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THE OFFICIAL ATARI JOURNAL

JULY/AUGUST 1992

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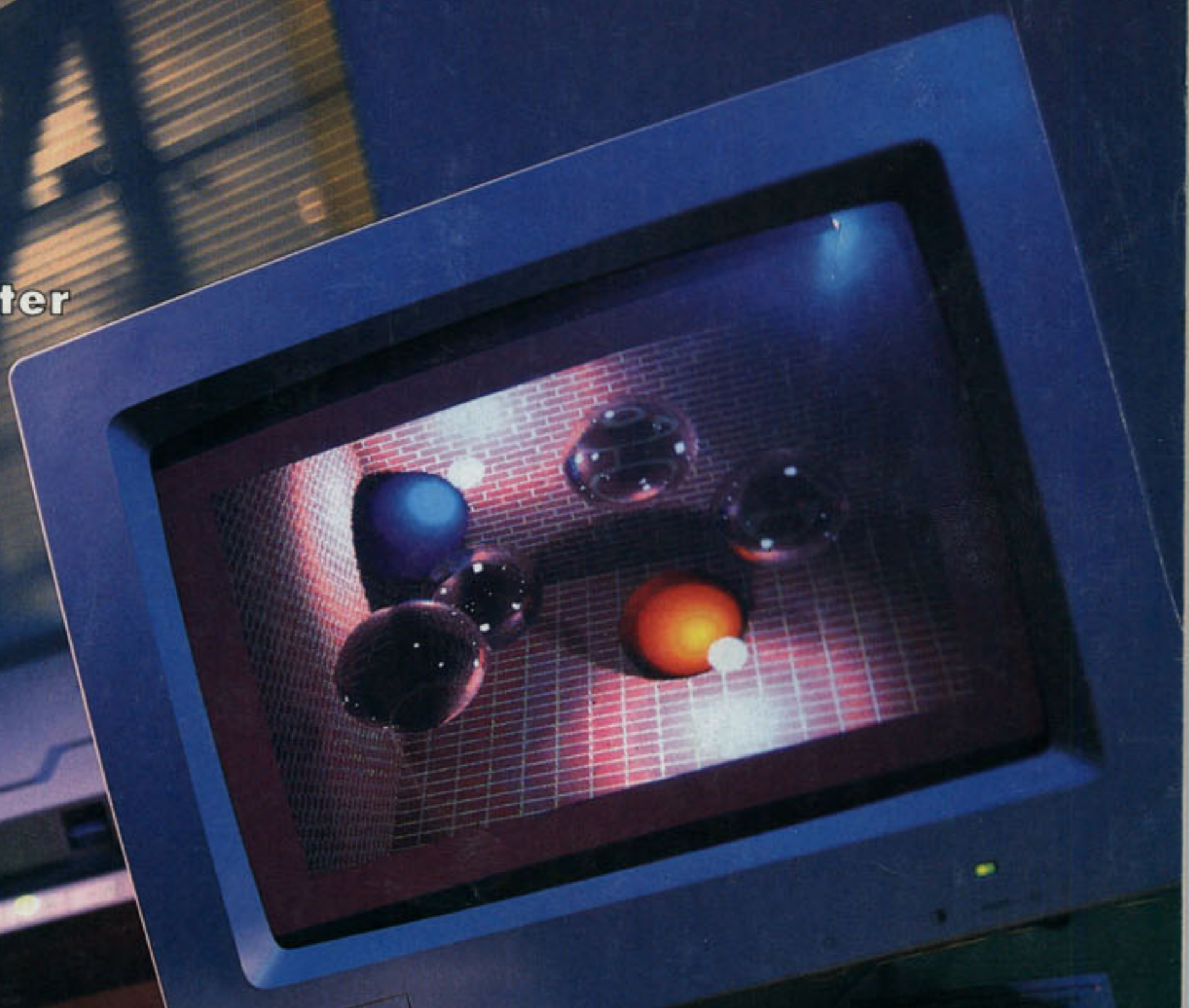

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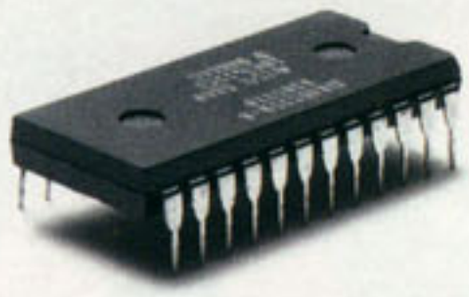

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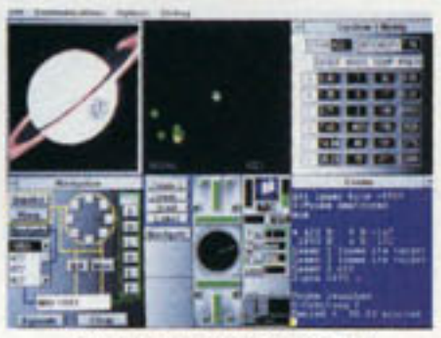

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ATARI® EXPLORER

July/August 1992

FEATURES

REVIEWS

PROGRAMMING

ENTERTAINMENT

DEPARTMENTS

Cover: Stan Schnier

Atari Explorer Magazine is produced entirely on Atari Mega STe and TT computers, using Soft-Logik's PageStream 2.1

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Editor's Note

Graphics!

Graphics have always been an important part of Atari's computing message. And today, Atari owners have more graphics options than ever before. This issue, we offer a broad cross-section of articles and reviews on every aspect of Atari graphics, from DTP to video!

Up top: our review of Calamus SL, the enhanced version of DMC's powerful and popular desktop publishing system. SL's unique modular design offers increased flexibility and expansion potential, while preserving the speed and ease of use that made Calamus 1.x a favorite among Atari publishers.

We're also proud to present the winning entries in DMC's Calamus Outline Art Contest, announced in these pages, last September. Winning designs run the gamut from traditional and abstract illustration, to package design and logos: testimony to Outline Art's flexibility and power. Judging the contest were Geoffrey Earle, President of Atari Canada; Mario Georgiou, Art Director of DMC Publishing; and Explorer's own Art Director, Jesus Diaz.

Hands-on Video

Want to learn more about video? Check out our plans for Dij-It, a low-cost, ST-driven video digitizer! Engineered by author/inventor Paul Swanson, Dij-It is a relatively simple circuit that substitutes ST computing power and custom-written software for expensive components. Part One of Swanson's article explains how Dij-It works, and presents key concepts that will help you understand how video and computers can work together.

Also on tap is a review of Convector, Gribnif's new raster/vector conversion package. Designed for high-throughput professional applications, Convector lets you customize the conversion process for optimum image quality on output.

Speaking of image quality, nothing is more important to your business image than high-quality presentations! Our review of RPM's 1st Graph shows how this powerful tool can help you understand and communicate the graphic patterns in raw data, producing charts, graphs, and sophisticated analytical illustrations that will give punch to any proposal or report.

Portfolio programmers will enjoy BJ Gleason's in-depth intro to character-set programming: key to mixing text and graphics on the Port's economical display. And there's much more. Whatever your interest in graphics: from desktop publishing to video, presentations to programming, Atari continues to set the pace for innovation, providing state-of-the-art functionality at commodity prices. So, get in the picture! ■

JOHN B. JAINSCHIGG

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Letters

Floppy Schematics

Is there an address that I can write to, to get schematic diagrams for a TEAC floppy disk drive? The label on the drive just says "Made in Japan."

Demetrius Whitaker
Chicago, IL

Disk drives are generally sold to end-users either through computer manufacturers (as installed components), or through repair or electronics retailers (as replacement parts or upgrades for installed components). The assumption, in both cases, is that individuals will not require schematics and other documentation. Unfortunately, because disk drives contain moving parts and are somewhat exposed to the environment, they tend to fail more often than other computer subassemblies. Appropriate documentation can aid the advanced user or hobbyist to repair the most frequently-encountered disk-drive problems.

How do you know you have a problem with your drive? The most common problems reveal themselves intermittently, at first. You may have trouble copying files from one disk to another. Or your computer becomes incapable of reading disks formatted on somebody else's system, but has no trouble with disks recently formatted on its own drives.

If symptoms like these persist, you probably have drive trouble. Barring electronic failure (actually quite rare, in our experience), most drive problems occur for one of two reasons: either the drive's read/write heads are dirty, or they're becoming misaligned. The first problem is easy to fix. Just clean the drive heads, using a commercially-available cleaning kit. Follow the manufacturer's instructions, and don't clean drive heads too often.

Misalignment is a more serious problem. Some misalignments are caused by external forces, and problems may disappear if you rearrange your computer setup. For example, we were tearing our hair out over a misalignment problem on our TT030's internal drive, until we realized it was caused by our having parked a 50-lb TTM194 monochrome monitor on top of the TT's system housing, deforming the case and squishing the floppy mechanism. Our high-tech solution was to move the monitor onto the tabletop.

"Real" misalignment requires real attention. Most computer repair outfits prefer to replace, rather than re-align a failing drive, since labor costs for re-alignment run higher than the cost of a brand-new component. If your machine is in warranty, or you're afraid of electronics, we recommend simply taking (or shipping) your machine to an Authorized Atari Service Center (or to Atari) so that the problem can be professionally diagnosed, and the drive replaced, if necessary.

On the other hand, if your machine is out of warranty, you don't exactly have to be a rocket scientist to replace a floppy drive. The drives in Atari systems (e.g., 1040 STe, Mega, TT, etc.) are standard OEM components, and equivalents can be ordered from almost any electronic retailer. Just open up your Atari, pull off the cover, remove the shielding, and read the manufacturer's name and part number off the drive unit so that you can be sure you're getting an equivalent model. If this is too difficult, we've found that the phrase "your cheapest IBM-type, 720K, half-height, 3-1/2" floppy drive with a right-hand pushbutton release," usually works. When the replacement arrives, detach the old drive's power (four wire) and data (ribbon) cables, noting their orientation; unscrew the drive from its mounting, and install the new one.

Advanced electronics hobbyists (especially those with no regard for the value of their time) may want to try actually re-aligning a failing drive. Tools for this finicky and thankless task include a standard oscilloscope, a commercial "test disk," some screwdrivers, and a schematic of the drive, showing where its strobe points (timing-signal reference contacts) can be located. Ah, but there's the rub: where do you get the schematic?

