output, you must turn on printer or disk output to avoid an error.

Redirecting The Output

Let's cover these options one at a time and see what they can do.

−s This option turns off the screen output. It's valid only when directing the output elsewhere, such as to the printer or another disk file. If you turn off screen output without redirecting output to a

printer or a disk file, then File Viewer displays the error message *No Output Requested.*

−p You can send output to the printer by including the *−p* option on the command line. If at any time File Viewer cannot communicate with the printer, it displays the error message *Problem Communicating With Printer.*

−d Two steps are necessary to redirect output to a disk file. First, the option *−d* must be included on the command line. Second, a filename for the new disk file must be included as the last parameter on the command line. If you specify a filename that already exists, the existing file is deleted, and the new file takes its place. If File Viewer is unable to write to the disk—for instance, if the disk is full—it displays the error message *Disk Write Error on [filename].*

−t This option is generally needed only when running File Viewer from the GEM desktop as a TTP application. When included on the command line, *−t* forces File Viewer to pause after displaying the output until you press a key. It then exits back to the GEM desktop. This gives you a chance to examine the output or any error messages that may appear. Without the *−t* option, File Viewer would return to the desktop too quickly for you to see any results. The *−t* option is not necessary when running File Viewer from a command-line interface such as ST-Shell, because the screen isn't cleared after the utility executes.

−o Normally, File Viewer starts dumping the file from the beginning (offset zero). If you include the *−o* option on the command line followed immediately by a decimal or hexadecimal value (with no spaces intervening), File Viewer begins displaying the file from the specified point. (To specify a hexadecimal offset, precede the value with an *x* or X.) If the offset value is not within the range of the file, File Viewer displays the error message *Illegal Offset Given* and begins dumping from the beginning of the file.

−w By specifying this option on the command line, you effectively turn off the screen-wait feature and the interactive-mode screen prompt.

Interactive Mode

As mentioned above, File Viewer has an interactive mode that lets you edit the disk file you're analyzing. Normally this feature is on. After displaying 21 lines of output on the screen, File Viewer waits until you press a key. You'll see this message:

A=Abort, N=No Wait, C=Change Byte, O=New Offset, Any Other Key

This is where File Viewer's interactive mode comes into play. You can press A, N, C, O, or any other key:

A (Abort) This aborts the display and exits the utility. If you've made any editing changes to the file you're analyzing, File Viewer asks whether you'd like to save the file with the changes. Just follow the prompts; the program will exit afterward.

N (No Wait) This turns off the wait feature; File Viewer displays the file continuously. To make the screen pause, press CTRL-S. To restart it, CTRL-Q. Since the interactive mode is available only when Wait is on, you can no longer edit the file or specify a new file offset.

C (Change Byte) This lets you edit the contents of the file by changing any byte. First, File Viewer asks you for the file offset. This is the number of bytes from the beginning of the file. Next, the program asks for the new byte value. Both the file offset and the new byte value may be entered in decimal (base 10) or hexadecimal (base 16) format. If you choose hexadecimal, the first character must be *x* or X. After you change the byte, File Viewer asks whether you'd like to change another byte. If you don't, File Viewer asks whether you'd like to continue the dump.

O (New Offset) This brings up a prompt for a new file offset. When you supply a new number in decimal or hexadecimal (with an *x* or X preceding hexadecimal numbers), the dump continues from the new offset.

Pressing any key other than A, N, C, or O continues the dump.

A Few Examples

If you're confused by how these options work, a look at the following examples should clear things up. Each example is shown two ways: As used from the GEM desktop when running File Viewer as a TTP application, and as used from a command-line interface such as ST-Shell. (Remember to rename the utility VIEW.PRG if you're running it from a command-line interface.)

Desktop example:

TEST.PRG

ST-Shell example:

VIEW TEST.PRG

This simply dumps the contents of disk file TEST.PRG on the screen. The dump starts at the beginning of the file, and File Viewer pauses every 21 lines until you press A, N, C, O, or any other key as explained above.

Desktop example:

−p −d TEST.PRG B:TEST.DMP

ST-Shell example:

VIEW −p −d TEST.PRG B:TEST.DMP

In addition to dumping the contents of disk file TEST.PRG on the screen, this example also sends output to the printer (*−p*) and a disk file (*−d*) named TEST.DMP on drive B. Since screen output is

active, File Viewer continues to wait every 21 lines for a keypress.

Desktop example:

```
-s -d -p TEST.PRG B:TEST.DMP
```

ST-Shell example:

```
VIEW -s -d -p TEST.PRG B:TEST.DMP
```

This is very similar to the previous example; it dumps the disk file TEST.PRG to the printer and to a disk file named TEST.DMP on drive B. But it turns off screen output by including the *-s* option. This also disables the interactive mode, since File Viewer won't prompt you on the screen to press a key every 21 lines.

Desktop example:

```
-p -d -oxFF TEST.PRG D:\DMP\TEST.DMP
```

ST-Shell example:

```
VIEW -p -d -oxFF TEST.PRG D:\DMP\TEST.DMP
```

This example shows how to display the contents of a file starting at an offset within the file, rather than from the beginning of the file. The *-o* option specifies the offset, which in this case is entered as a hexadecimal value, FF (remember that hex values must be preceded by *x* or X). In other words, the dump starts at position FF within the file TEST.PRG, which in decimal is the 255th byte. Alternatively, you could specify the offset in decimal as *-o255*. Other options on this command line specify that the dump is sent to the printer and a disk file named TEST.DMP in the DMP folder on drive D.

Notice that the offset value must follow the *-o* option without any space.

Desktop example:

```
-w -d -p -t -o10000 E:TEST.PRG A:TEST.DMP
```

ST-Shell example:

```
VIEW -w -d -p -t -o10000 E:TEST.PRG A:TEST.DMP
```

This dumps the file TEST.PRG on drive E to the screen, the printer, and a disk file named TEST.DMP on drive A. The dump starts at an offset of 10000 (decimal) within TEST.PRG. The *-w* option turns off the screen-wait feature, so the display scrolls by continuously without pausing for a keypress. Therefore, interactive mode is not available. The *-t* option forces File Viewer to pause for a keypress when it finishes the dump.

Sample Output

As seen in Figure 2, File Viewer's output is rather straightforward, particularly if you've used similar utilities or have ever seen a *core dump* on a mainframe computer. Since the Atari ST is a 16-bit computer, File Viewer formats the output in *words* (one word is two bytes or 16 bits). If you're more familiar with byte output, you'll quickly become accustomed to the new format.

Every page is numbered and includes a header with the name of the file being dumped. Each line of the dump includes the file offset in hexadecimal and decimal. Following this is the value of each word. Each word on the line is followed by a space.

Remember that there are two hexadecimal digits per byte, and four hexadecimal digits per word. Each line thus contains eight words or 16 bytes (hexadecimal 10).

The last portion of each line shows an ASCII representation of each byte on that line. Even if you're not familiar with hexadecimal numbers, you can observe the ASCII data within the file.

The file offset numbers make it possible to locate any byte within the file by locating the nearest offset and then counting to the byte you want. For instance, to find byte 50 (decimal), locate the nearest offset, which is 48. Start counting from the beginning of this line. Byte 50 would be the third byte, since the first two bytes are 48 and 49.

Whenever you change the file offset during a dump (by pressing O at the interactive-mode screen prompt), File Viewer outputs a blank line. Looking again at Figure 2, you'll see that the file offset was changed after byte 351 (336 + 15). The new offset starts from byte 944 and continues until byte 1295.

File Viewer continues dumping until it reaches the end of the file or until you abort. If you abort a dump while directing output to a printer or a disk file, File Viewer sends the message *Only a Partial Dump of [filename]* to the printer or disk file.

Additional Notes

When File Viewer dumps a file, it reads the entire file into the computer's memory and manipulates it there. That means you must have enough free memory to load the file. If there's insufficient memory, File Viewer displays the error message *Can't Allocate Enough Memory for This File*. You can free up extra memory by removing desk accessories, reducing the size of RAM disks, and so on.

Another error message that may appear occasionally is *Error Opening [filename]*, where *[filename]* is the file you're trying to examine. This indicates a problem with that particular disk file. File Viewer knows the file exists (a directory search has proven this), but it has encountered an error when trying to open the file. Try reading another copy of the same file on a different disk.

Programmers who wish to study how File Viewer works can examine the source code file VIEW.C on the magazine disk. File Viewer was compiled with *Mark Williams C*.

Please keep in mind that File Viewer is a very powerful utility that is intended for intermediate and advanced users. If you're not careful, you can do a lot of damage to a file. If you're going to make changes to a file, always work with a backup copy, not the original. **ST**

Nodemaster Chess

Jim Todd

How well do you play chess? Can you beat the ST in a head-to-head match? Find out when you play "Nodemaster Chess," a game written entirely in machine language. It runs on all STs, color and monochrome.

The game of chess has fascinated people for thousands of years. It originated somewhere in Persia or India and gradually spread throughout the world. The rules we use today evolved in Europe during the Middle Ages.

The first researchers in artificial intelligence (AI) believed that a good chess-playing algorithm would be a major breakthrough. If you could figure out how to write a program that thinks and makes decisions like a grandmaster-level chess player, you'd be able to write other very powerful AI applications.

As computers got faster and the cost of memory decreased, programmers were able to take a new approach to chess—using *brute force*. First, you give the computer a way of deciding which moves are legal, and you add a routine that analyzes the relative strength or weakness of a position. Then you test every possibility. The computer has, say, 40 possible moves. The other player has perhaps 40 responses. That gives the computer somewhere around 1600 positions to analyze. Another 40 moves (64,000 boards) and 40 responses (2.5 million boards) later, you find a reasonably good move. It doesn't require intelligence, just a way of deciding if a move will lead to a good or a bad position.

This is how "Nodemaster Chess" works. In fact, after every move it will tell you how many board positions, or *nodes*, it considered before deciding on a single move.

Preparing To Play

Nodemaster Chess is on this issue's magazine disk as CHESS.PRG. You can run the program from the GEM desktop or the magazine disk menu. It works on both monochrome and color monitors. Readers with color monitors must use Set Preferences to switch to medium resolution; Nodemaster Chess doesn't work in low resolution. Black and white are used for the chess pieces, while the chess board is drawn in red and dark gray.

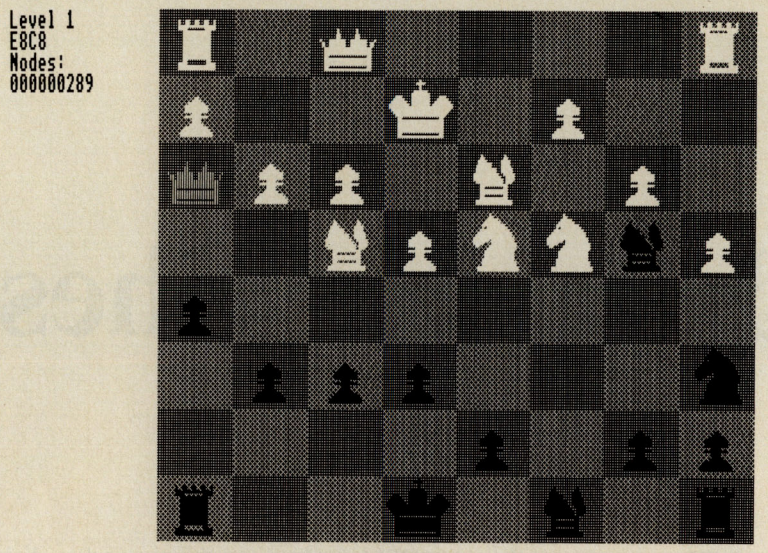
When the copyright notice appears, press any key. The program asks, *Play W)hite or B)lack?* Press the *W* key to play the white pieces or the *B* key to play the black pieces. The color you select is always positioned at the bottom of the screen. White always moves first.

Next, the program asks, *Set up chess problem (Y/N)?* If you press *N* for No here, Nodemaster Chess sets up a standard board for a new game. If you press *Y* for Yes, the program will present you with a blank board before the game starts. By repeatedly pressing the right mouse button on the blank board, you can cycle through all of the white and black pieces and place them on any squares you want. (An alternate method of selecting the pieces is to use the cursor keys and the *Home* key; more about this later.) This makes it possible to set up a game in progress (using notes made from a previous game) or to set up chess problems. To begin playing, move one of your pieces.

Next, the program asks, *Skill level 1–5 (1=easy, 5=hard)?* Simply press a number key from 1 to 5 to choose a difficulty level as described below:

Level	Approximate Time Per Computer Move
1	2 seconds
2	2 minutes
3	1 hour
4	24 hours
5	24+ hours

Level 1 is recommended for beginning players. Level 2 plays at an approximate 1200 rating (a United States Chess Federation rating of 1500 is about



With "Nodemaster Chess," you can play against your ST on any of five skill levels.

average for tournament players). Level 4 is good for postal chess, and level 5 is recommended only for solving difficult chess problems.

Making Moves

If you selected the white pieces, it's your move to begin the game. All moves are made with a large cursor that always returns to the lower left square between presses of the mouse button. To pick up a piece, position the cursor on that piece by moving the mouse or pressing the cursor keys, then click the left mouse button.

To move the piece, simply position the cursor on the destination square and click the left mouse button again. The piece instantly moves to the new square, and the computer begins thinking about its countermove.

You may prefer to use the cursor keys instead of the mouse; press them to move the cursor in the indicated direction. To select a piece, a left mouse button function, press the *Insert* key. Move the cursor to the desired position, then press the *Insert* key again to complete the move. As mentioned earlier, the *Home* key allows you to change a piece, simulating a press of the right mouse button.

If you pick up a piece by accident, or change your mind and decide to move another piece, you can put down a selected piece by deliberately making an illegal move. Since Nodemaster Chess doesn't allow illegal moves, it deselects the piece and returns the cursor to the lower left square.