To find out, we called a real rocket scientist: Gayle Maddox of American Technavision (see display ad in this issue). Gayle said that Howard Sams Publishing, of Indianapolis, sells a wide range of schematics for various electronic components, including floppy disk drives! Currently, Sams has schematics in stock for TEAC FD54A and FD55BV-75 floppy drives, plus many others. Schematics cost $24.95 each, plus shipping. Order by calling Howard Sams at (800) 428-7267, or write them at 2647 Waterfront Pkwy., East Drive, Indianapolis, IN 46214.

STacy Opener

You won't believe this, but my six-year-old son stuck a small metal keychain into the floppy-drive slot in my out-of-warranty STacy 2. I'm pretty handy with machines, but I can't figure out how to get inside the STacy case. What's the secret?

Barry Inwalt
Lawrence, KS

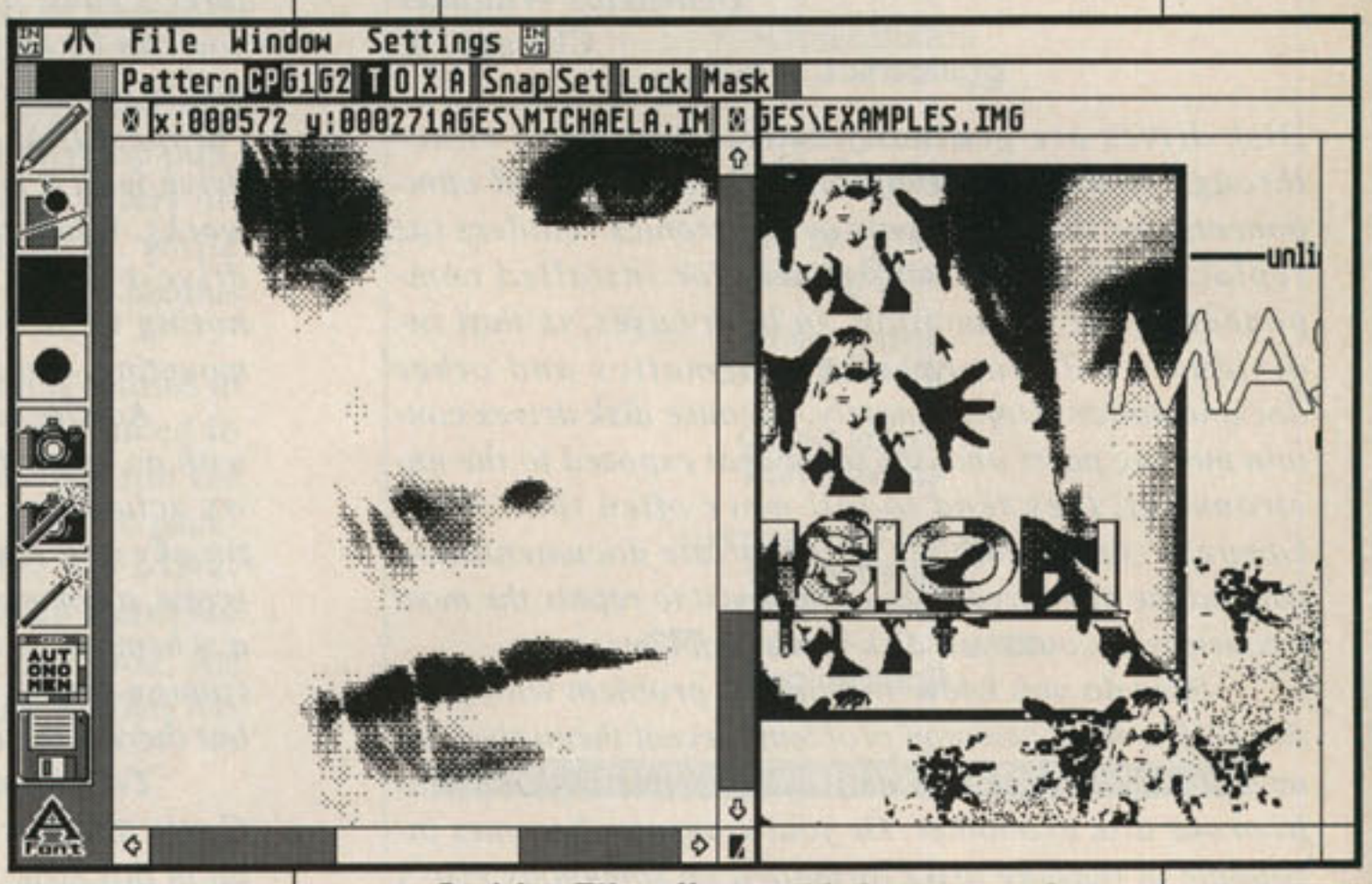
First, unplug your STacy. Then take a straight pin and pry up the adhesive label below the STacy's LCD display, revealing a set of Phillips screws. Unscrew them, and you'll be able to pry the screen shell apart. Detach the screen driver cabling (marking the orientation of connectors), and you'll have enough slack to open the main case.

After that, you're on your own. Pack a lunch, and get yourself a good coal-miners hat with an acetylene lamp. Happy spelunking! ■

News & New Products

INVISION ELITE

Power Thought Software, of Toronto, has announced Invision Elite, a sophisticated, black and white raster drawing package. The GEM-based package lets you work on up to seven images at one time, and offers such sophisticated features as gradient fill, Image Bending, Bezier Curves, Outlining, Smoothing, Rotation, Skewing, Mirroring, and Atari Clipboard Support. A demo version has been released to GEnie and other information services. Official release is slated for August 1, at a suggested retail price of $174.95. Pre-release versions are available now for only $149.95. The pre-release offer includes the full program, a quick-start manual, and the option to purchase the full manual upon release. (Power Thought Software, Box #98, 275 King St. East, Toronto, Ontario, Canada M5A 1K2, (416) 594-9355).



Invision Elite offers sophisticated tools for raster-image generation.

BATMAN REBATES!

Atari kicked off a national television advertising campaign for Lynx with the announcement that it will give away a free Batman Returns game card (a $50 value) with every new Lynx purchase made between now and September 1, 1992. Lynx dealers have been provided with coupons that will allow purchasers to order the free cartridge with proof of purchase. Atari simultaneously announced a new pricing structure for Lynx games. "Classic" cartridges will now be available starting at $19.99, while new 4 Mb titles such as Pit Fighter, Ninja Gaiden III, and Dracula: The Undead will retail for up to $49.99. (Atari Entertainment, 500 Watersedge, Lombard, IL 60148, (708) 629-6500).

SOFT-LOGIK UPGRADE

Soft-Logik Corporation, developers of PageStream, have announced an upgrade program for owners of early versions of PageStream and other DTP products. Until August 31, owners of PageStream 1.x can upgrade to PageStream 2 for $75. Owners of Publishing Partner can upgrade for $100, and owners of any other Atari DTP package can upgrade for $120. Send original materials, and include $5 for shipping and handling.

Soft-Logik has also announced special pricing on its typeface library of over 600 PostScript Type 1 fonts. Fonts now cost $12.50 per typeface weight, though they are sold by font family, only. A full family of ITC Caslon, containing four fonts, thus costs $50. A poster detailing all of Soft-Logik's Type 1 fonts may be requested from the company. (Soft-Logik Publishing, P.O. Box 290070, St. Louis, MO 63129, (314) 894-8608).

ISD TRADE-UP & NEW SL FEATURES

Not to be outdone, ISD Marketing (now DMC Publishing) is offering a trade-up to owners of Publishing Partner, PageStream, and other Atari desktop publishing packages. Until August 31, anyone who proves ownership of an Atari DTP program can obtain Calamus 1.09N for only $100 (US) including shipping—a $200 value! And if you're among the first 100 people to take advantage of this generous offer, you'll get DMC Publishing's Guide to Calamus DTP, at no extra charge.

DMC's advanced desktop publishing system, Calamus SL (reviewed in this issue), is also being enhanced. An announcement made July 10 detailed numerous improvements to the first release of Calamus SL, including consolidation of the program's Text module and its PKS-Write editor, and the release of a complete Focoltone color-spec module, including color samples and other documentation. Also announced were several anticipated new products, including Outline Art 2. Details will be released at a later date. (DMC Publishing, 2800 John St., Unit #10, Markham, Ontario, Canada L3R 0E2, (416) 479-1880).

GEMULATOR NEARS COMPLETION

Branch Always Software has announced that its much-touted Gemulator, a PC-based Atari ST emulator, will be released in September at an expected retail price of $399. Those who order before August 31, however, will pay only $199. The software/hardware Gemulator, which requires Atari ROMs, emulates all 68000 CPU instructions as well as ST/STe hardware features. It is reported to permit any 386- or 486-based MS/DOS or Windows system to run almost any ST program, including such favorites as PageStream and Calamus. A VHS demonstration video is now available for $5. (Branch Always Software, 14150 N.E. 20th Street, Suite 302, Bellevue, WA 98007).

WRITE ON TRIAL OFFER

Through August 31, owners of any ST word processor can upgrade to Compo Software's popular entry-level WP package, Write ON, for only $30 (regular retail, $99.95). Later upgrade to Compo's more powerful That's Write word processor will cost only $100 additional (regular retail, $199.95). Or, you can have That's Write 1.52 for only $130, with tradeup from any other Atari WP package. When That's Write 2.0 ships, presently, registered owners may upgrade for no additional charge. (Compo Software Corp., 104 Esplanade Avenue, Suite 121, Pacifica, CA 94044, (415) 355-0862).

SPELLING SENTRY

Phil Comeau Software has announced the imminent release of Spelling Sentry, a dynamic spell-checker that runs either as a desk accessory or program. In DA mode, Sentry checks spelling as you work with any word processor or other application, notifying you in realtime if you make a typing error. The program will offer up to eight alternative spellings for misspelled words, drawn from its 100,000-plus word dictionary. Spelling Sentry can also be used as a stand-alone spell-checker for document or clipboard contents. Release is expected in September, at a price of $59.95.