When the computer is done thinking, you'll hear a bell tone (if you don't, turn up the volume on your monitor). The computer's piece flashes twice, then moves to the new square. If you're keeping records of the game, notice that the computer's move is printed in the upper left corner of the screen in algebraic chess notation.

The program also reports the number of *nodes*—possible board positions—it evaluated before making its decision. This number increases on the higher skill levels.

Additional Notes

To castle (a special maneuver involving the king and a rook), move the king two squares toward the rook. Don't move the rook first; it will be taken as a single move by the rook and not recognized as a castling move. Nodemaster Chess recognizes castling and automatically places the rook into position for you. Remember that castling is not allowed if the king is in check.

To capture a pawn *en passant* (another special maneuver), the capturing pawn must be on the fifth row. When the computer moves a pawn two spaces, so that its new position is next to your pawn, you may capture it *en passant* by moving diagonally into the square the other pawn passed through.

When a game ends in checkmate or stalemate, Nodemaster prints an appropriate message in the upper left corner of the screen, and rings the bell three times in succession. Press *R* (Restart) to play another game; press *E* (Exit) to end a game in progress and return to the GEM desktop.

If you're losing badly, think of *R* as *Resign*. You can select a different color or skill level for the next game.

At any point during a game, you can change,

add, or delete a piece on any square by repeatedly pressing the right mouse button until your choice appears. Occasionally this feature comes in handy for pawn promotion and other unusual situations. Of course, it also lets you cheat. Is the computer's queen causing you trouble? Turn it into a pawn. Better yet, turn four or five of your own pawns into queens. Nodemaster Chess will do its best to cope with any situation you may create.

The intelligence routines in Nodemaster Chess work by performing a *ply search*—the program looks ahead a certain number of moves and picks the best alternative from that range of moves. The depth of the ply search is twice the skill level. Therefore, on level 1, the program looks only two moves ahead; on level 5, it looks ten moves ahead.

Nodemaster Chess is written entirely in machine language for speed and compactness. The executable program file CHESS.PRG is only about 11K long.

The Rules Of Chess

If you've never played chess, here's a brief introduction to the rules. There are many books available that explain tactics and strategy in depth, so this is just an overview to get you started.

Players take turns making moves, with the white player making the first move. You must make a move when it's your turn; it's not possible to pass. If the only available moves would place the king in check—which is illegal—the game is said to end in *stalemate*. In other words, it's a tie; nobody wins.

When it's your turn, you have the choice of moving any piece that's not blocked. There's one exception: If your king is under attack, it's in *check* and you must protect your king by moving him out of check by interposing a piece between the king and the attacker, moving the king out of the attacker's path, or capturing the piece giving check. You must defend the king at all costs. You can never move the king into check.

The goal of the game is to checkmate your opponent's king. (*Checkmate* comes from the Persian phrase *shah mat*, which means *the shah is dead*.) Checkmate occurs when the king is in danger of being captured and there are no moves which will extricate him from this state. The game ends on this note. The king is never captured.

The king is thus the most important piece because checkmate ends the game. The king can move one space in any direction—horizontally, vertically, or diagonally. Once per game, the king can castle, moving two spaces toward a rook, with the rook jumping over the king. You're not permitted to castle if the king or the rook is under attack or if either has previously moved. You can't castle across a square that's covered by an opponent's piece. The advantage of castling is that it moves the king near a corner, away from the action, and puts a rook into play near the center columns.

The queen can move in a straight line any number of squares horizontally, vertically, or diagonally. No piece can jump over another, except a knight. So for a queen's move, the intervening squares must be clear.

Bishops move any number of squares diagonally, which means that a bishop that begins on a white square remains on that color for the whole game. The bishops flank the king and the queen, one on each side, at the start of the game.

Knights are the horse-shaped pieces that start one square from the corner, between the bishops and rooks. They move in an *L* shape: forward or backward two spaces—horizontally or vertically—and then one space at a right angle (or one space horizontally or vertically followed by two at a right angle). They're the only pieces allowed to jump over other pieces.

The rooks, which resemble castles, begin in the corners. They move in straight lines forward or backward, left or right (but never diagonally).

Pawns advance forward, one square at a time, in a straight line. They can't move backwards. As their first move, pawns can optionally move two squares instead of one, from the second row to the fourth. If the space in front of a pawn is occupied, no movement is allowed. Pawns capture diagonally one space (but only in the squares to the left and right).

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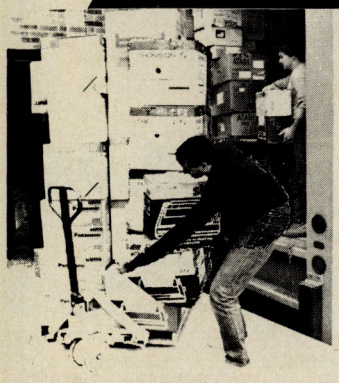

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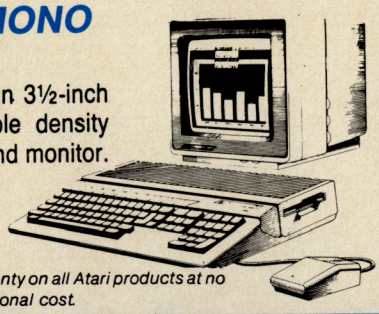

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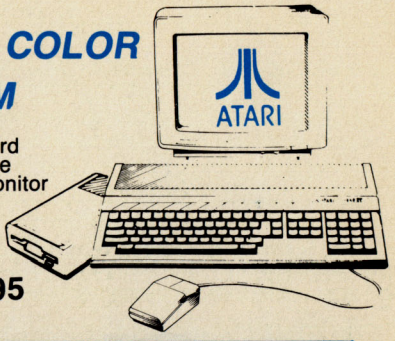

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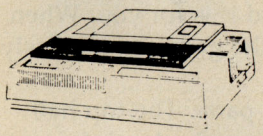

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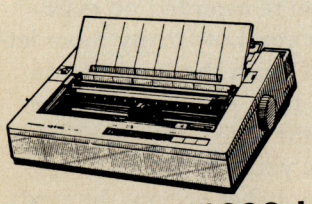

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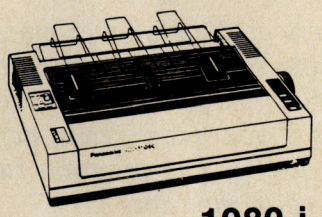

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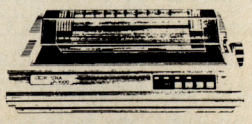

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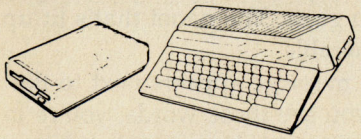

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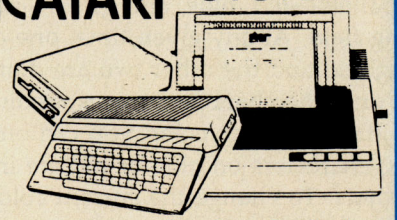

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Character Combat

Jeff Stillson

As letters of the alphabet march relentlessly across the screen, your job is to zap them before they breach the inner wall. You'll succeed if you have steady nerves and good typing ability. The program runs on all STs with a color monitor.

There are two ways to describe "Character Combat." If you're a hunt-and-peck typist, it's an educational program that helps you learn to type a little faster. For keyboard experts who don't need any typing practice, it's an action game that challenges your dexterity.

To run Character Combat, switch to low resolution and open the file CHARCOM.PRG from the desktop or select it from the disk menu program. If you attempt to run Character Combat in medium resolution, an alert box tells you to switch to low resolution.

Character Combat is fairly easy to play. Letters appear on the left side of the maze and scuttle to the right. If one of them makes it to the right-hand edge, you lose a life. You stop a letter by pressing the corresponding key on the keyboard (typing A shoots the character *A*, typing Q zaps the *Q*, and so on).

There's one trick, though. There are three colored panels—red, blue, and green—just above the playing field. At any given time, one of the panels is highlighted and the other two are dim. You may shoot only the characters corresponding to the bright color. If green is the color, you can only shoot green letters; characters on blue or red are immune from your shots. To change the current color, press the space bar.

Getting Started

After you've run the program, you see the title screen. You have the option of playing a relaxed, standard, or frantic game. Select the speed by pressing the number next to the speed at which you want to play. It's probably best to try the standard game first to judge how easy or hard it is for you. When the speed has been selected, the game immediately starts at level 1.

The main screen has two parts. The top half contains a variety of indicators and other information. The bottom half is the playing field, where all the action occurs.

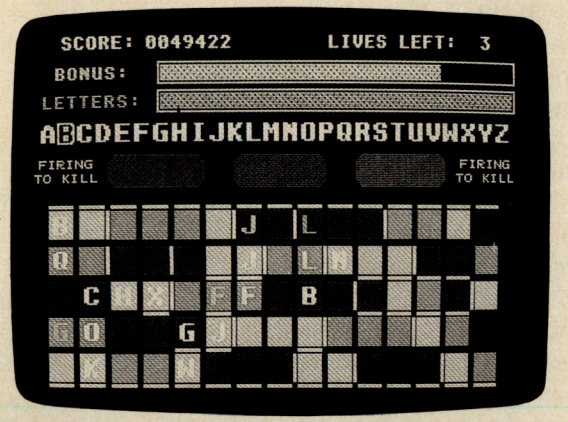
The top line of the upper screen tells you the score and number of lives left. Just underneath is the bonus/timer bar, which measures the time you have left to clear the level. If the bar hits zero, the level automatically ends, and you're awarded no extra points. The letters bar tells you how many more letters you have to destroy to finish the level. If you clear the maze with bonus time remaining, you're awarded bonus points for the level. The more time left, the more bonus points you get.

The 26 letters of the alphabet occupy the next row. At the beginning of a level they appear in order, from *A* to *Z* (later, they may change positions, which is explained below). As you move to higher levels, some of these letters will not look normal; they might be outlined, light, or underlined. We'll explain what this means in a moment.

Just above the playing field are the three color panels. These rectangles tell you which letters are vulnerable to your zap guns. The panel that's lit up is the color that's vulnerable.

The *Firing To Zap* message appears next to the three color blocks. If you see these words, you're in zap mode, where shooting at a letter sends it into oblivion. If the message is turned off, you're in back-up mode, where pressing a key causes the letter to back up a space.

The rest of the screen is the maze. The configuration for the current level is selected randomly from a pool of ten, but the hardest mazes aren't activated until you get to higher levels. All mazes are 5 rows



Zapping letters of the alphabet in "Character Combat."

by 15 columns, and contain three things: colored squares (red, blue, green, or white), walls, and letters.

Keyboard Commands

The keys you'll use most often are the letters *A*–*Z*. Other keys you may need include the following:

- The *space bar* changes the color of the target background. One of the three color panels darkens and the one to the right lights up.
- *Return* toggles the firing between zap mode and backup mode, turning the message *Firing To Zap* on or off.
- *F1* pauses the game. Press F1 again to resume the game.
- *F10* ends the current game. You see your final statistics, and are then asked if you want to play again.
- *Enter* (on the numeric keypad) starts a new level after the bonus/timer or letters bar has counted down to zero.

Special Characters

Letters always enter the playing field on the left edge. They generally move from left to right. If a wall blocks forward progress, letters try to walk around it by moving up or down. They never back up unless you're shooting at them in backup mode.

To shoot a specific character, you must note which color it's on and use the space bar to highlight that color panel. Then type the corresponding letter on the keyboard. Most of the time you shouldn't be aiming for individual letters, however. A better strategy is to note the current color and shoot any letters that match up. If the current color is red, shoot all the red letters.

When you begin a game, you'll notice that the 26 letters are in alphabetical order and they all appear as normal characters. As you proceed to higher levels, some characters will be underlined or outlined and some will change places. These are *special characters*, which change the rules slightly. Keep in mind, though, that the letters in the maze are always white and of normal style.

Shakers are the outlined letters. When zapped, they shake up all the letters in the maze. The remaining characters move one space in any direction. In addition, a zapped shaker leaves a white spot in the maze where it was shot.

Makers are underlined. When makers are zapped, they make a wall in one of the four spaces around them.

Takers are underlined and light. These guys can walk through walls—or actually, knock down the walls as they walk over them. Nothing special happens when they are shot.

Swappers are light (shadowed). These are nasty ones. When you shoot one, two letters swap positions in the alphabetical list of letters. Henceforth, when you want to shoot a letter which is not in its proper place in the list, you must hold down Shift while pressing the letter key.

Two Firing Modes

You are allowed to shoot letters of a certain color for only a little while before the color changes automatically. The higher the level, the shorter the color cycles.

There are two firing modes, Shooting To Zap and Shooting To Back Up. Press the Return key to toggle between the two. When you are shooting to zap and you hit a letter, it disappears from the board. If it is a letter whose target letter has a special style, then the special effects are triggered.

When you are in backup mode, the current target color has no effect. The rightmost letter corresponding to the key fired is affected, regardless of the color that's turned on, including white squares. Also, the letter is not zapped. Instead, it simply moves one space to the left. If moving to the left pushes the letter off the left edge of the maze, it is removed from the maze.

The main benefit of backup mode is that if the letter is of a special style, no side effects are triggered when you shoot it. If you dislike the effects of zapping a swapper, you can push it off the board. It is also the only way to shoot letters stuck on white squares, because it's impossible to eliminate letters occupying white spots while you're in zap mode.

Additional Rules

White squares make things a little harder. Besides being unable to zap the letters they contain, you can't see white letters against their white background. Keep this in mind if you're just about finished with a maze, but can't seem to figure out the location of the last letter or two. The missing letters are probably caught on white squares surrounded by

walls. You must turn zap mode off and start going through all the letters of the alphabet as quickly as possible, listening for a letter backing up. Then get it out in the open and zap it, or simply back it up until it falls off the left edge of the maze.

Each of the sound effects has a meaning. There are distinct *pings* and *shooshes* for each of the following events: zapping a normal letter; zapping a shaker; zapping a maker; zapping a swapper; a taker breaking down a wall; hitting a letter in backup mode; hitting the space bar or Return key to change the color or firing mode; the target color changing by itself; losing a life; and the clearing of a maze.