TLC UTILITIES 3.0

TLC Software has announced immediate availability of an upgraded version of its TLC utility package. The nine programs in the TLC set include an Address Book, a file-attribute utility, a generic search-and-replace utility, a digitized sound player, a Spectrum viewer, a resource-file converter for GFA BASIC, an icon-data conversion utility for Degas, a file-renaming tool, and a fast disk-formatter; all for only $20 (registered owners may upgrade for $5). (TLC Software, c/o MSgt Tom Hayslett, HG USAFE/FMF, PSC 2, Box 6195, APO AE 09012).

REVIEW

Turn your Atari into a FAX Workstation!

STraight FAX

by John B. Jainschigg

LET ME ADMIT MY BIAS: I THINK FAX IS PRETTY much an all-around stone drag. Fax machines cost too much, waste paper, and produce substandard output that can't be read directly by machines. Unfortunately, the Luddite majority has been led to believe that fax is a miracle of information science, and has embraced the standard with bleating, sheeplike enthusiasm. The resulting trend leaves us technically-literate types with no choice but to conform—admitting that the fax standard exists, and using it when there's no reasonable alternative.

The real miracle of fax, of course, is that people will pay upwards of six bills for the equivalent of a cheap auto-dial telephone, a handful of stock chips, and a low-res thermal printer. Luckily, however, there's now an alternative. Just because we're forced to use fax from time to time doesn't mean we have to put up with its unwieldy, redundant, underpowered, and overpriced machinery. Combined with one of the new high-speed faxmodems, Joppa's inexpensive STraight FAX software turns your Atari ST or TT into a versatile facsimile workstation, as powerful as the best stand-alone, plain-paper fax machines on the market.

✔ STRAIGHT FAX

Requirements: Any ST, STe, or TT computer with 1 MB or more RAM. Class 2 Faxmodem (receive and transmit) or SendFAX modem (send only). Hand-scanner and ScanLite (Dr. Bobware), optional.
Summary: Powerful and well-designed send/receive fax software package.
Manufacturer:
Joppa Software Development
P.O. Box 214, Dallastown, PA 17313-0214
(717) 428-3231
Price: $89.95

The Basics

STraight FAX works by coordinating system resources—faxmodem, printer, and hand scanner—to substitute for the components of a fax machine. But by dissociating these components, it achieves efficiencies a stand-alone fax can't match. Unlike a regular fax, which accepts only physical documents, STraight FAX can take input in file form—transparently converting ASCII text (from word processors, spreadsheets, databases, etc.), .IMG, and Degas files to its own "fax" format, prior to transmission. This approach saves time and paper, eliminates feed errors, and scotches any physical limitation on feed capacity. Perhaps even more important, converted documents are free of the spurious data, shadowing, and other problems introduced when physical pages are scanned into a standard fax, making for far cleaner output at the destination.

To broaden the range of applications that can provide input to STraight FAX, Joppa has created "printer drivers" for Calamus (1.09 and SL), PageStream (1.8 and 2.1), and GDOS that let these programs produce fax files directly. Multiple-page transmissions can be assembled from up to 33 files in any of the supported formats (ASCII, .IMG, Degas .PI3, and "fax" (.J01 to .J99

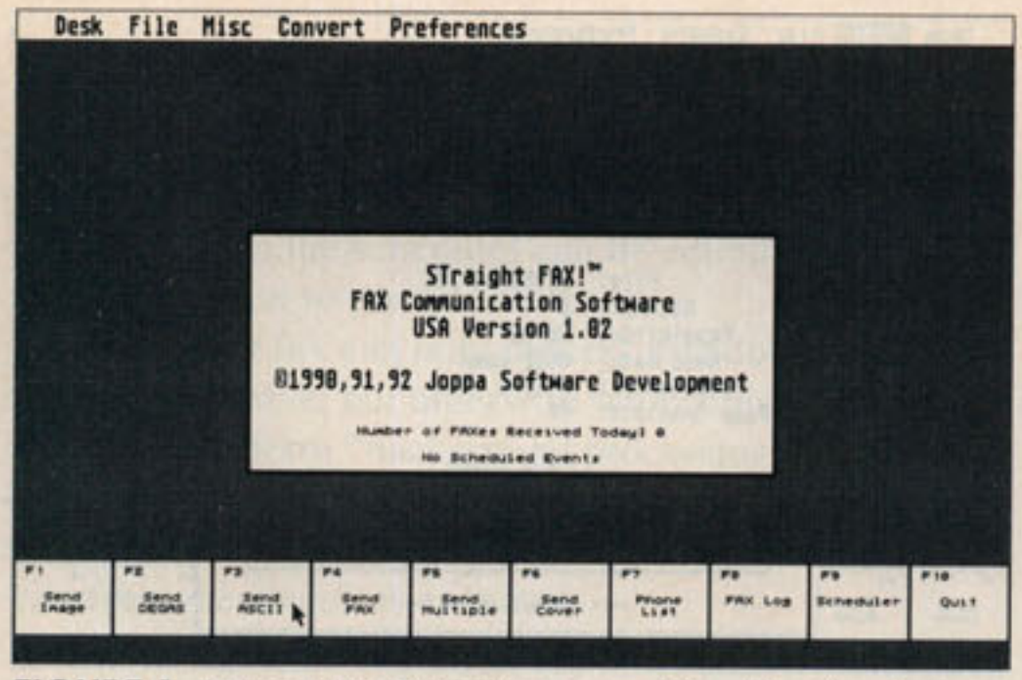


FIGURE 1. STraight FAX' main screen offers function buttons for quick access to basic features.

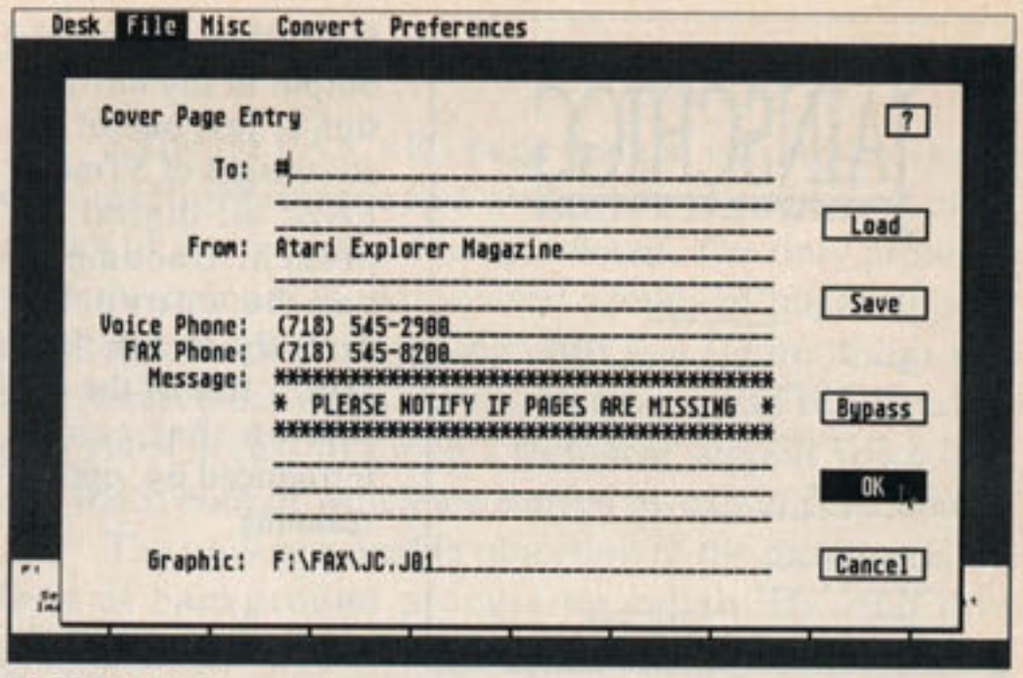


FIGURE 2. Cover-sheets are generated automatically, and can include a graphic image (logo, letterhead, etc.)

extenders)); and the file-conversion routines can be operated manually to convert files to fax format for later sending. This capability is leveraged by sophisticated features permitting deferred document transmission (see below).

Faxing hardcopy requires a hand-scanner (MiGraph, Golden Image, etc.), plus Dr. Bobware's ScanLite desk accessory. With ScanLite present, STraight FAX controls your scanner directly, using ScanLite to combine the narrow "strips" produced by each pass into a single, seamless image. The image can then be reviewed, cropped, and massaged in one of STraight FAX's four "view windows," before saving as an .IMG file for transmission.

While this is admittedly somewhat more laborious than simply feeding hardcopy to a fax machine, there are real advantages to this approach. Not least of these is the fact that scanned documents can be "touched up" (e.g., algorithmically smoothed, contrast-corrected, etc.) prior to transmission, making for clear output at the destination end.

As STraight FAX receives a document, it outputs a series of page-files in its own "fax" format—optionally displaying these in a view window as they are received. Once transmission is complete, fax files may be printed (using GDOS), reviewed directly in a view window, or converted to .IMG format for various purposes, including import to graphics, DTP, or perhaps even OCR software. (Now there's irony for you: use all this sophisticated tech to receive a fax, process it through MiGraph OCR, and end up with the same ASCII text file you could have downloaded directly, if the ruminant at the other end of the line would learn how a modem works! Is that high techno-camp, or what?)

STraightforward!

Though essentially a specialized telecommunications package, STraight FAX is much easier to operate than regular terminal software. Once the program is properly configured, it hides the complex business of faxmodem management behind a simple user-interface that automates every aspect of fax communication, and provides clear records of faxes transmitted and received.

Initial installation is easy—an "install" program is supplied on the distribution disk, so all you have to do is point, click, fill in the blanks in the online registration form, then (as a famous scientist once said) "sit back und vatch der blinkenlights." STraight FAX can reside in any folder, and can address independent folders for outgoing and incoming material.

Patches and Fixes

Additional preparations are only slightly more complicated. For printing, STraight FAX requires that GDOS (or G+Plus, or Font GDOS, or FSM/GDOS) be installed, though since the program does not require any special fonts for printing, an existing GDOS configuration should work fine. Depending on what version of TOS you're running, it may also be necessary to install one of a variety of AUTO-folder "patches" to insure proper handling of the modem port. The necessary patches are supplied with STraight FAX (Atari has released these to the public domain), and the manual contains a table correlating TOS versions, patches, and flow-control options.