When a letter falls off the right edge, you lose one life. The letter that went off the edge disappears and the rest of the letters in the seven rightmost columns are removed from the maze to be added back later in the level.

You score points for the following: zapping a letter, having bonus time left at the end of a level, and making the special bonus on the bonus round. For knocking out a letter, you generally receive around 400 points, although this value depends on two factors: the speed at which you're playing, and where you zapped the letter (the farther to the left the letter is when you kill it, the more points you get).

For bonus time, you receive 240 points for every second left. You also get 20,000 points for zapping all 20 letters in a bonus round.

Earning A Bonus

On the first three levels, you see standard mazes. The fourth is the dark level. The fifth is a bonus round, where you have a chance to earn extra points. This pattern of three normals, one dark, and one bonus repeats until the game ends.

All levels that are multiples of 5 (levels 5, 10, 15, and so on) are bonus rounds, where there are no walls, white squares, or special letters. The maze always has the same simple color pattern, and there are always exactly 20 letters that must be zapped to clear the maze. What makes a bonus round hard is that the letters move a lot faster than usual. You get normal points for the letters, but if you zap all 20, you get a special 20,000-point bonus. This really is a bonus round; you don't even lose a life when a letter goes off the right edge of the maze, and the rightmost seven columns don't clear when a letter goes off the right edge.

You're given an extra life after completing every bonus round, whether you make the 20,000-point bonus or not.

Just before the bonus rounds (levels 4, 9, 14, and so on) are dark levels. The colored squares of the maze all start out black and change to their actual color only when a letter moves onto the square.

At the end of a game, your final skill level is displayed. This rating is a measure of the actual difficulty of the final level you completed. **ST**

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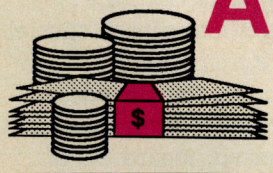

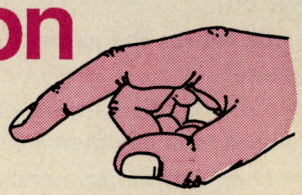

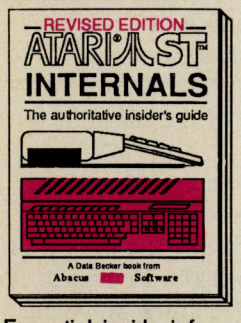

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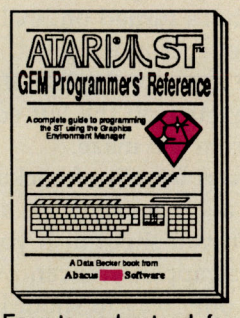

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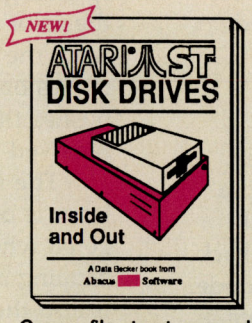

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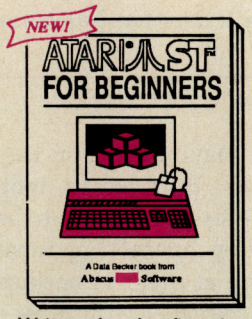

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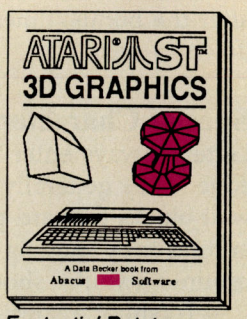

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Personal Calendar

Guy Davis

Never miss an important appointment, birthday, or anniversary again. With this valuable application, you can create an appointment calendar for any month of any year. It's easy to use and runs on all STs, color or monochrome.

Elephants and computers may never forget (at least while the power's on), but people do. Forgotten appointments and events can lead to disaster, discord, and disruption. Were you supposed to have lunch with Marty this Tuesday or next Thursday? Is Uncle Ben's birthday on September 7 or September 17? When is the next loan payment due? And is your wedding anniversary creeping up again?

If you use your computer frequently—either at the office or at home—an appointment calendar program may help you keep up with important events. Ideally, the program should be easy and quick to use, allow you to schedule events as far in advance as you want, and let you jot down short notes to jog your memory about important dates and appointments.

"Personal Calendar" lets you do all this and more. You can even schedule events into the next century if you want. And it runs on all STs—color systems in medium resolution, and monochrome systems in high resolution.

Getting Started

On this issue's disk you'll find two files for Personal Calendar: CALENDAR.PRG and CALENDAR.PAS. CALENDAR.PRG is the Personal Calendar program itself, and CALENDAR.PAS is the *Personal Pascal* source code, which is mainly of interest to programmers. To run Personal Calendar, select it from the disk menu or click on the icon/filename from the

Figure 1: "Personal Calendar" lets you schedule appointments and important events for any month of any year.

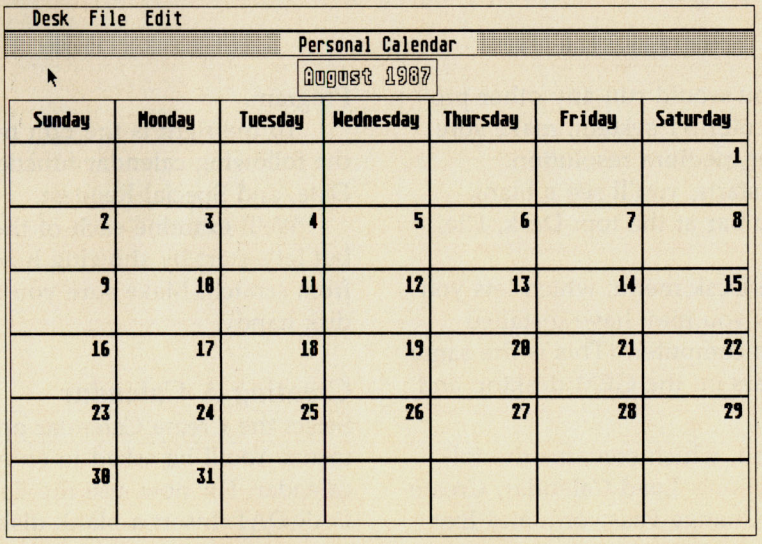


Figure 2: Each day of the year has a ten-line memo pad for jotting down notes.

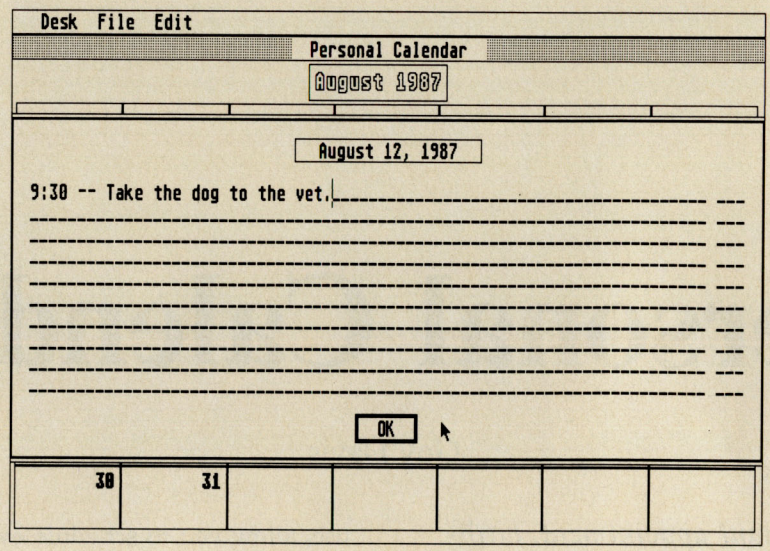
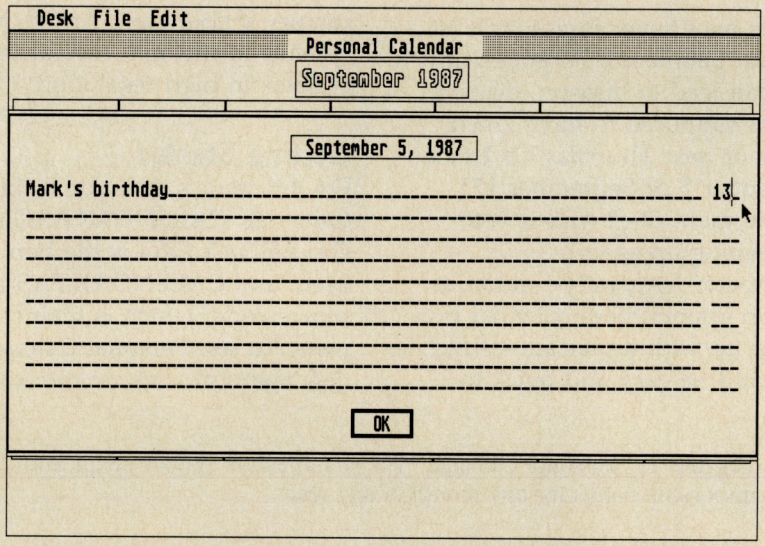


Figure 3: The program can even warn you ahead of time of upcoming special events.



GEM desktop, just as you would run any other program. If you're using a color ST system, make sure the screen is adjusted for medium resolution.

When the program starts, you'll see a blank screen with a new menu bar at the top: Desk, File, and Edit.

At the far left is the Desk menu, which lets you run any desk accessories you may have installed when you booted up the computer. (This is the same Desk menu which appears on the GEM desktop and in all GEM applications.)

Next is the File menu, which contains the following disk-related selections: Load Calendar, Create Calendar, Convert File, Change Password, and Exit Program.

To the right is the Edit menu, which contains the following calendar functions: Select Month, Set Date, and Special Request.

We'll examine each of these functions in detail, but let's start by showing how to create a calendar from scratch. Make sure you have a blank formatted disk handy.

Creating A Calendar

Select the Create Calendar option under the File menu. You'll be asked to enter a filename for your calendar. For now, use the default filename, CALENDAR.DAT. Insert a blank disk in the drive and press

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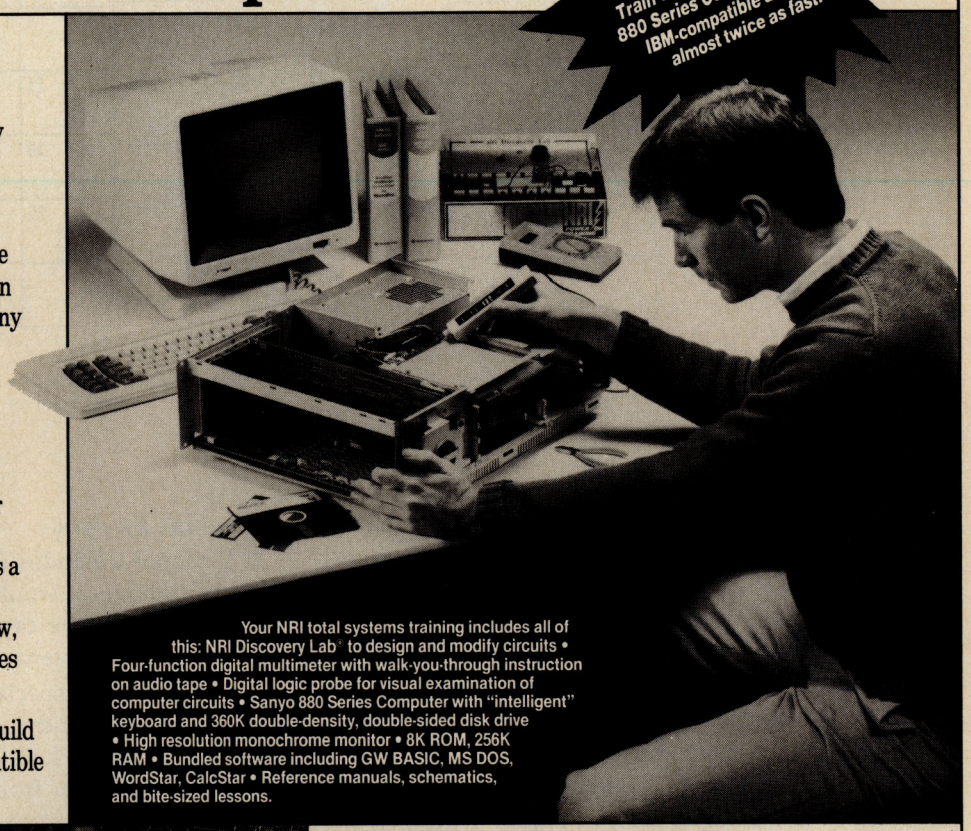

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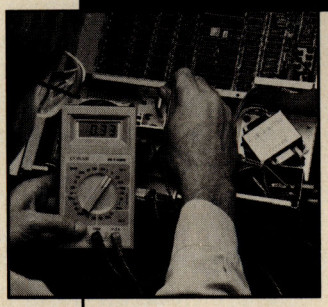

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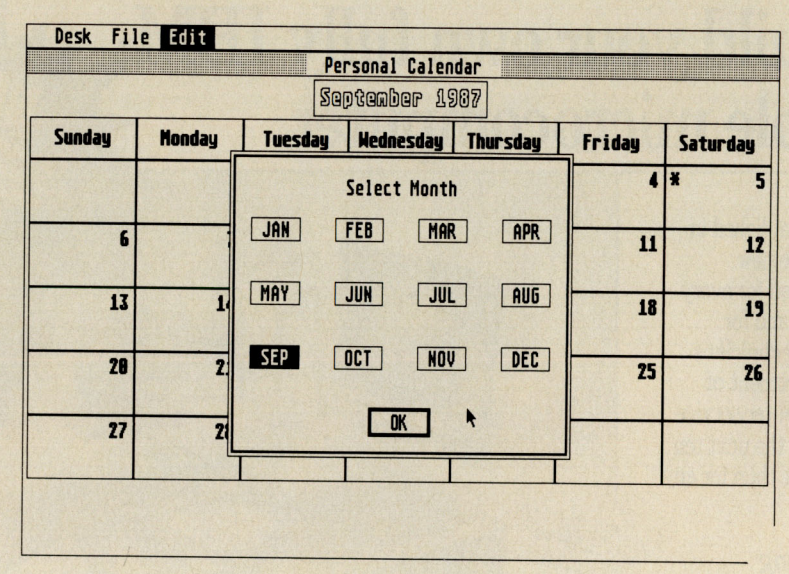
Figure 4: Once you create a yearly calendar, you can display any month in that year.