Finally, STraight FAX's unattended transmission and logging features require that system time be set correctly. Because early-model STs lack battery-backed clocks, Joppa has thoughtfully included a time-setting utility with the package. This utility can be run as a program or installed as a desk accessory. Additionally, if STraight FAX determines that system time has not been set during the current work-session, it will auto-execute the time-setting program if the utility is stored in the same directory as the main application.

Once the program is up and running, online configuration is simple and straightforward. You will have to identify the type of faxmodem you are using (the pro-

FIGURE 3. Attractive output at the destination is just one of the advantages of STraight FAX' all-digital approach. Documents can be converted directly to fax "images," free of the distortion that can be introduced by optical scanning.

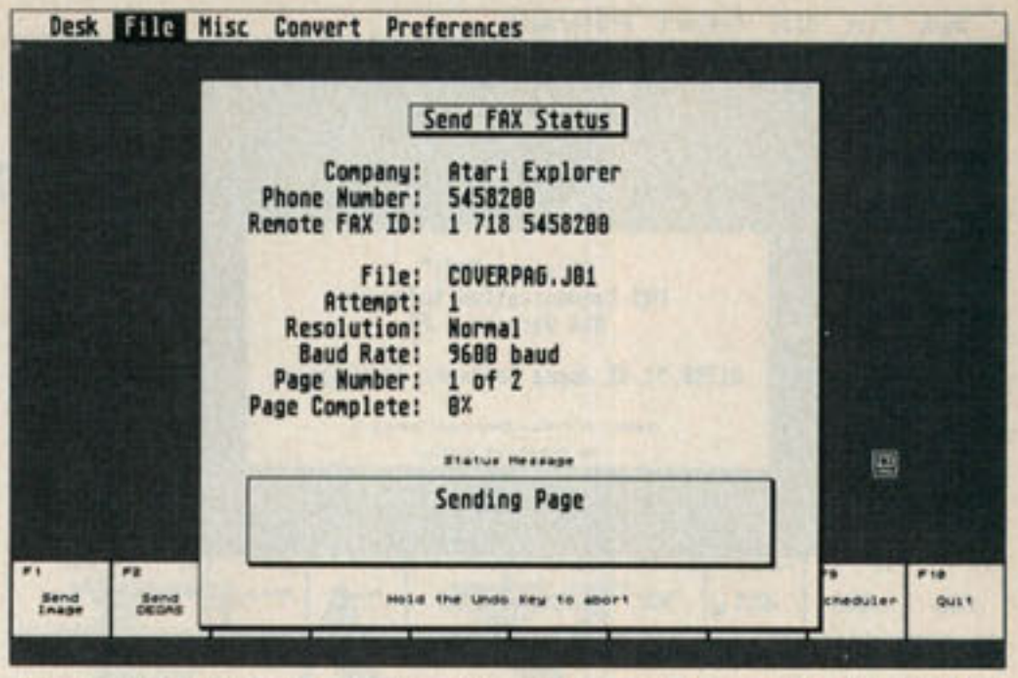


FIGURE 4. When sending faxes in realtime, STraight FAX keeps you informed of progress.

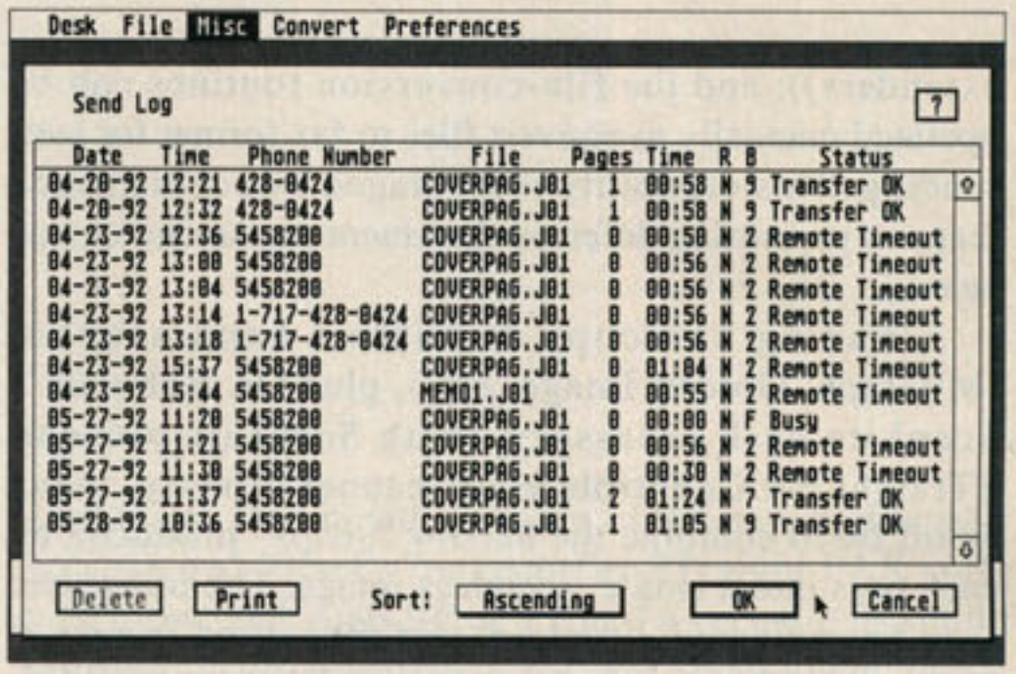


FIGURE 5. A complete log is maintained, detailing results of both immediate and deferred fax transfers.

gram supports both Class 2 send/receive faxmodems up to 14,400 baud, and Joppa's own SendFAX, send-only faxmodem), though most other low-level parameters (DTMF intertone delays, redial intervals, comma pause times, etc.) are preset to tolerable default values. Setting baud rate in the program is easy—just set it to the highest rate your faxmodem will support, and the modem will handle such "stopping down" as may be needed to communicate with lower-speed equipment. Additional configuration options may be set to control automatic cover-page and page-header generation and appearance, to influence the formatting of .IMG and Degas files on conversion, and to master certain cosmetic aspects of program behavior (use of "grow" and "shrink" boxes, etc.).

Features and Details

Though menu-driven, all of STraight FAX's features may also be elicited by keypress. Frequently-used features are coded to the main function keys and to a small button panel, embedded in the screen background. Faxes may thus be sent, received, and scheduled; phone lists may be updated and logs reviewed, all with "one-touch" ease (see Figure 1).

Four "send" buttons permit transmission of a single document in ASCII, .IMG, Degas, or FAX format. When one of these buttons is clicked, a file selector pops up—its mask set to reveal only files of the selected type. Once a source document is selected, conversion and transmission proceed immediately unless automatic cover-page generation is active. In this latter case, a default cover-page file is loaded and displayed for approval or modification (see Figure 2).

Cover pages contain standard fields for sender, recipient, and other information, and can incorporate a graphic saved as a fax-format file. Cover page parameters may be loaded and saved to disk, so several types of cover sheets can be maintained. When a cover page is generated for transmission, variable fields such as date, time, and total number of pages are filled in, automatically (see Figure 3). Recipient name can also be filled in by the program from information found in the telephone list. This is particularly useful when sending the same document to multiple recipients.

Selecting a destination fax number is the next step. Just point and double-click, and your fax is on its way. Call progress is monitored by a status dialog box (see Figure 4), and automatic redial, re-sending of failed pages, and other "hands off" convenience features are supported. Transmissions are automatically made at the highest speed sender and recipient can support, limited by current line conditions. Successful completion is announced by an audio tone, and entries are automatically made in the transmission log, for later reference (see Figure 5).

Sending the same document to multiple recipients is just as easy: select multiple destination phone numbers from the phone list (up to 100 numbers may be loaded at once, and phone lists can be saved and loaded from disk), and off you go. STraight FAX automatically logs each requested transfer into the scheduler (using the current time), then calls each number and sends the document. Recipient information, actual time of transmission, and date are automatically modified for each cover page. As always, complete individual call history

is saved in the transmission log file.

Deferred transmission is also handled by the scheduler: just select a document, approve a cover page, designate one or several recipients, then input a time and date. Entries to the scheduler can be edited or cancelled at any time prior to transmission.

STraight fax can only process scheduled transmissions when active, but otherwise unoccupied—it cannot inherently perform "background processing," nor "wake up" from dormancy to perform pending tasks. For this reason, the program is designed to perform any pending transfers whenever it is executed.

A similar problem occurs in fax receipt: which STraight FAX performs gracefully either in manual or automatic mode—but only when up and running. Happily, when Atari releases MultiTOS, later this year, both these quibbles will go away. According to Joppa, STraight FAX is already fully compliant with the promised operating system upgrade. As a MultiTOS background process, STraight FAX will be fully capable of unattended transmission and receipt.

In the meantime, high-volume business users may wish to dedicate a system for constant use with STraight FAX; keeping it up 24 hours per day, much like a Bulletin Board node.

Final Notes

STraight FAX's 80-page manual is complete, concise, well-organized, and well-written—covering each aspect of the program in ample detail. The only problem with the manual is that several groups of pages appear more than once—confusing until you figure things out and remove the extra sheets. Purchase and registration also gives access to Joppa's technical support voice line and BBS, both of which are staffed by expert personnel.

The only reasonable objection to the program is its lack of background processing capability, and this problem will evaporate as soon as MultiTOS is released. Beyond this, it's hard to think of any feature STraight FAX lacks, though the ability to convert and transfer additional file-types would be appreciated.

Overall, STraight FAX is a very good piece of software. Anyone managing a sales force, keeping in touch with a broad client base, zapping press releases out to expectant media, or fielding any similarly advanced, professional fax application (oxymoronic as this may sound) would be well advised to purchase STraight FAX and an appropriate faxmodem, straightaway. It's simply the cheapest, neatest, most efficient way to deal with the fax phenomenon. ■

REVIEW

Instant Online Help for PageStream

Page Assistant 1.10B

by Peter Donoso

SOFT-LOGIK'S PAGESTREAM 2.1 IS A STATE-OF-the-art desktop publishing system with features galore. Unfortunately, the program's sheer power implies complexity that regular documentation and tech support (though Soft-Logik excels in providing both) sometimes fail to explicate. As a result, most PageStream users find themselves wishing for expert help now and again—usually when deadlines loom.