Return.

The program then prompts you to enter a password. This lets you protect your calendar entries from prying eyes. The password must be in all-uppercase letters (such as OVERLORD). If you don't want password protection, just press the Return key.

Next you're prompted to enter a four-digit year. Enter 1987 and press Return.

After some brief drive activity, a month is displayed on the screen as seen in Figure 1. At this point you have successfully created your first calendar file. Now let's make some entries.

Point to any day on the calendar and click the left mouse button. A ten-line memo pad for that day appears, as shown in Figure 2. Each line is divided into two columns; the lefthand column is the longest line. This column is for entering notes like "Mom's birthday" or "9:30—Take the dog to the vet." The righthand column, only three spaces wide, is for special entries, and we'll cover this in a moment. For now, just type a couple of entries in the first column.

You can move the cursor to a new line in the memo pad by clicking on that line with the mouse, by pressing the cursor-control keys, or by pressing the Tab key. If you make a typing mistake, you can fix it with the Delete, Backspace, and cursor keys; the Escape key erases all text on a line. When you're done typing entries, click on the OK box or press Return. The memo pad disappears.

When the calendar reappears, you'll notice that the day you selected is flagged by an asterisk. This indicates that information is stored for that particular day. In the future, whenever you run the program and check the calendar, you'll know that something you want to remember is happening on that day.

Special Events

If Personal Calendar did nothing but what is described above, it would already be a useful program. But it also has the capability to alert you ahead of time to special events that are particularly important.

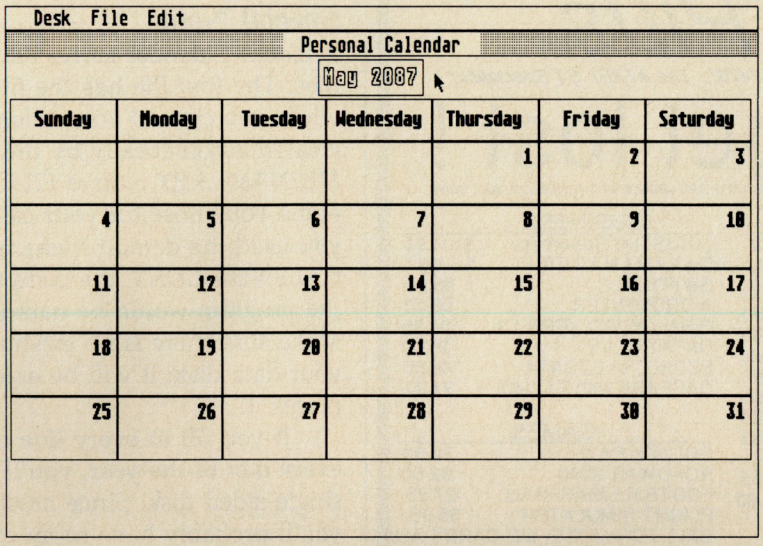
To record a special event, enter a note to yourself in the lefthand column of the memo pad as explained before. Then, in the small righthand column, enter any number from 1 to 366 to indicate how many days in advance you want to be alerted to the event. For instance, if you enter a 10 in the righthand column, Personal Calendar will automatically display the memo pad for that day up to 10 days ahead of time. The memo pad will pop up whenever you select the Load Calendar option under the File menu or the Set Date option under the Edit menu.

To see how it works, point to a day on your calendar and click the mouse button. Type in an entry and include the 13 in the second column as shown in Figure 3. Then click on the OK button and select the Set Date option under the Edit menu. Set the date to be within 13 days before your entry and press Return.

The first thing you'll see is the memo pad for the date you just set; this lets you enter any appointments for that day. When you click on the OK box, the program searches for any upcoming special events. When it reaches the special event you just entered, it displays that day's memo pad on the screen.

This is an extremely valuable feature. As long as you run Personal Calendar on a daily or near-daily basis, you'll always be alerted to a special event in plenty of time—up to a year in advance, in fact. (Remember, any number from 1 to 366 days can be entered in the special event column.)

Figure 5: The Special Request feature of "Personal Calendar" is ideal for people who like to plan their life far in advance.



Note: The memo pad that pops up to inform you of a special event doesn't let you make any editing changes. To close the memo and return to the calendar, click on the OK box. If you want to make changes to the memo pad for that day, just click on the calendar and open it as usual.

Other Options

Let's examine some of the other functions of Personal Calendar. The Set Date option can be used to set the current date or to test any special entry you type in. When you first run the program, the computer's GEMDOS system date is retrieved and used as the current date. (If you have a realtime clock and calendar installed in your ST, you'll probably never need to access this function.)

The Select Month option under the Edit menu lets you change the month displayed on the screen to any month in the current year. Just click on the box representing the month you want and then click OK. (See Figure 4.)

If you want to set an event further into the future—next year or next century—choose Special Request under the Edit menu. Type in any date you can think of and press Return. As shown in Figure 5, Personal Calendar calculates the calendar for that month and displays it on the screen.

You can even use the Special Request function to call up calendars for past years. For instance, the calendar for December 1941 accurately shows that Pearl Harbor Day, December 7, fell on a Sunday.

To exit the Special Request function, click the mouse anywhere on the calendar screen or make any other menu selection.

When you select the Change Password option under the File menu, the program displays the password you entered for the current calendar file and lets you change it. If you didn't choose password protection when you created the file, or if you change the current password to blanks, the file will automatically load for you in the future without requesting a password.

The Load Calendar option under the File menu lets you load any previously created calendar file. Normally you select this function each time you run Personal Calendar. If the year of the calendar file you are loading matches the year to which the system clock is currently set, the program displays any special events for that particular date.

Converting Calendars

The Convert File option under the File menu lets you convert an existing calendar file to another calendar file of a different year. This can save you a great deal of work when each new year begins.

For example, let's say you've created and used a calendar file for 1987. When 1988 rolls around, you want to keep all of your old special entries—annual events such as birthdays, anniversaries, and the like. By loading the 1987 calendar file (or a copy of it) and selecting Convert File, the 1987 calendar will be reformatted so you can use it for 1988.

Before carrying out this conversion, the program asks if you're sure you want to reformat the currently loaded calendar. If you answer yes, you're asked to enter a password and the year to which you want the file converted (normally the following year). Any entry that was not marked as a special entry is stripped from the file.

To exit Personal Calendar and return to the

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GEM desktop, select the Exit Program option under the File menu.

Special Notes

Personal Calendar stores all of its data in two disk files. The first file has the filename you selected when you created your calendar. The second file is created automatically by the program and is named *FILENAME*.KEY, where *FILENAME* matches the filename you chose for your calendar. For instance, if you used the default filename for your calendar, CALENDAR.DAT, the companion file generated by the program would be named CALENDAR.KEY. Make sure there is no existing file of this name on your data disk; it will be erased as the new file replaces it.

If you fill in every line on the memo pad for every day of the year, you'll just about fill up one single-sided disk. Since most people aren't *that* busy, you'll probably have room on your disk for several calendar files. You can keep separate calendars for personal events and business appointments, for example. If a disk starts to get full, though, it's a good idea to copy the current calendar file and its .KEY file to a fresh disk.

If you decide to put several calendar files on one disk, name the files carefully. The files CALENDAR.Y87 and CALENDAR.Y88 would have the same key file, CALENDAR.KEY. Of course, this means that the second CALENDAR.KEY file would erase the first one. To avoid this problem, name your files CAL1987.DAT and CAL1988.DAT or something similar. These two files would have the key files CAL1987.KEY and CAL1988.KEY, thus eliminating any problem.

You can easily make a paper copy of any calendar by pressing the Alternate-Help keys to generate a printout using the ST's built-in screen dump utility. Just make sure you have a compatible graphics printer hooked up and online, and that it has been set up properly with the Install Printer desk accessory that came with your ST. See your computer manual for more details.

Personal Calendar computes all of its dates using the Gregorian calendar system. By papal decree, the Gregorian calendar replaced the old Julian calendar in 1752. Although Personal Calendar can display months before this year, the program displays the month as it would have appeared if the Gregorian calendar were in effect at that time. Therefore, the calendar screen won't reflect the actual arrangement of days as they fell under the Julian calendar. For instance, Personal Calendar can display the month of December 0001, but it appears as that month would have looked if the Gregorian calendar had been adopted in the year 0001.

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ST

Balance of Power

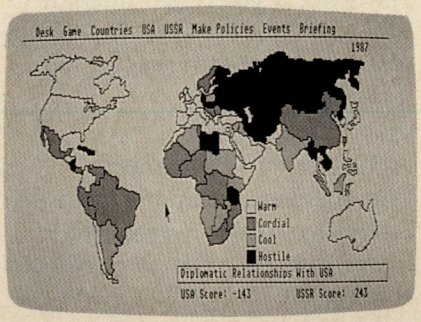
Todd Heimarck
Assistant Editor

Requirements: Any ST with the TOS operating system in read only memory and a color or monochrome monitor.

When the title screen of *Balance of Power* first comes up, you're given the choice of playing the part of Americans or Russians. But, contrary to what you might think, this is not a typical war game where two superpowers slug it out for supremacy. In fact, if you accidentally (or deliberately) set off a nuclear war, everybody loses. *Balance of Power* is best described not as a war game, but as a peace game.

The main screen is a world map, and everything is controlled with the mouse and drop-down menus. The menus also act as a kind of world almanac—you can find out which nation has the most political violence, the most doctors, or the most television sets. A scoreboard on the bottom line tells you how many points have been acquired by the USA and the USSR. The goal of the game is to gain more points than the other player. Most people automatically choose to play the United States president against the computer's Soviet leader, but it's occasionally insightful to try the Russian side, to see things from their point of view.

You get points by helping your friends and not helping your enemies. But it's not that simple. It's really a popularity contest in which you have to reap votes from the other countries in the world.



Wielding Influence

As the leader of a superpower, you have a wide variety of options at your disposal. You can send military aid to a country's government or bankroll the insurgents—or do both, if you want. You may send billions of dollars in economic aid. To put a little more force behind your actions, you can land troops in a country, either in support of the government or on the side of the rebels. You can ask the CIA (or KGB) to destabilize the government. This might range from encouraging dissidents to the more extreme actions of inciting riots or supporting a *coup d'etat.* You can sign treaties with the heads of governments, whether it's a simple matter of establishing trade relations or agreeing to a conventional (or nuclear) defense accord. Finally, you can turn on the diplomatic pressure, which often leads to a statement that the country wishes to maintain good relations. You get points for these statements.

At the same time that you're providing military aid to Israel (assuming you're playing the USA), giving economic grants to Peru, and signing a treaty with Burma, the Soviets could be rushing troops to East Germany, supporting the economy of Syria, and destabilizing the government of the Philippines. East Germany and Syria are Soviet allies, but the Philippines are on your side, so you'd have to stop the Russians from getting involved there.

While it's your turn, either before or after you've sent guns, money, troops, diplomats, and spies into a country, you have to take a look at what the other side is doing. You'll see a list of things that the Soviets (or Americans) are up to. Let's say the Russians have sent some economic aid to Poland. You, as the president of the USA, can ignore their action or start a back-channel discussion, in which your diplomats indicate that your government disapproves of their actions in this situation. If you object, you initiate a *crisis,* which gives each side a chance to either stand firm or back down.

In a crisis situation, whoever backs down first loses points. If you're arguing about the Sudan and you back down, you might lose a few points. No problem. But if you're talking about Great Britain or India, the stakes might grow to a few thousand points.

If neither side backs down and you both stand firm, the result is a nuclear war. Everyone loses. The game is over.

Exercising Judgment

When you're deciding on a policy to pursue in a certain country, you must remember two things: How important is the country and in which sphere of influence does it belong?

For example, Australia is worth a lot of points—it's strongly on the American side, and it's a partner of the USA in a nuclear defense treaty. If you play the

Soviet side, you can't send troops into Australia (well, you can, but you'll either have to back down or risk starting a nuclear war). Likewise, if you're playing the USA, stay away from places like East Germany. If the computer is playing the USSR, it won't let you destabilize or support rebels in major countries that are strong Soviet allies.

After you make your moves and object to a few of the other player's policies, you select Next Turn. At this point, the computer lodges diplomatic objections to some of your decisions.

Balance of Power has an important psychological component, especially when you're playing against another person. You have to make tradeoffs and compromise occasionally. You might back down and remove your troops from Mali. But when the question of Mozambique comes up, you don't flinch. ("Look, I removed my troops from Mali. You've got to give a little on this Mozambiquean situation.")

The computer's personality is very tough. It will let you get by with one or two outrageous actions, but eventually you'll be backed into a corner where the choice is to blow up the world or lose a lot of popularity points. However, if you're too timid, it will walk all over you. The trick is to avoid being too weak or too gung-ho.

A Game For Thinkers

The opening screen of *Balance of Power* says you're wasting your time if you play the game without reading the instructions—and it's right. You have to read the accompanying manual to understand how the game works.

Chris Crawford, who wrote *Balance of Power*, has also written a separate book (published by Microsoft Press) about how he put the game together. If you buy *Balance of Power* and you're interested in becoming a better player (or if you're a programmer who wants to learn how he programmed it), the $10.95 book is a wise purchase. Crawford has also written a more general book (published by Osborne/McGraw-Hill) about how to write computer games. It's pretty good, too.

Balance of Power is unlike the vast majority of computer games you might have encountered. If you have an interest in international politics, you'll find it a challenge.

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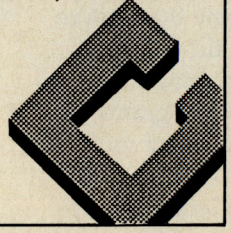

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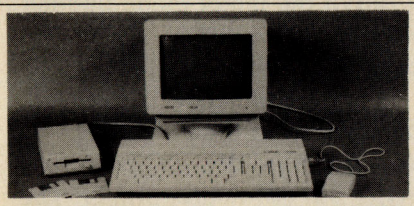

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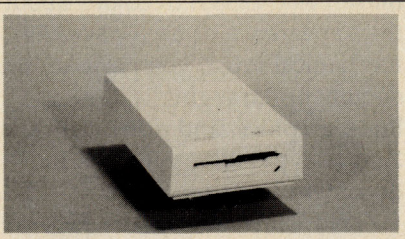

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Publishing Partner

Philip I. Nelson
Assistant Editor

Requirements: Any ST with a color or monochrome monitor and a printer. A laser printer is desirable, but not required.

SoftLogik's *Publishing Partner* is a comprehensive and extremely popular desktop publishing program for the Atari ST. Although some of the program's popularity certainly stems from lack of competition (at this writing, it is the only ST desktop publishing program available in the US), *Publishing Partner* is a powerful and attractive program in its own right.

Publishing Partner works on either color or monochrome Atari ST systems, although a monochrome monitor is strongly recommended for its higher resolution and superior picture quality. A color monitor may be useful if you want to use a color printer. Because some color printers may support a wider color range than the ST can display, the screen may not reflect the exact colors you select for printing, but the program will output whatever colors your printer can handle.

This versatile program even works on a minimum-configuration ST system: a 520ST computer with a single floppy disk drive. As is usually the case, though, you can work more efficiently if you have a second floppy drive, a hard disk, or enough memory to support a RAM disk. *Publishing Partner* is not copy-protected and can easily be installed on a hard disk drive.

Instant Press Baron

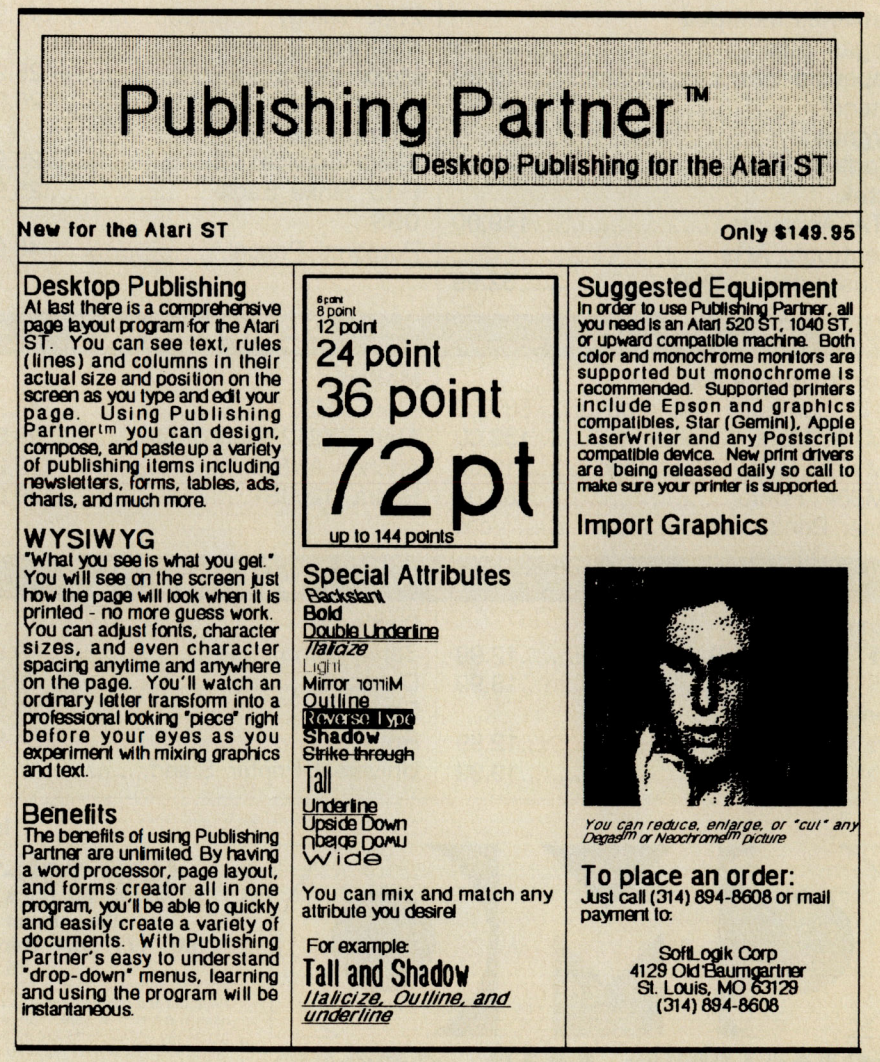
Like other programs of its type, *Publishing Partner* combines several functions in a single package, allowing an individual to act as a complete publishing company in miniature. In the guise of an editor, you compose copy or load previously prepared text into the document. As art director, you make basic design decisions about the appearance of each page. As mechanical artist, you paste up the document, arranging text, headlines, graphics, and other elements. And as typesetter, you print the document in its final form.

Not surprisingly, any program which offers that many functions is not simple. *Publishing Partner* includes a multitude of program options, and you can expect to spend a significant amount of time learning how to use it. However, the author has done a good job of making the program's many options accessible in an orderly, uncluttered fashion. Every program function is available from onscreen menus and tools, and, as a convenience to experienced users, all of the major menu options also can be selected with keyboard commands.

Figure 1 illustrates a sample document from the *Publishing Partner* disk printed on an ordinary, 9-pin dot-matrix printer. The document has been reduced to fit on this magazine page, so the print quality looks somewhat sharper than it really is. Nevertheless, you can see that even a dot-matrix printer is sufficient for many purposes. Of course, you can obtain significantly better quality with a 24-pin dot-matrix printer or a laser printer.

Figure 1 also demonstrates several basic features of *Publishing Partner*. You can place text of vari-

Figure 1: Sample Printout



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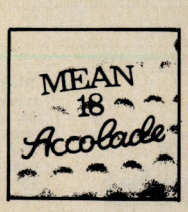

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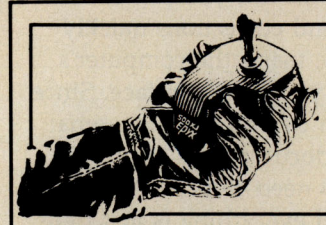

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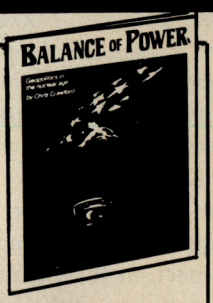

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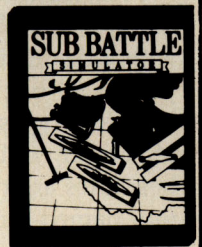

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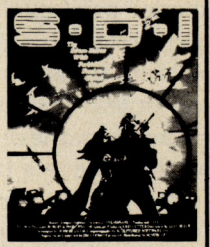

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ous sizes and styles anywhere on the page, within columns or outside them. Column rules, boxes, and other graphic elements are easy to create, and you can include graphic images wherever you wish.

Electronic page composition is comparatively fast and convenient, but it still takes time to create a page as complex as this sample. Even if you begin with a clear mental picture of what you want, there's a certain amount of trial and error involved in laying out most pages, so creating the page may take longer than you expect, at least until you gain experience with the program.

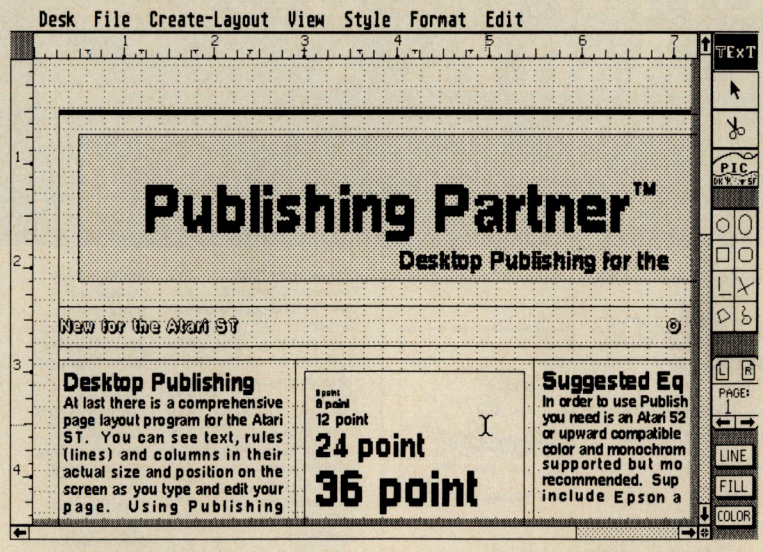
Printing takes time, too. We printed this page on Star and Epson dot-matrix printers and timed the process. In both cases, the printout took more than 20 minutes. That speed may be acceptable for light-duty applications, such as a monthly newsletter, but it's not practical for large documents. The *Publishing Partner* manual, for instance, is 164 pages long, plus or minus a few pages of addenda. At a rate of 20 minutes per page (3 pages per hour) it would take more than 54 hours, or about six 8-hour days of continuous printing, to print that manual on a dot-matrix machine—assuming that its printhead didn't suffer a meltdown during the ordeal.

Laser printers provide vastly superior print quality and also are much faster than their dot-matrix brethren, usually cranking out a page in less than two minutes. If you need that level of quality, but you don't have a laser printer, there are many services (including the SoftLogik company itself) that will print documents on a laser printer for a fee.

WYSIWYG

Computerized page composition has the same advantage over traditional composition methods that computerized word processing has over typewriting: Because the process is electronic, you can make changes and corrections quickly and easily, using the computer's screen as your work surface. Since the screen depicts precisely what the final document will look like, there's no need to print the document until everything is just right.

Figure 2: *Publishing Partner* Work Screen



The Publishing Partner *work screen always shows you the document in correct relative proportions, as it will appear when printed. In this case, the actual size viewing option has been selected. At the top of the work screen are the program's main menus, with special tools located along the right border.*

The term *WYSIWYG* (What You See Is What You Get) often is used to describe this one-to-one correspondence between the onscreen document and its printed counterpart. Figure 2 shows the sample document as it appears within the program, viewed at normal size. *Publishing Partner* lets you view the document in many different sizes, always with the correct proportions. To check the overall composition of a page, for instance, you might select the full-page viewing option, which shows the entire page on the screen at once.

Publishing Partner makes it easy to flip from one page of the document to another, although only one page appears onscreen at a time. The number of pages you can have in memory depends on the size of your computer's memory and the complexity of the pages involved.

The program also supports many different text styles. A text *style* is a way of modifying the text font currently in use. In addition to standard ST text styles such as italics and boldface, *Publishing Partner* offers double underline, backslant, strike-through, and several other styles. These styles can be used singly or in combination with one another. When you select a different text style, it appears immediately on the screen, mirroring the appearance of the final document.

Unfortunately, the same cannot be said for text *fonts*. A text font is a complete character set with a distinctive appearance. (The body of this article, for instance, is typeset in a font named Malabu II, while its title and headlines are typeset in a different font named Times New Roman.) Although you can use various fonts on the screen, the *Publishing Partner* manual states in an addendum that you can print with only one font: Helvetica. If you attempt to print any font other than Helvetica, character spacing is thrown off.

For text fonts, then, WYSIWYG should be amended to

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WYSIKOLWYG (What You See Is Kind Of Like What You Get). The one-font limitation is a significant drawback in a desktop publishing program. Perhaps by the time you read this, SoftLogik will have solved the one-font problem.

Columns And Forms

One feature that sets a desktop publisher apart from most word processors is its ability to format text in columns. Unlike most books and letters, which have a single column of copy, most magazine, newspaper, and newsletter pages have multiple columns.

When you insert text into a column, *Publishing Partner* formats the text to fit the column's boundaries automatically. Within a column, you can format the text in many different ways: centered, right-justified, and so on. Furthermore, you can link columns together, so that if the text is too large to fit in a single column, it flows automatically into the next column.

Once columns are linked, the flowing process, also known as *routing*, is automatic. If you delete a paragraph from the first column, text that previously occupied the second column flows back into the first, and so forth. Text often is routed from one column to an adjacent one, but you can also route to any other column in a document. In a newsletter, for instance, you might want to continue a front page story on an inner page, a task which is easily done with *Publishing Partner*.

The program provides a few standard forms, such as the 8½ × 11, three-column form shown in Figure 1. Of course, you can create an unlimited number of custom forms by dropping in columns and other elements and then saving the blank document on disk.

The *master page* feature is similar to the automatic header/footer feature of many word processors, but goes one step further to accomodate double-sided pages. A document could contain two different master pages, with information that repeats on each page. Thus, you could arrange for the book title and page number to appear on the right side of the page for odd-numbered pages, and on the left side of the page for even-numbered pages.

Manipulating Text

As you might expect, *Publishing Partner* gives you minute control over the placement and appearance of text on the page. The *point size* of a character refers to its physical size. One point equals 1/72 inch, so 12-point type is 12/72, or 1/6, inch in size; 72-point type is 1 inch in size, and so forth. This program lets you use many different point sizes, as illustrated at the top of the center column in Figure 1.

Just as important as the size of characters is their position on the page with relation to each other and to other graphic elements. Here *Publishing Partner* lets you choose from three different measurement systems: picas, inches, and centimeters.

When you're placing text and other graphic elements on the page, it is often desirable to have certain items aligned visually. To aid in this process, the program allows you to display a grid on the background of the page. You can also display rulers above and to the left of the work screen. The grid and rulers are calibrated to match the currently selected measurement system. These tools do not appear when you print the document, of course.