Page Assistant solves this problem by putting PageStream help online, letting you instantly call up the proper commands to perform almost any PageStream operation. A desk accessory, Page Assistant comes on a double-sided floppy disk, is not copy-protected, and may be installed on hard disk.

When loaded, Page Assistant the accessory occupies only about 145K, meaning that it will run on a 1MB machine with PageStream installed. A more practical configuration, however, requires that your system contain at least 2 MB of total RAM. This permits more rapid access to data and prevents conflict with PageStream's memory-management systems.

Page Assistant draws on data stored as external files in a proprietary (.DAT) format. The accessory can be configured to find these files anywhere on your system, so they can be stored conveniently in a folder, away from "live" data. Options include the choice of large or small text display.

Once configured, accessing Page Assistant from the Desk menu causes an instruction window to appear instantly on your screen. The window cannot be resized—a sensible decision, since this would involve realtime reformatting (causing loss of speed), and might detract from the legibility of information presented. Instead, Page Assistant opts for speed and clarity, presenting fast-scrolling screens of data, preformatted for quick absorption. A set of simple arrow buttons let you "page" forward and back through the sequence of screen pages devoted to a particular topic—other than these controls, few user-interface "bells and whistles" separate you from the subject matter.

A button labeled "Pop-up Menus" gives you access to a main menu from which heirarchichal submenus can be selected. Only seconds are required to work down the menu tree to a particular topic "leaf." When found, clicking on the Print button lets you create a hardcopy record of any screen page, for future reference.

Once you've perused a main entry, Page Assistant reinforces your newfound knowledge by providing an alphabetic index of related topics, correlated precisely to the ordering scheme of PageStream's own manual. The program thus enhances the utility of PageStream's own

✔ PAGE ASSISTANT 1.10B
Requirements: Any Atari running PageStream 2.1.
Summary: Comprehensive, online help facility, makes complex DTP tasks easy to understand.
Manufacturer:
Spar Systems
381 Autumn Avenue
Brooklyn, NY 11208
(718) 235-3169
Price: $49.95

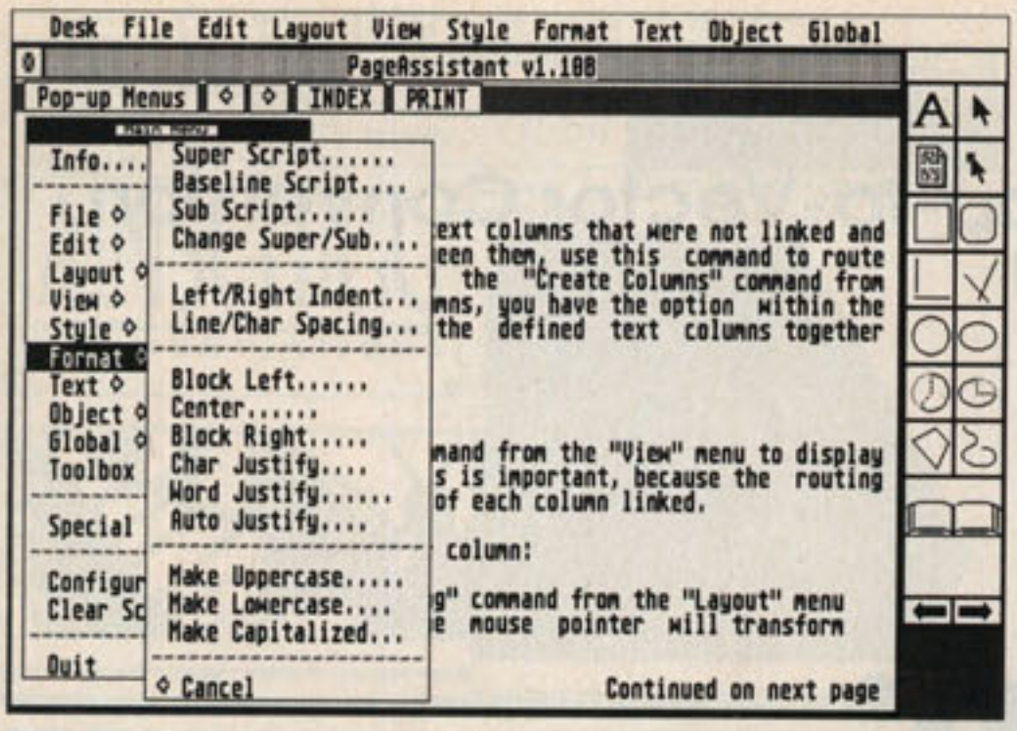


FIGURE 1. Selecting a subject from Page Assistant's main menu leads to a heirarchical submenu of related topics.

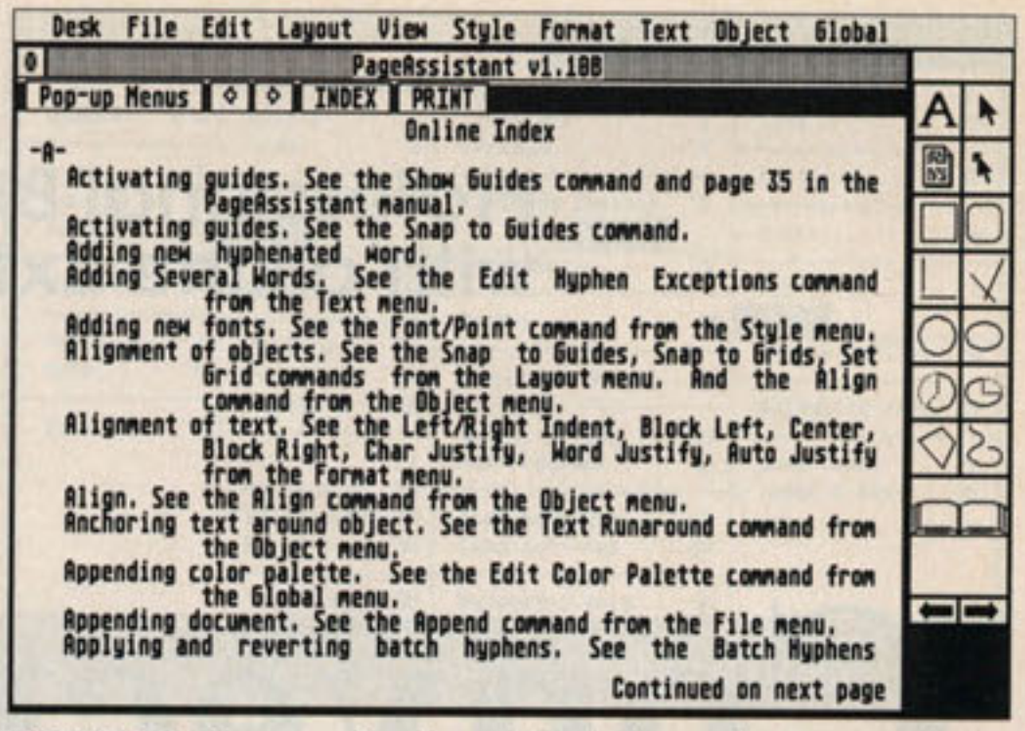


FIGURE 2. Once you've found the information you need, access the Index for further information.

documentation, rather than imposing a system of its own.

Value-Added Documentation

Page Assistant's manual is also informative and well-written, expanding on a number of topics touched on only superficially in PageStream's docs. Tutorials provide step-by-step guides to using PageStream's more advanced and abstract features, such as object and text rotation; special techniques of object manipulation and grouping; text-baseline shifting; text flow, and much more. Even advanced users may discover features of PageStream they never knew existed. ■

REVIEW

Professional Bitmap-to-Vector Conversion, with all the Extras!

Convector

by Dakota Crespo

IF YOU'RE INTO DESKTOP-PUBLISHING OR graphics, you probably already know the difference between bitmap and vector images. Bitmaps, expressed as a series of pixels at a particular resolution, cannot be resized without data loss or "jaggies." Vector graphics, expressed as a series of lines and curves, can be resized freely, meaning that they can be used in a wider variety of applications.

Autotracing—the conversion of bitmap images to vector form—is a complex, mathematically-intensive process. Essentially, an autotracing program traces the edges of each discrete section of a bitmap image, turning the image into a vector dataset. Simple images can be subjected to automatic tracing, with excellent results. But when the source bitmap is complex, human intervention can help the program make appropriate decisions about detail.

Though many vector graphics packages offer some level of automatic bitmap-to-vector conversion, few provide the user-interface muscle needed to access human aid in converting complex images. Indeed, only a stand-alone conversion program can offer the time-saving features required.

Gribnif's new Convector is such a stand-alone utility: a powerful and easy-to-use raster-to-vector graphic converter offering fully-automatic, as well as human-assisted conversion, and functioning either as a program or as a desk accessory. Convector comes on a double-sided disk that includes some sample raster and vector graphics with which you can experiment. The program is not copy-protected, but must be installed with a utility that registers your name and disk serial number in the installed copy. The installation utility is highly automated—capable of creating the necessary directories and copying appropriate files and folders to their destinations, unassisted.

Memory Management

Convector opens to display a GEM-like menu bar and desktop, complete with Printer, Trashcan, and Clipboard icons. The Clipboard icon accesses Atari's CLIPBOARD.CPX, permitting images to be imported and exported between applications. At the bottom of the screen, ten function-key buttons provide mouse access to commonly-used program options, also accessible from the keyboard.

A memory status box displays the amount of memory used and available. Memory permitting, Convector can retain up to sixteen bitmaps and their vector equivalents in dynamically-allocated RAM, each repre-

✔ CONVECTOR
Requirements: Any ST/STe/TT with 1 MB RAM and double-sided drive. Monochrome only.
Summary: Dedicated bitmap/vector converter.
Manufacturer:
Gribnif Software
P.O. Box 350, Hadley, MA 01035
(413) 584-7887
Price: $149.00

FIGURE 1. Work in Convector's active window, while leaving an assortment of bitmap and vector windows open.

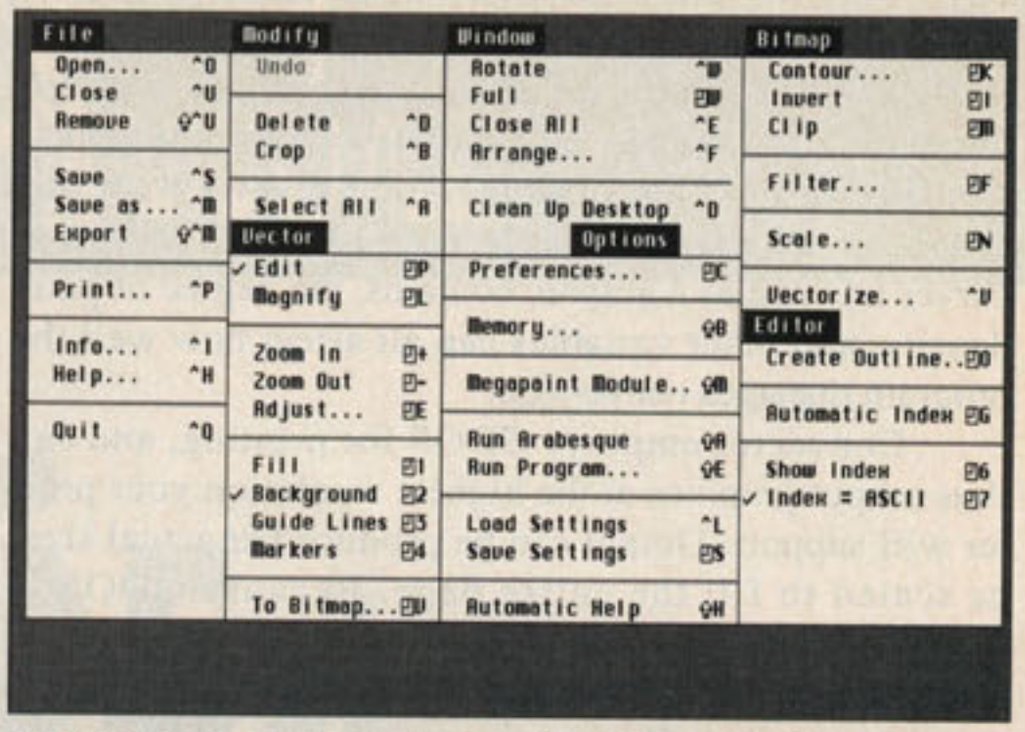


FIGURE 2. An enormous roster of options make Convector both flexible and powerful.

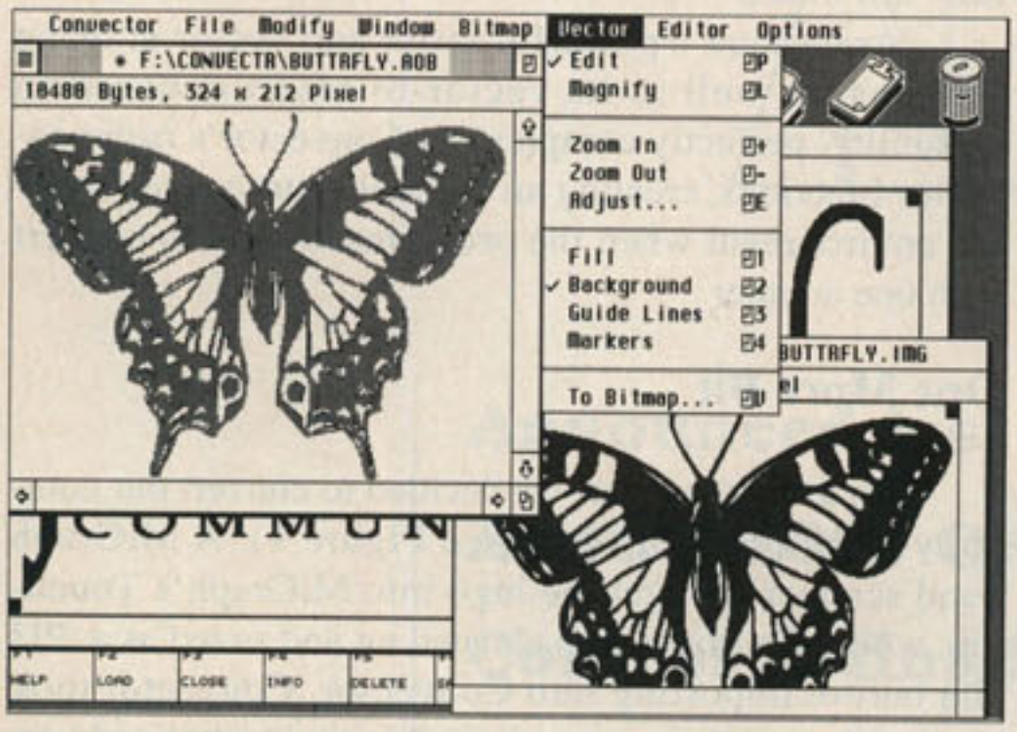


FIGURE 3. Autotracing in progress. When it's complete, use the Zoom function to review the accuracy of a conversion.

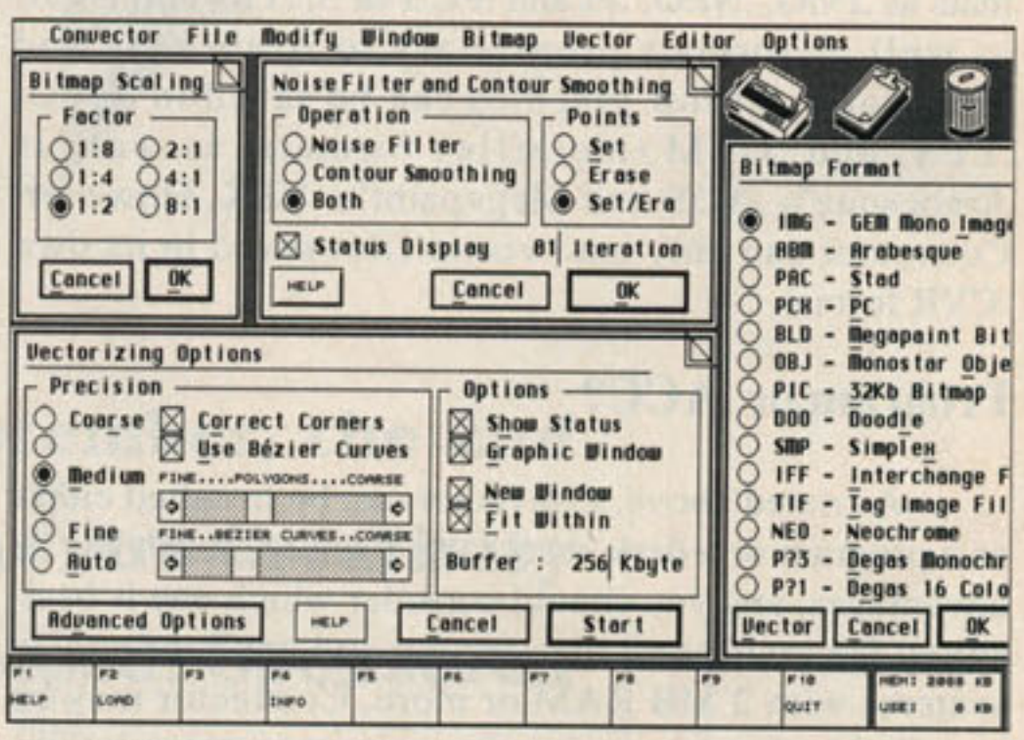


FIGURE 4. Numerous input (bitmap) formats make Convector the most software-friendly autotracer around!

sented as an icon on the program's pseudo-desktop. This scheme is particularly convenient when Convector is employed as an accessory, working alongside graphics and DTP software as a vector-conversion engine. The downside: when Convector is used as an application, you have to remember to save your graphics before exiting—otherwise, your work will be lost.

Opening a bitmap graphic file causes the graphic to appear in a window labeled with the filename. The graphic's size in bytes and its horizontal and vertical pixel dimensions are displayed on the window's information line.

Autotracing can be applied to the entire image or to a rectangular area, selected with the mouse. If part of an image is selected, the chosen portion expands to fill the entire window. Choosing the Vectorize option from the Bitmap menu initiates autotracing—the color of the displayed image changes from black to grey to show the process is beginning.

Convector's first step is to determine how many disjoint parts the image contains—each will be converted to a discrete, vector "object." Once this count is complete, the work window's information line changes to show the number of objects converted and awaiting conversion.

If you watch the display closely as vectorization proceeds, you will notice a thin black outline moving from one portion of the graphic to the next, indicating which bitmap section is being converted to a set of line-connected dots and Bezier curves. When the process is complete, the converted graphic appears in its own window. The vector data can be saved as a file, or exported via the Clipboard to any compatible vector graphic program.

Time Constraints

The amount of time required for conversion is dependent on a number of factors, among them the size and complexity of the bitmap graphic; the degree of detail you wish preserved in the resulting vector dataset (values can range from rough to very smooth conversion); and whether the conversion generates Bezier curves, as opposed to line segments. Though managing

the conversion process requires no great knowledge or skill, it would benefit the user to experiment with different program settings on a variety of source graphics. Configurations that produce good results with one graphic may not work well with another. The more curves and angles a graphic contains, the degree of pixel density, and other variables can all affect how well the program manages conversion.

Convector employs GDOS for printing, and can thus output graphics at the highest resolution your printer will support. Output can be produced at actual size, or scaled to fill the entire page. Because GDOS is resolution-independent, printed output is the ultimate tool for checking conversion quality.

At present, Convector can import 14 different raster graphic file types, including such popular file formats as .IMG, .NEO, .PI and .PC 1 or 3, .TIF, and .PCX, as well as formats proprietary to Arabesque and Megapaint. Vector graphics can be saved in .CVG, .EPS, and .GEM (metafile) formats, as well as Arabesque's .AOB and Megapaint's .VEK. However, Convector can only load vector files saved in its own .CVR format.