Another useful composition tool, which has no counterpart in conventional word processing, is the *snap-to guide*. A snap-to guide is like an invisible magnetic line which you can implant in a document. Once implanted, the guide attracts anything placed within a certain range, making alignment a quick and easy process. Snap-to guides can be placed wherever you need them, and turned on and off at will.

Publishing Partner does a good job of spacing characters correctly when you enter text in a document. However, depending on the point size of characters and the length of the words involved, this process occasionally can lead to odd results (one short word might be stretched across an entire line, for instance). To let you correct such anomalies, the program allows *manual kerning*—precise adjustment of the space between individual characters.

Text Objects

Publishing Partner allows you to handle text in two entirely different ways. The first sort of text, already mentioned, is the same sort of text you might create with a word processor: a sequential collection of characters in orderly lines. When you type past the end of a line, the cursor automatically drops down to the beginning of the next line, and so forth.

Publishing Partner allows you to enter and edit text in this way, although nobody would mistake this program for a word processor. Because its main function is page composition, not text editing, *Publishing Partner* understandably lacks many features common to word processors. You'll probably want to create text with a real word processor, then load it into a *Publishing Partner* document for composition. The text-editing features of *Publishing Partner* are provided chiefly for the minor adjustments and editing incidental to composition, not for composing long documents from scratch.

The second way the program allows you to handle text is as a *text object*—a body of text that is "pasted onto" a page outside a column. Text objects often are used to create titles or banners; the title at the top of Figure 1 is an example. A text object can be freely restyled, and moved into position just as you might push a cut-out headline around on a physical page until it's in exactly the right spot. However, text objects lack some features of text contained in columns; you can't

link two text objects and flow text from one object to another, for instance.

Thus, *Publishing Partner* contains two different editors: a text editor and an object editor. In Text mode, you can manipulate text much as you would with a word processor, with a number of special features designed specifically for page composition. In Object Editor mode, text objects and columns are treated simply as graphic elements that happen to contain characters rather than some other images. Once you have placed a graphic element on the page, the object editor remembers its size and position, allowing you to reposition the element as needed.

The toolbox menu, located at the right side of the work screen (Figure 2), includes a number of tools for drawing lines and other shapes, filling areas with a pattern, and so forth. Again, since these functions are intended as aids to page composition, they are less powerful than corresponding functions in a full-fledged drawing program. It's possible to draw simple shapes with these functions, but for serious artwork you'll need a program designed expressly for that purpose.

Import Quotas

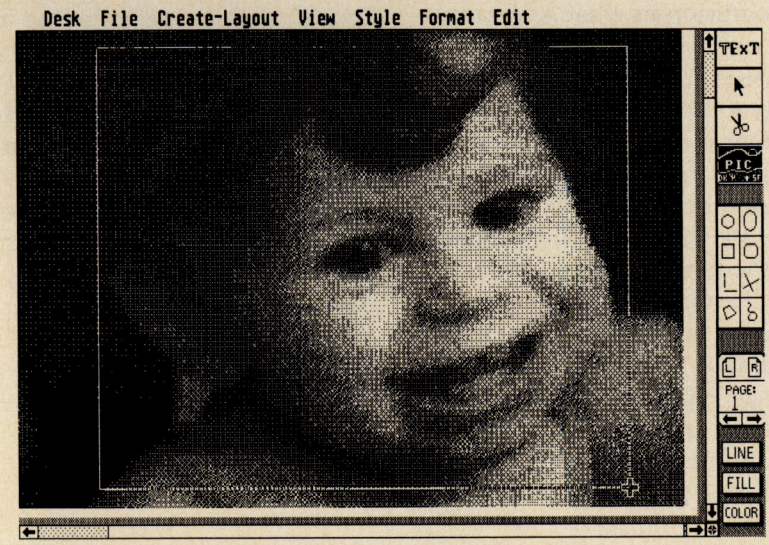
To simplify the process of mixing graphics with text, *Publishing Partner* allows you to import any graphic image stored in a *DEGAS*-, *NEOchrome*-, or TNY-format disk file. In Picture mode, you can load any such image into the program's picture buffer. You then may copy any part of the picture into the current document.

Like other graphic objects, the picture element can be resized or repositioned at will, without destroying the picture or anything that it overlays. Figure 3 illustrates the *Publishing Partner* work screen in Picture mode: A picture has been loaded from disk and we are selecting a portion of the image to copy into the picture buffer.

Graphics can come from anywhere, of course. Most snapshot programs for the ST support both *DEGAS* and *NEOchrome* format, so it's possible to import just about any image that you can display on the ST's screen. Given the popularity of desktop publishing, it probably won't be long before some enterprising soul starts marketing clip art for *Publishing Partner* and similar programs, just as has been done for eight-bit publishing programs.

The term *importing* also is

Figure 3: Picture Mode



In Picture mode, Publishing Partner *allows you to import graphic images from any* DEGAS-, NEOchrome-, *or TNY-format file.*

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used to describe the process of bringing a non-*Publishing Partner* document into the program. This is ordinarily an ASCII text file which you have created with a word processor or obtained by other means. A text file is very different from a *Publishing Partner* document file, which contains all the object, formatting, and position data needed to recreate every page in its entirety. Once the text file has been imported and put in place, it becomes part of the document.

Since the program has only one picture buffer, you are restricted to loading one picture at a time (although parts of pictures can be copied to and from the document freely, within the limits of available memory). You are not allowed to import any text file larger than 32K (32,768 bytes); any file larger than 32K must be split into segments smaller than 32K before loading.

Dazzling Customer Support

One of the greatest strengths of *Publishing Partner* doesn't involve the program at all, but rather the company behind the program. Customer support is something which all software companies promise, and most consumers take for granted, but it's rare to see a company take customer support as seriously as SoftLogik.

Deron Kazmaier, the programmer behind *Publishing Partner*, has shown a rare devotion to supporting and improving his program. He is personally available on CompuServe's Atari ST Forum to answer questions and provide online help to *Publishing Partner* users. This help even goes so far as writing custom printer drivers for *Publishing Partner* users who own oddball printers. This level of support, almost unheard-of in the industry, greatly adds to the attractiveness and utility of the software.

On The Minus Side

Though *Publishing Partner* works well for the most part, it is no exception to the rule that every large, complex program has a few warts and bugs.

In the wart category, some users may be annoyed by the program's use of nonstandard dialog boxes. *Publishing Partner* uses standard GEM menus, but its dozens of dialog boxes appear in a different font, with peculiar, rounded selection boxes. Some people think this adds a distinctive, decorative look to the program, but others find it obtrusive and unnecessary. Since the dialogs don't do anything that a standard GEM dialog can't do, making them look like something else simply adds to the potential for confusion in what is already a very complex program.

As mentioned earlier, the inability to print with more than one font is a serious limitation, although it may be corrected soon.

Another weak point is the user's manual. It's understandable that the authors wanted to produce the manual with their own software, but they apparently did so without the benefit of copy editing. Typographical errors are common, and the manual begins with an introduction that begs for an editor's pencil. Here's a brief sample:

Unless you are a descendant of Randolph Hurst [sic] *and were born with printers* [sic] *ink in your veins, you will no doubt be amazed to find that there is something to be learned even by you, the Great Karnack.*

To its credit, the manual does contain some informative tutorials and an explanation of all the program's features. But the index is somewhat haphazard (the elephantine entry *Working with* DEGAS, NEOchrome, *and Tiny Pictures* is followed by no page reference, for instance), and the manual ends with a four-page addendum containing corrections and additions to the main text. The program disk contains a third piece of documentation with further addenda.

It's understandable that the first edition of the manual was rushed to market in somewhat rough form. But the program is no longer in its first release, and a revision that demonstrates the ease of using *Publishing Partner* is overdue.

Competition Is Coming

In summary, *Publishing Partner* is a full-featured, reasonably bug-free package, backed up by excellent customer support. By leaping first into an empty market, *Publishing Partner* has gained a healthy following and established a strong competitive position for the future.

But competitors (notably, *Fleet Street Publisher* from Great Britain) already are gathering in the wings, and *Publishing Partner* still lacks the mature, polished character of a package like Aldus's *Pagemaker* for the Apple Macintosh. To survive and prosper, SoftLogik needs to iron out the wrinkles in the program and improve the documentation.

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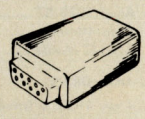

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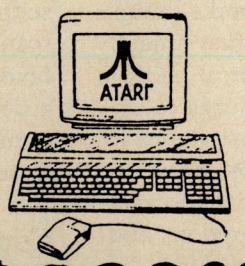

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ComputerEyes Video Digitizer And MichTron Realtizer

Todd Heimarck
Assistant Editor

Requirements: Any ST with a monochrome or color monitor and a video source (such as a color or black-and-white video camera, or videocassette recorder).

Analog information does not please computers. The continuous variation of a human voice, for example, contains pitches ranging from high to low, volumes from loud to soft, and speeds from fast to slow. You can't just plug a microphone into a computer to record a voice; you need a sound digitizer to convert the analog signals into discrete chunks of digital information—numbers—which can then be stored in memory or saved on disk.

Likewise, the signal from a videocassette recorder (VCR) or video camera is analog. A video digitizer allows you to take a video picture and convert it to a digital form usable by a computer.

If you own a video camera or a VCR with a good freeze-frame capability, and you also own an ST, you may be interested in one of two new video digitizers: the Realtizer (from MichTron) and ComputerEyes (from Digital Vision). Both devices take an ordinary video signal as input and convert it into a graphics screen on the ST. The screen can then be saved in *NEOchrome* or *DEGAS* format. Once you have the picture digitized, you can manipulate it to your heart's desire.

Both systems are plug-in cartridges and are easy to use. With the ST turned off, plug the digitizer module into the cartridge port and insert the Video Out cable from the camera or VCR into the RCA plug on the cartridge. Then turn on the ST and run the digitizer program that is supplied on disk. The only significant hardware difference is that the Realtizer draws its power from the computer, while ComputerEyes has a power adapter that must be plugged into a wall socket.

There are several other differences, however, which we'll cover in a moment. For instance, although both digitizers work in the low- and high-resolution modes, only ComputerEyes works in medium resolution. The first time you use either digitizer, it helps to suppress your natural urge to experiment and to at least glance through the manual. Within a short time, you'll become accustomed to the various options and will be ready to start making pictures.

Why Digitize?

To begin with, you may be wondering what a video digitizer is good for. If you already have a video camera, why not simply videotape something you want to record?

There are some useful applications for digitized pictures. If you're a teacher or are writing educational software, you could capture a picture of a flower and, using *DEGAS* or *NEOchrome*, label the stamen, pistil, petals, and other parts. Or you could digitize a map of the Mediterranean and draw in the conquests of Alexander the Great or Caesar.

In a business setting, you could create presentations that include actual pictures mixed with text or graphics. A graph of five-year profits could be superimposed on a picture of the factory. Information about product lines could be combined with digitized photos. Employee records could be linked to photos stored on a hard disk. With a desktop publishing package such as *Publishing Partner* (reviewed elsewhere in this issue), you could incorporate photos into a newsletter.

Game designers who want to analyze the movements of a golfer or swimmer could record a sequence of actions and then move through them, digitizing the individual frames. Or they could capture scenes for use as backgrounds in games.

But perhaps the best argument for a video digitizer is that it's fun. If you already own a video camera and an ST, you can hook them together to do some interesting things. For example, freeze a frame of a *Star Trek* episode and put yourself in the scene. Or digitize a picture of your favorite enemy and print it out for a personalized dartboard. Or draw a mustache on a friend's face, just to see how it looks.

ComputerEyes Screen Modes

The ComputerEyes system works in all three screen modes supported by the ST: low resolution (320 × 200 pixels with 16 colors out of a palette of 512), medium resolution (640 × 200 pixels with 4 colors out of 512), and high resolution (640 × 400, monochrome).

In lo res, you can capture screens using two, four, or eight shades of gray. You can also add a red, green, or blue tint to exploit the full range of 16 colors.

Another lo-res capability is the full-color mode, which requires a color video camera. In this mode, the program analyzes a picture for up to 16 of the most predominant colors. It then uses that palette within a screen, rounding all colors to the closest color available on the ST. This mode produces the most realistic pictures, but there's a catch: If you create two pictures, the palettes are usually incompatible, so you can't make collages with elements selected from different color videos. If you want to mix and match pictures, it's best to stick to the gray scales.

On a medium-res screen, you can select two tints (black and white) or four tints (with two shades of gray). There's also a full-color mode, but it's limited to four colors.

In hi res, you have two modes to choose from: *dither* or *normal*. Dither decreases the reso-

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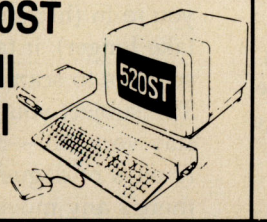

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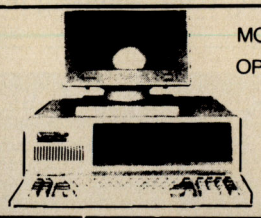

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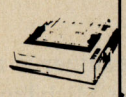

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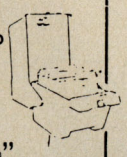

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lution somewhat, but it uses various pixel patterns to simulate shades of gray. It usually produces the most realistic results. Normal mode offers the full 640 × 400 pixel screen, but each point is either black or white, with no simulated gray scales.

Two-Stage Digitizing

The ComputerEyes software digitizes a scene in two stages. In the first stage, the video signal is scanned and stored in memory as series of color values (an intermediate picture). Next, the internal representation is converted to a visible screen.

There's an advantage and a disadvantage to this system. The advantage is that once the image has been captured in memory, you can fine-tune it, adding or subtracting color, adjusting the brightness and contrast, and generally fiddling with the picture until you like what you see.

The disadvantage is that it's slow. Depending on the mode you're in (higher-resolution screens take longer), it takes 6, 12, or 24 seconds to scan a video image. The subject you're shooting must stay very still—not unlike the early days of daguerreotypes. If there's any movement, the picture becomes unrecognizably fuzzy.