Program or .ACC?

As noted above, Convector can be installed either as a program or a desk accessory. Each approach has its advantages, and you should consider which one is best-suited for your particular system and application. On systems with 2 MB RAM or more, Convector may be installed both ways, and power users may consider implementing this configuration so as to have the advantage of accessory convenience or application power, as required.

Those with limited RAM should probably avoid using Convector as an accessory, since its habit of keeping graphics in RAM can limit memory available for running other programs. To speed up use of Convector in its .PRG version, you can install it (using the Desktop's Install Application feature) to run automatically whenever you click on a graphic file with an extension such as .IMG or .PI3.

Those with sufficient memory can use Convector as an accessory by changing the program's filename extension from .PRG to .ACC and copying it into the boot directory, along with its resource file. In this mode, you will have the convenience of being able to vectorize graphics directly from within any program that supports the use of desk accessories, without having to abandon your work. In DA mode, Convector also offers the unique ability to vectorize any or all portions of any image displayed on your application screen, a very unusual feature, and one with numerous potential applications.

When Convector is used as an accessory, its pseudo-desktop and drop-down menus aren't available. Program functions can still be called up by keystroke, however, and a reference list of commands is provided at the back of the manual.

The Arabesque Connection

Convector is designed to work closely with Arabesque Professional, Gribnif's versatile raster/vector drawing program. As a desk accessory, Convector will automatically import the contents of Arabesque's current bitmap drawing page or buffer, perform vectorization, then automatically transfer the results into Arabesque's associated vector drawing page. Run as a program, Convector offers a shell feature that can execute Arabesque directly, letting you employ the latter program's full complement of functions before returning directly to Convector's pseudo-desktop, with all your converted files still intact.

Arabesque's powerful raster and vector drawing features, as well as its vector-to-raster conversion capability, perfectly complement Convector's raster-to-vector functions, creating an optimal raster/vector drawing environment when the programs are run in concert with one another.

One More Bit

To test Convector, we decided to convert our company logo to vector form (see Figure 1). A MiGraph hand scanner brought the logo into MiGraph's TouchUp, where the image was cleaned up and saved as a .PI3 file before importing into Convector. Convector took about 90 seconds to convert the file to a vectorized version, using its finest setting to preserve maximum detail in the finished product.

A second test employed one of the sample bitmaps included on Convector's distribution disk. Since complex images take longer to convert, we chose a very detailed European public domain illustration of a butterfly to use in a time-comparison test. The image was far too large to display in a fully-expanded window, and Convector's initial object-counting process yielded a far larger number of discrete image components than our first example. This time, conversion took 13 minutes on an 8 MHz Mega ST 4 with TOS 1.4. The same conversion took eight minutes on a 16 MHz Mega STe 4, and only five minutes on a 33 MHz TT with 26 MB total RAM. The resulting vector image could be scaled to only one-third screen size, with no noticable loss of detail. On printout, the quality of the resized vector image was even more striking.

Whether you're an artist, a desktop publisher, or just interested in computer graphics, Convector is a valuable and interesting tool that can add considerably to your system's capabilities. The combination of Convector and Arabesque provides a powerful and versatile platform for black and white line-drawing in raster and vector modes. ■

SECOND ANNUAL

DMC

OUTLINE ART

CREATIVITY CONTEST

Announced last September, the 2nd Annual DMC Outline Art Creativity Contest is finally closed! Sponsored by ISD Marketing and Atari Explorer, the contest attracted hundreds of entries from professional and amateur Outline Art users, worldwide. After several extensions of the closing date, our panel of judges has finally convened and selected five winners, presented here for your approval.

FIRST PRIZE: DAN MARUSICH, ABSOLUTE VISUALS

First Prize of $1,500 worth of AGFA CompuGraphic fonts for Outline Art and Calamus was won by Dan Marusich, of Absolute Visuals in Tucson, AZ. Marusich's logo designs employ stylized fonts and readily-recognizable, basic imagery to communicate the personality and culture of organizations in economical, unique, and memorable ways.

JUDGING THE CONTEST WERE Geoffrey Earle, Managing Director of Atari Canada; Mario Georgiou, Art Director and Product Support Manager for ISD Marketing; and Jesus Diaz, Art Director of Atari Explorer Magazine.

"Art always comments on both its subject and—reflexively—on its medium." Diaz says. "When art is produced on computer, using a sophisticated program such as Outline Art, it always tends to reveal something of the computer and the software, as these shape the artist's vision. We expected this, and selected a panel of judges who could view contest entries from a viewpoint of aesthetics, informed by familiarity with advanced technology."

Georgiou continues: "But what surprised us about this year's entries is how well-integrated the influences of computer and software tended to be with the overall process of artistic creation. The best of the entries show their makers to be completely at ease with Outline Art—capable of using it with great fluency to achieve art and design goals. We see this both as an expression of how artists are maturing, and of the inherent flexibility of Outline Art as a medium and the Atari as a tool."

"We think the Atari is a great tool for artists," concludes Geoffrey Earle. "As the recent Toronto Atari Show

demonstrated, Atari ST and TT systems have come into their own in the graphics arena. Equipped with programs such as Calamus SL and Outline Art, Atari systems can offer a real price/performance edge over competing platforms. Artists are responding to this added value by using Atari systems to produce significant work, as entries to the contest demonstrate."

Hard Working Artists

"Another surprising fact about this year's entries was the amount of work put into producing submissions." Georgiou says with justifiable pride. "Entries included ads, clip art, business cards, stationary, logos, fonts—even an undergound music magazine. All were assembled with painstaking care, and many were clearly intended either as examples of commercial work, or seem to have come out of actual commercial projects. Obviously, people are using Outline Art in a wide variety of professional design applications."

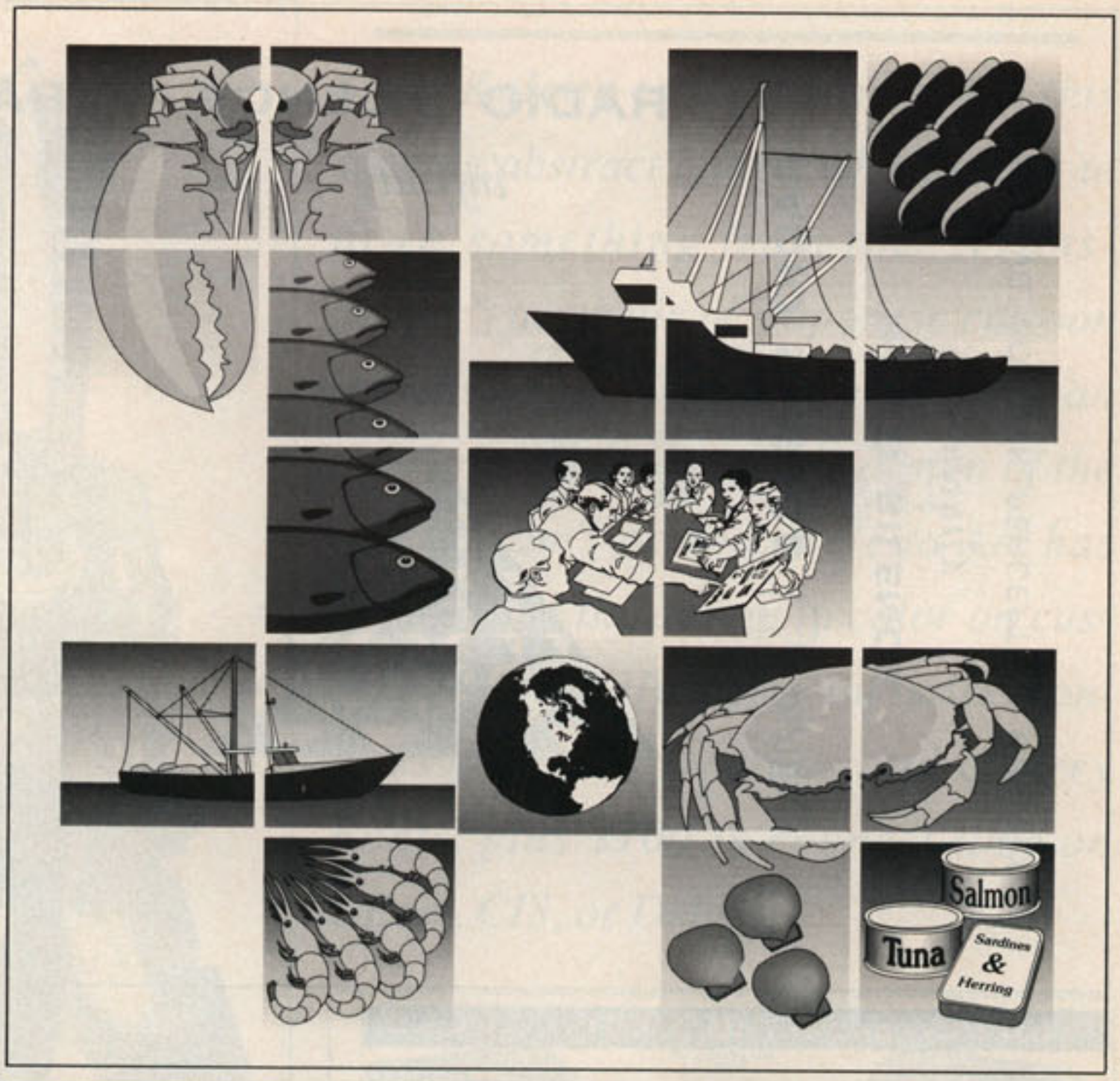
In addition to their prizes, all five winners will receive one-year subscriptions to Atari Explorer.

Commentary on the individual works was distilled from the judges' marginal notes, and represents combined opinion and analysis.