If you have a video camcorder with a freeze-frame button, you can work around this limitation by taping a scene and then freezing it before feeding it to the digitizer.

The Realtizer

Although the Realtizer is marketed in the U.S. by MichTron, it originally comes from a company called Print-Technik, in Germany. The cartridge is much smaller than the ComputerEyes cartridge, and it doesn't require a separate power supply.

The designers of the Realtizer took a different approach to digitizing. There's no intermediate digital image stored in memory. Instead, the video signal is converted directly to a picture on the screen. This means the Realtizer is much faster at capturing a scene—fast enough for a continuous mode, in which the image is constantly updated. When you limit the number of shades to two or four, the screen changes very rapidly, almost in realtime. Instead of fine-tuning a captured picture in memory, you adjust the brightness and contrast on the fly.

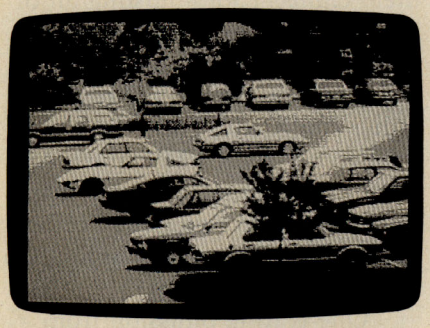
Like ComputerEyes, the Realtizer has a lo-res mode that captures up to 16 shades with 320 × 200 pixels. There are also lo-res modes with two, four, or eight shades. Of course, these shades can be selected from any of the ST's 512 possible colors.

The Realtizer's hi-res mode takes advantage of the full 640 × 400 pixel screen, but there is no medium-res mode. The Realtizer also lacks a full-color mode, so

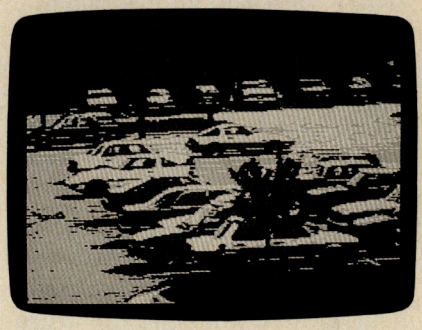
Only ComputerEyes converts a full-color video signal to a full-color image.

Lo res with 16 shades of green and gray (ComputerEyes).

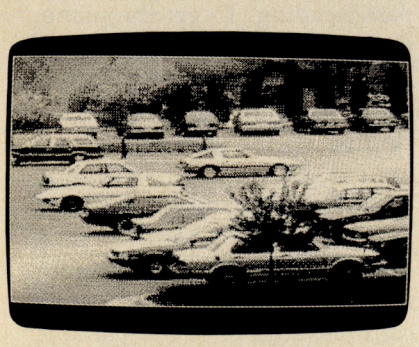
Lo res with 8 shades of gray (Realtizer).



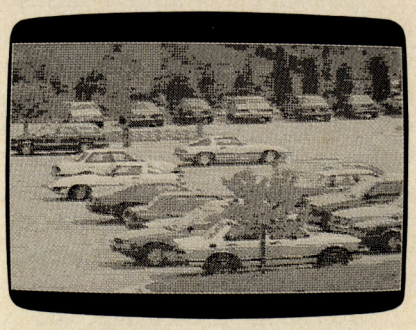
Medium res with 4 grays (ComputerEyes).



Lo res with 4 grays (Realtizer).



Dithered hi res (ComputerEyes).



Hi res (Realtizer).

there's no reason to use a color video camera.

Built-In Graphics Tools

The Realtizer software includes some graphics tools for manipulating images that have just been captured. It's possible to invert the screen, to create a mirror image, or to zoom in for a close-up. It also features a toolbox program that's good for twiddling pictures—bending them into new shapes, rotating, and stretching them.

Almost all of these effects, of course, can be duplicated with the various drawing programs on the market. Once you capture an image and save it in *DEGAS* or *NEOchrome* format, you can load it into any graphics program for manipulation later. But even though the Realtizer software isn't a full-blown drawing program, it does provide a few tools for modifying the image on the spot.

If you want to print out a digitized picture, you can use the Alternate-Help function built into the ST or the printing features of your favorite drawing program. The Realtizer also includes custom printer drivers for the Epson, C. Itoh, Canon color inkjet, and laser printers.

Both of these video digitizers are highly recommended. While the Realtizer is faster and has more graphics tools, ComputerEyes supports full-color input and allows finer tuning of the image. As you can see from the accompanying screen photos, the image quality is very comparable. Choosing between them is largely a matter of determining which features are most important to you.

ComputerEyes
Digital Vision
66 Eastern Ave.
Dedham, MA 02026
$249.95

The Realtizer
MichTron
576 S. Telegraph
Pontiac, MI 48053
$199.95

ST

Flight Simulator II

Tom R. Halfhill
Editor

Requirements: Any ST with a disk drive and color monitor.

Few entertainment programs have enjoyed the popularity and stamina of *Flight Simulator*. Arcade-style videogames come and go, and role-playing adventure games generally appeal to a fairly narrow audience, but *Flight Simulator* has remained a thriving bestseller for years—in a market where a program's profitable lifespan is usually measured in months.

Versions of *Flight Simulator* are available for all popular personal computers, and the IBM edition (from Microsoft) has done surprisingly well on what is usually considered a business machine. It has even become an informal benchmark for testing the compatibility of IBM PC clones.

Flight Simulator's success is probably due to three factors: its attention to realism, its appeal to our innate fantasies of flight, and its aura of legitimacy. (It's an entertainment program, but not a *videogame*, so even serious users don't feel too uncomfortable switching off the spreadsheet and taking to the skies now and then.)

SubLogic's *Flight Simulator II* for the Atari ST, by Bruce Artwick and Mike Kulas, is a noticeable improvement over *Flight Simulator*. The ST version runs faster and boasts much-improved graphics. Although it uses the ST's lowest-resolution screen mode, it allows up to 16 colors to be displayed simultaneously, and the details really pop.

For instance, when you fly over a major city, you can clearly make out the various airports, freeways, rivers, lakes, mountains, and skyscrapers. Important landmarks such as the Golden Gate Bridge in San Francisco, the Space Needle in Seattle, and the Sears Tower in Chicago are rendered in color with recognizable architectural features. The mapping is so accurate that a good road atlas makes a useful navigational aid.

Flight Simulator II is so rich in features that it's nearly impossible to cover everything in a review. Let's take a look at some of the highlights.

Preflight Setup

The package includes a 132-page spiral-bound manual; a keyboard/mouse reference card; navigational charts for the five regions mapped in the simulation (New York/Boston, Chicago, San Francisco/Oakland, Los Angeles, and Seattle); and a copy-protected disk. The disk is guaranteed against media failure for six months. Beyond that period, replacements are available for $5. For $10, you can buy a backup disk. Since the program accesses the disk periodically to update the scenery, the disk is subject to wear, so a backup is desirable.

When *Flight Simulator II* loads, it takes over the entire computer. You can't install any desk accessories, and the Quit option reboots the machine.

The main screen consists of a cockpit view and an instrument panel. (See photos.) You can change the cockpit view to look in nine different directions, including straight down. The cockpit view is actually a resizable and movable window that can be expanded to fill the entire screen, if you wish. The instrument panel, which we'll cover more thoroughly in a moment, closely simulates the instrumentation found inside a single-prop Cessna 182.

The simulator always begins with your Cessna idling on runway 27 Right, at Oakland International Airport. Of course, you don't always have to take off from Oakland. By entering any of the coordinates listed on the navigational charts, you can relocate your plane to any of the regions in the simulation.

To change coordinates, you pull down a menu labeled NAV and select Position Set. Other pull-down menus labeled FILE, VIEW, ENVIRO, SIM, and SITUATION let you set numerous other options supported by *Flight Simulator II*. You can turn the sound on or off; set the season to winter, spring, summer, or fall (this affects flying conditions, what time it gets dark, and how the scenery appears); make winds blow in any direction, at any speed, and at four different altitude levels; create clouds at two different altitude levels, plus ground fog; make the plane easier or harder to fly by linking or unlinking the rudder and aileron controls; turn autopilot on or off; adjust the sensitivity of the flight controls; and even make the plane less reliable, so that you might have to cope with a minor (or major) mechanical failure during flight.

Unusual Menus

Earlier versions of the simulator for eight-bit computers provided a screenful of prompts for setting all of these options. The pull-down menus in *Flight Simulator II* are handy for changing just one or a few of these options while in the air, but some people may find them clumsier for adjusting all of the options when preparing for a flight. Numerous mouse clicks are required, and the menus respond rather sluggishly. That's because they aren't true GEM menus. Apparently the programmers chose to bypass GEM routines in order to speed up the scenery animation (a fair tradeoff).

One glaring omission from the menus is that it's no longer possible to set the airplane's compass heading. To get the plane pointed in the right direction before a flight, you must either taxi around on the runway (if starting on the ground), or fly around in the sky (if starting in mid-air). This is tough for beginners, because it's hard to stabilize the plane on a compass heading unless you're accustomed to the controls. And once the plane is finally oriented, you must usually reset the coordinates.

Aside from these drawbacks,

the menus do have a few advantages over the earlier method of screen prompts. Checkmarks indicate at a glance how certain options are set, and you don't have to flip to an alternate screen (and therefore lose your cockpit view) to verify or change an option. Some of the options also have keyboard equivalents so you can bypass the menus altogether.

One interesting menu option is Map Display. You can open a resizable, movable window on the screen that shows a bird's-eye view of the area under the plane. By changing the magnification, you can pull back for a view of the entire region or zoom in for a closeup look at a certain spot. If you keep a road atlas handy, the map window is invaluable for navigating and for locating landmarks. (Purists might consider this cheating, since the map view is never obscured by clouds or darkness.)

Teleportation Simulation

Another interesting way to vary your point of view is to select the Spot option under the VIEW menu. This brings up a view of your aircraft as seen from an imaginary spotter plane flying nearby—sort of like an out-of-body experience. If you're about to crash into a mountain or a building, you can just "beam" yourself to safety.

To get a better idea of the depth of this program, consider the other options available under the VIEW menu: Cockpit, Tower, Track, View Direction, Zoom, Set Spot Plane, Main 3D, and 2nd 3D. The Cockpit and View Direction options duplicate the keyboard controls for changing your direction of view. The Tower option lets you watch your plane from an airport control tower on the ground. If you fly out of sight of the tower, you can select Track; the control tower then "chases" your plane to keep it in view. You can even set the tracking distance for the tower.

The Zoom option lets you change the magnification of all views, not just the map display. The zoom factor is shown on the instrument panel.

The Set Spot Plane option includes ways to place the spot plane where you want it, to make the plane maintain its spotting position, or to make it chase your aircraft. You can even determine whether the spot plane will follow you through acrobatic stunts such as loops and rolls.

The Main 3D and 2nd 3D options let you open a second cockpit view as a window upon the main cockpit view. Both views are resizable windows that can be independently zoomed and repositioned. The scenery animation slows down, however, since the program has to update two different views.

Flight Controls

If you've already become a veteran pilot on earlier versions of the simulator, you may be disappointed to discover that *Flight Simulator II* no longer allows you to fly the plane with a joystick. Instead, you'll have to retrain yourself to use the mouse or the keyboard.

Each control device has its devotees and detractors. Some people prefer the mouse, saying that it preserves some of the traditional feel of a joystick as it translates physical motion into aerodynamic action. Others argue that the keyboard allows more precise control; the mouse is used for so much input in *Flight Simulator II* that you can easily do something you didn't intend to.

For instance, there are two mouse modes: cursor and yoke. In cursor mode, the mouse is used to pull down menus, select menu options, and adjust the instruments. In yoke mode, the mouse controls the airplane. To switch back and forth between cursor mode and yoke mode, you can double-click the left mouse button or single-click the right mouse button. Although the instrument panel always indicates the current mode, it's easy to forget what you're doing and send the plane

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into a tailspin when you really meant to pull down a menu.

It's also easy to make mistakes when controlling the plane with the mouse in yoke mode. For example, pushing the mouse forward and backward lowers and raises the elevators, while rolling the mouse sideways tilts the ailerons. Pushing the mouse forward while holding down the left button increases the throttle, while rolling the mouse backward while holding down the left button decreases the throttle. If you inadvertently mix any two of those motions, or forget to hold down or release the left button, you can send the plane into an unintended dive, climb, or bank.

To keep everyone happy, maybe SubLogic will someday restore the joystick as an alternative control device in *Flight Simulator II*.

Dials And Digits

Perhaps the most outstanding feature of *Flight Simulator II* is its accurate simulation of an instrument panel. Flight instruments include an airspeed indicator, attitude indicator (artificial horizon), altimeter, turn coordinator, heading indicator (directional gyro), rate of climb indicator, magnetic compass, and omni-bearing indicator with glide slope.

Other instruments and controls include a realtime clock, digital tachometer, throttle indicator, elevator trim indicator, aileron and rudder indicators, marker light switches, instrument panel light switch, gauges for the left and right fuel tanks, oil temperature and pressure gauges, carburetor heater, two magneto switches, landing gear switch, wing flap control, and autopilot status indicator.

The radio stack includes six radios: voice communication (COM), navigational receivers (NAV1 and NAV2), distance measuring equipment (DME), automatic direction finder (ADF), and transponder (XPNDR).

All of these instruments, controls, and radios are fully functional and work almost exactly like those on a real airplane. Although the instrumentation may seem bewildering to a beginner, the excellent manual explains what each device is for and how it's used. Well-illustrated sections show how to navigate using the NAV, DME, and ADF radios in concert with VOR stations and nondirectional beacons, and how to communicate with air traffic control towers and obtain weather reports with the COM radio. The navigational charts give you the tuning frequencies for all of the major airport towers and VOR stations within the regions supported by the simulator. The instrumentation is so complete that an experienced simulator pilot will have no trouble taking off, navigating, and landing in weather conditions so adverse that nothing is visible from the cockpit window.

Idling on runway 27 Right at Oakland International Airport.

Clouds and winds can be set at several different altitude levels.

The only problem with the instrument panel is that sometimes *Flight Simulator II* relies too heavily on the mouse as an input device. To set a radio frequency, for instance, you have to click on the digital display to roll the numbers up or down. Sometimes this requires a couple of dozen mouse clicks. After a while, you wish you could just click once on the radio to select it, then simply type in the desired frequency on the keyboard.

The omni-bearing indicators are particularly difficult to adjust with the mouse. Sometimes it takes so long to center the needle on a VOR signal that you lose control of the airplane. Fortunately, you can press the P key to pause the flight while adjusting the instruments.

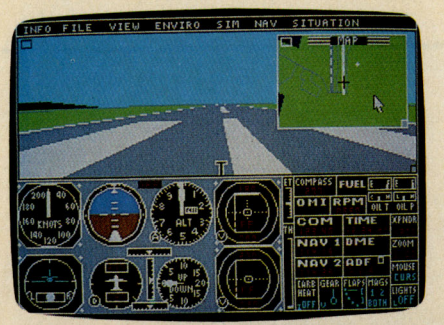
Saving And Loading Flights

Flight Simulator II lets you save an interesting flight on disk for recall later, load one of several prerecorded flights, and even play back the last few seconds of a flight you just finished. All of these functions are called from the SITUATION menu, and they're all especially valuable when learning how to fly the simulator.

For instance, beginning pilots can get lots of landing practice by loading the prerecorded flights for visual and instrument approaches. When you crash, just reload the situation and try again. The Instant Replay option lets you relive the last few seconds of a disastrous crash or glorious landing. You can even replay the conclusion of your flight as seen from the spot plane.

The save options are useful when you want to preserve an interesting view from the cockpit window, attempt a hazardous maneuver that may result in a crash, or simply take a break. (*Flight Simulator II* operates in realtime, so if it takes two hours to fly from one point to another in an actual airplane, it will take two hours to duplicate the journey with the simulator.)

Unfortunately, the save options in *Flight Simulator II* leave something to be desired. You can't save a flight directly to disk; instead, you must first select the Save And Name option to save it in the computer's memory, then



The Map Display window makes it easier to navigate and to locate major landmarks.

For an out-of-body experience, try viewing your aircraft as seen from the nearby spotter plane.

The World War I simulation lets you attack enemy ground targets and dogfight with hostile fighters.

pick Save RAM To Disk to make a permanent copy. The first point of confusion arises when you select Save And Name. Although it sounds like this option should let you assign a filename to the flight you're saving on disk, it really doesn't. Instead, you're merely naming the flight that's being saved to *memory*. Up to twelve flights can be saved in memory, though sometimes we had problems saving more than ten. Also, the program doesn't prevent you from assigning the same name to all twelve flights.

The next point of confusion is encountered when you select Save RAM To Disk. *Flight Simulator II* does not let you choose your own filename; instead, it automatically saves all flights stored in memory under the ambiguous filename F7. Although this file usually isn't more than 10K long, and contains only twelve or fewer flights, you can't store more than one of these files per disk. If you try, the new F7 file erases the old one. The program has no provisions for protecting an existing file by renaming it or moving it into a folder. It also doesn't warn you if it's about to erase an existing F7 file.

The only way to store more flights on a disk is to rename an existing F7 file or move it into a folder *before* running *Flight Simulator II*. But then you can't recall those flights into the simulator, because the program doesn't let you load any filename other than F7, or even load an F7 file that's stored in a folder. This approach to file-handling is rather baffling, and you usually end up wiping out a dozen of your favorite flights now and then.

Additional Features

As mentioned before, *Flight Simulator II* has many more features than we can review in detail. Here's a quick rundown of what else it has to offer:

• As an alternative to the Cessna 182, the program can also simulate a Gates Learjet 25g. The twin engines on this powerful business jet make it possible to climb as high as 51,000 feet at speeds of up to 464 knots (the Cessna is limited to 14,900 feet and 146 knots). The screen automatically changes to reflect the different instrument panel found on a Learjet. The manual admits that this simulation is not as real as the Cessna, but that it's still lots of fun.

• You can also fly a World War I fighter, bomb enemy targets, and engage enemy fighters in aerial combat. The fighter plane performs much like the Cessna, except most of the instruments disappear. The battlefield is an imaginary region surrounded by mountains, bisected by a river, and dotted with friendly and enemy airfields, fuel depots, and factories. Again, it's intended mostly for fun.

• Multiplayer feature: If two computers are located nearby, you can connect them with a null modem cable via the serial ports so that two people can fly together. Or, if you have a Hayes-compatible modem, you can call someone else with a similar setup and fly together over the phone. Each pilot has the usual cockpit view, and you can see the other person's plane if it's within visual range. All other features of the program work just the same, except the track mode lets you view your own aircraft from the other plane's point of view rather than from the airport tower. Another nice touch is that you can communicate via modem with any other computer that runs *Flight Simulator II* with the multiplayer option. For instance, you can fly with an Amiga owner to see who can perform the most daring stunts.

Despite a few minor flaws—mostly related to the user interface—*Flight Simulator II* is a fascinating and educational program that provides many hours of entertainment. Like an arcade game, it requires a certain level of dexterity and skill; like an adventure game, it offers a large world to roam and explore. But by simulating the real world and a real aircraft in such detail, it becomes something much more than a game. Whether you're experienced with earlier versions or are a total newcomer, you owe yourself a test flight with *Flight Simulator II*.

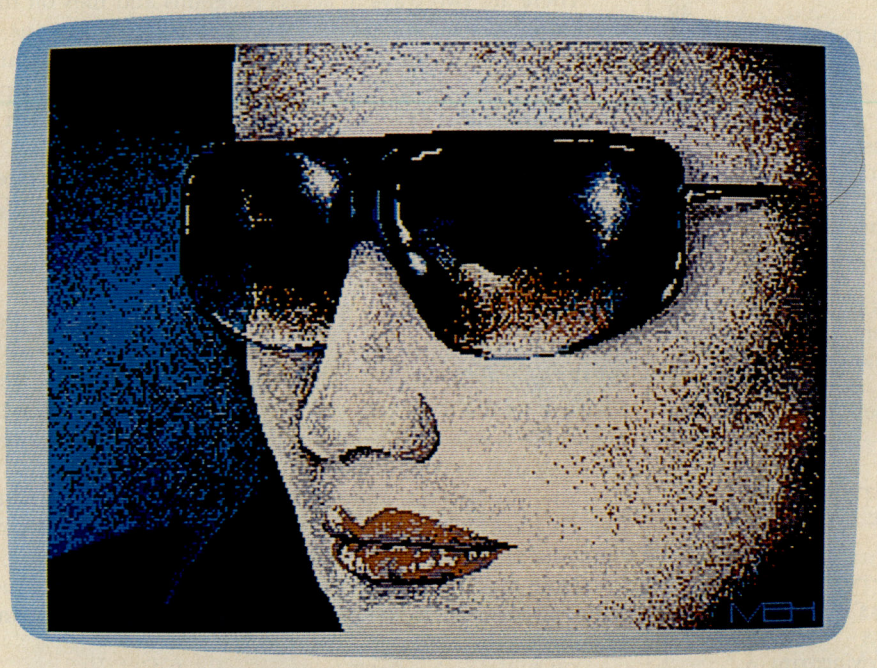
Flight Simulator II
SubLogic
713 Edgebrook Dr.
Champaign, IL 61820
$49.95

ST

Blue Eyes

Mark E. Hysell

Each issue, COMPUTE!'s Atari ST Disk & Magazine features computer artwork contributed by an ST artist. This issue, we picked two screens—though only one, "Blue Eyes," is on the magazine disk. You'll find the NEOchrome*-format file under the filename ART.NEO. It can be loaded into any graphic-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 in either* NEOchrome *or* DEGAS *format. Please include a paragraph or two of text describing the artwork and any special techniques employed. We pay $100 plus disk royalties for artwork that is accepted for publication. Accepted artwork becomes the property of COMPUTE! Publications, Inc. Only those disks accompanied by a self-addressed, stamped mailer will be returned.*



and Shades

Notes By The Artist

I began experimenting with computer art on my old Atari 800, using programs such as *Paint* and *Micro-Illustrator*. So when the ST with its exceptional graphics capabilities became available, I had to have it. At present, I am using *DEGAS Elite* almost exclusively.

When using the computer, I tend to approach the screen in the same way that I would a conventional painting. (I do mostly acrylic and watercolor portraits.) The first step is making a reasonably detailed drawing. When painting, this would be done using pencil on paper or charcoal on canvas. With the computer, I use a single neutral color (such as RGB=665) in draw or slow-draw mode.

In choosing the color palette, I like to reserve six or seven colors for the flesh tones, and another three or four for eye color. The remaining choices are based on hair color, background, and any other features. Often, I'll use shades of blue or green for flesh rather than realistic tones for an interesting effect.

This basic technique was used in "Blue Eyes" and "Shades." A video digitizer was not used to prepare either work—both were drawn from scratch based on preliminary drawings in a neutral color. The glasses in "Shades," however, were added halfway through the work. As a result, the finished work is very different from the preliminary drawing. This will often be the case when involved in the creative process. **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 then switching on the computer, but normally it contains no active desk accessories.

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

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

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

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

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

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

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

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

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

Special Notes

When running "Nodemaster Chess" in this issue, remember to switch to the medium-resolution color or high-resolution monochrome mode as mentioned in the article. If you attempt to run the program in the low-resolution screen mode, you won't get a warning message; the screen simply blanks out until you press a key.

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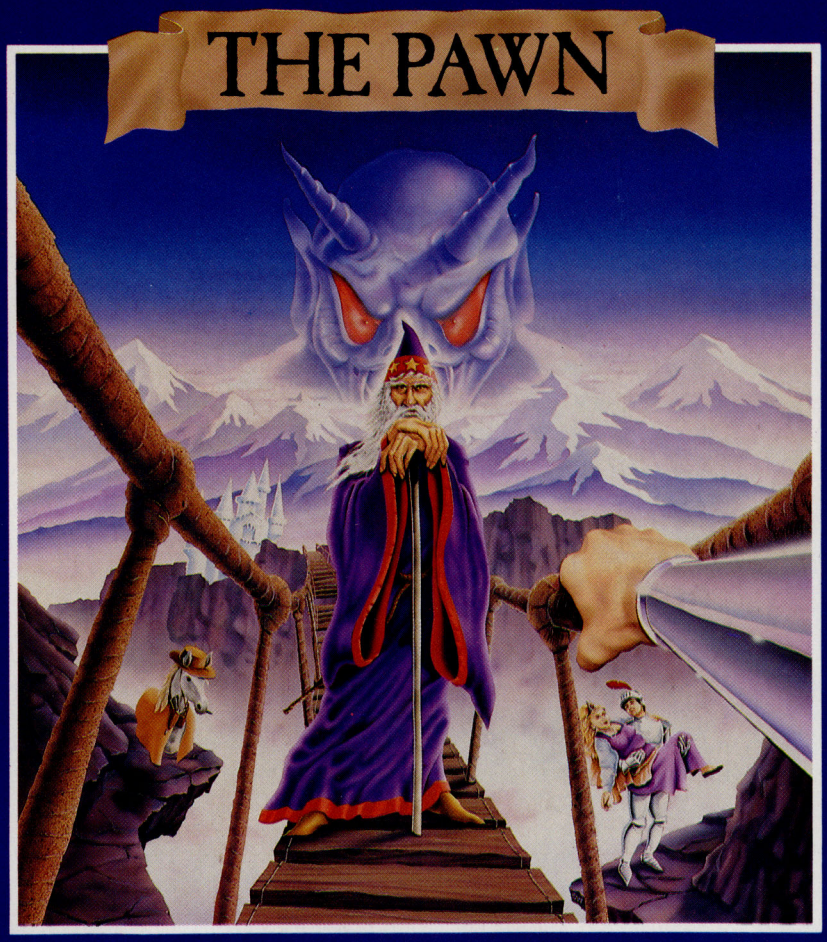

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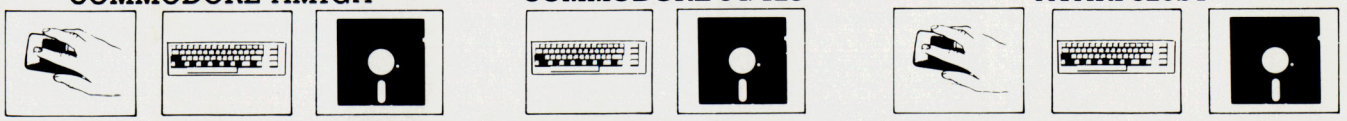

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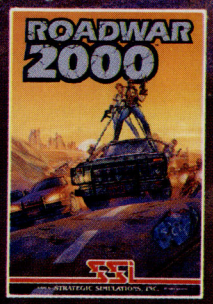

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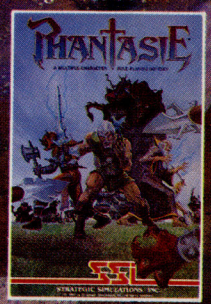

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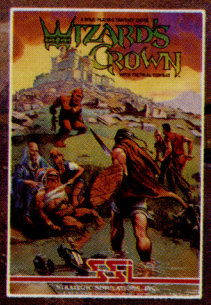

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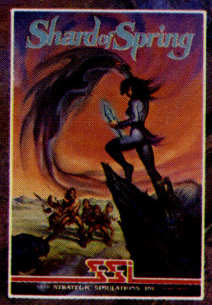

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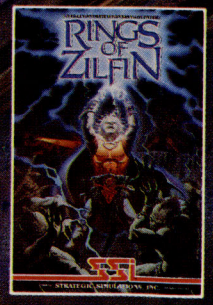

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