Honorable Mention

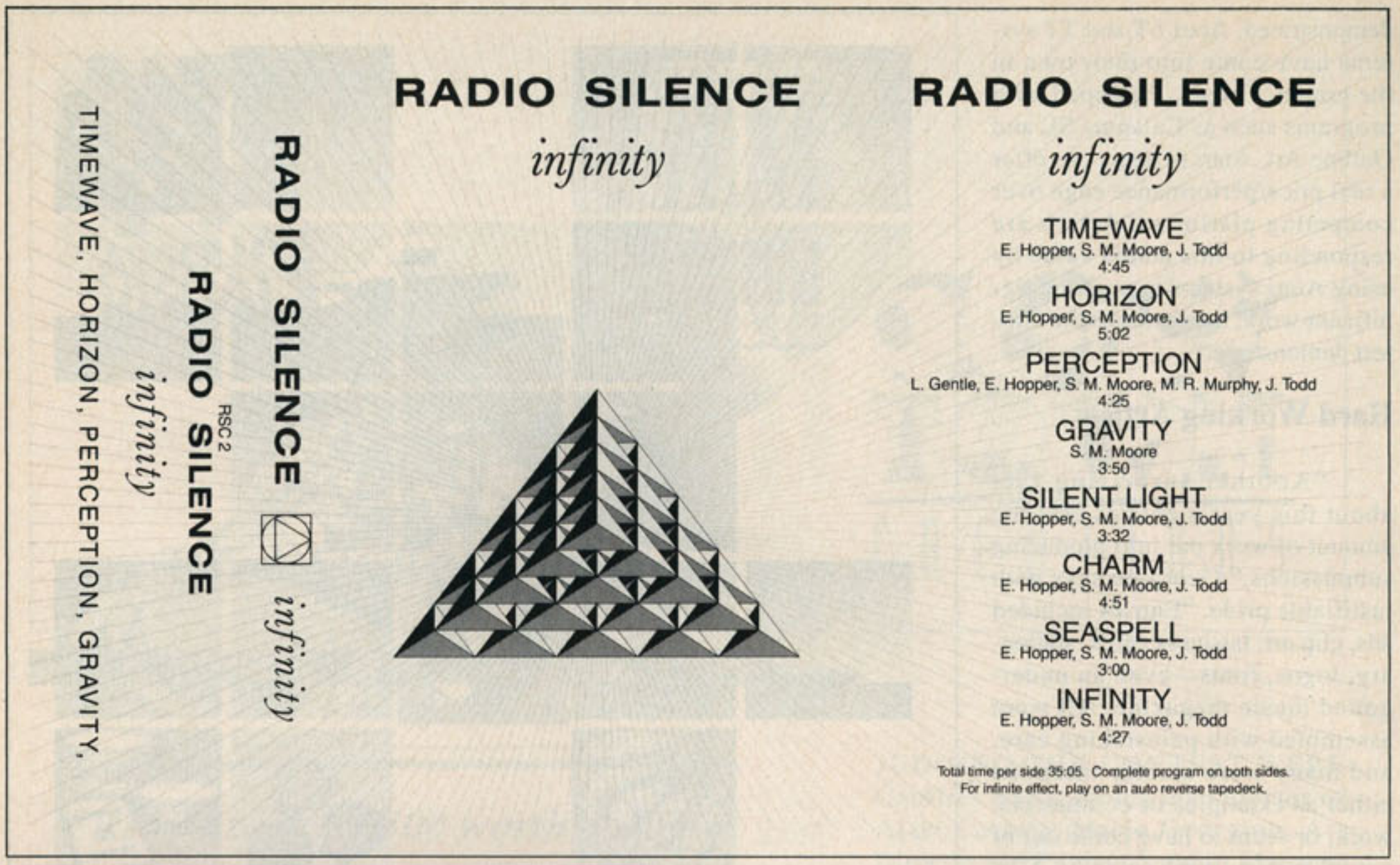
Not shown are five entries that received Honorable Mention. Recipients were James Tackett, for a Clipart font; an unusually "painterly" illustration by Don Harris, entitled "Flowers of the Mind"; a stylized glider design, produced by Martyn Phillips as a logo for the 50th Anniversary of the 151 Chadburn Squadron of the Royal Canadian Air Cadets; a cityscape by Michael Nilsen; and a minimalist picture of a saxophone player, by Bob Gillies.

All recipients of Honorable Mention will receive a one-year



SECOND PRIZE: ROLF BERGER, IMAGES UNLIMITED

Second Prize of an Atari SLM605 laser printer goes to Rolf Berger of Images Unlimited, a design firm and Calamus service bureau in Ottawa. Berger's classic illustration, produced for the Canadian Ministry of Natural Resources, combines realistic and stylized imagery to produce a clean, information-rich design that clearly communicates the Ministry's varied interests. At the same time, certain "retro" elements of the illustration, reminiscent of the "clip-art" style popular in '60's-era corporate communications, underscores the CMNR's conservative and businesslike image.



FOURTH PRIZE: JAMIE TODD, CHIMERA

Fourth Prize goes to Jamie Todd, of Chimera, who produced artwork for his band's cassette release, using the Calamus family of products. Todd's "radiant" design employs Masonic symbols, geometrics, and radiating lines to produce a high-tech effect reminiscent of currency engraving. Jamie and his band, Radio Silence, also use the Atari for music composition and performance. He will receive Font Packs from Cherry Fonts and MS Designs, plus $100 in connect time, usable on GEnie, CompuServe Information Service, or Delphi.

subscription to Atari Explorer Magazine.

Original Art

Copies of the winning drawings (plus Honorable Mentions) are currently available for download from the ST Roundtable on GEnie and other major information services. Files may be viewed with Outline Art or Calamus 1.x, following decompression with ARC602.TTP or equivalent archive utility.

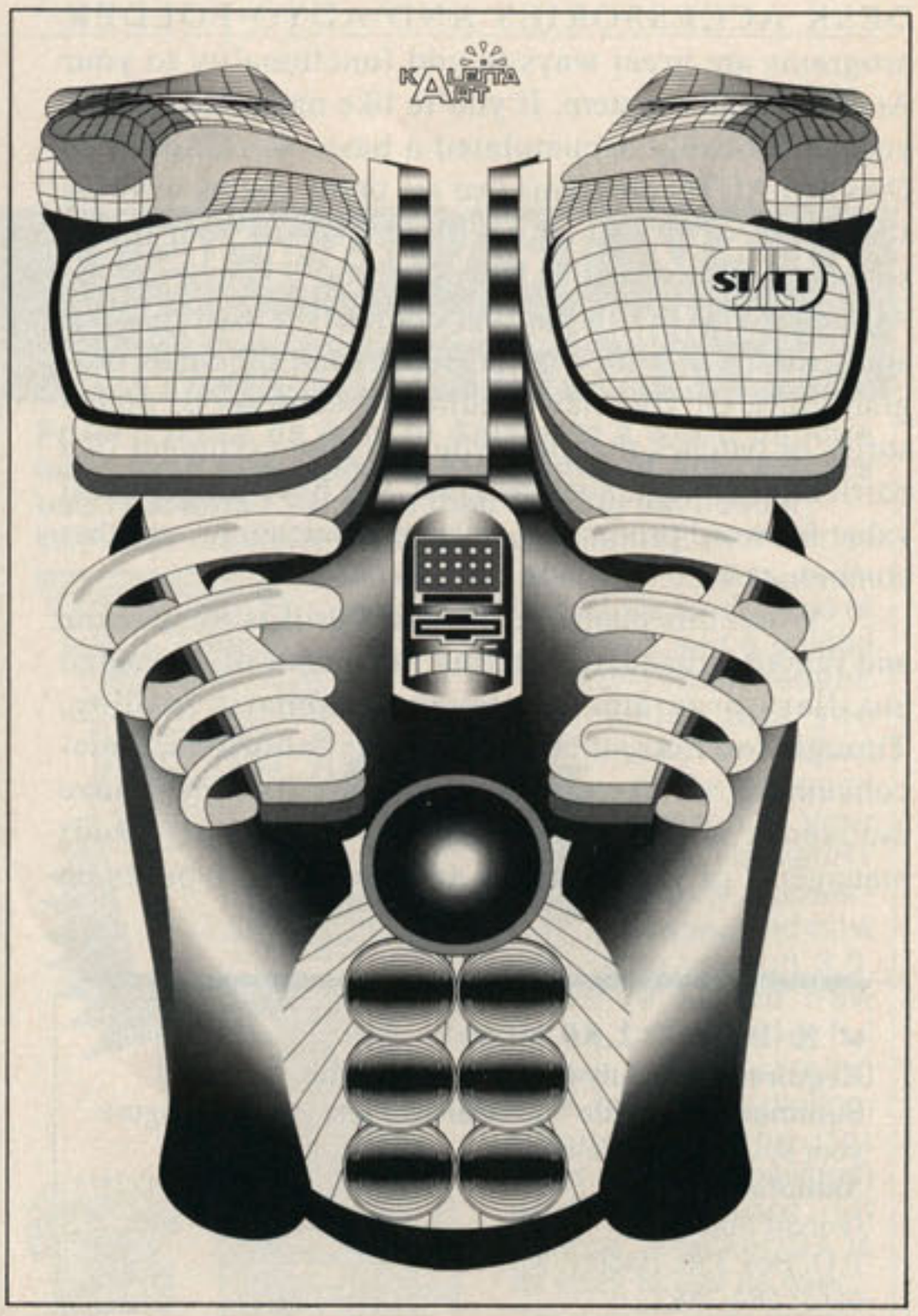
Production Notes

To produce this layout, original art, submitted in file form, was output to size from an Atari ST through a Linotron 300 imagesetter at 1,270 dpi (via Calamus SoftRIP Raster Image Processor). Camera-ready art was then photo-optically reduced (via stat camera) to fit the amount of space allowed for each work in the final design. ■

THIRD PRIZE: JOEY SHERMAN (Realm)

Submitted as an illustration for a fantasy short story, Third Prize winner Joey (Realm) Sherman's work can only be described as "intense." The drawing was built up in object layers, allowing the gradual accumulation of detail. Certain low-level details become apparent by viewing the original work at a high level of magnification. Sherman receives a complete Calamus SL package, or its equivalent.

Steve Kaleita took fifth prize for this striking abstract image, which seems to draw something from the "Transformer" aesthetic of Japanese cartoon animation, as well as from American industrial and automotive design of the "Airstream" period. Kaleita Art has reproduced the design in color on custom T-shirts. His prize includes Font Paks from MS Designs and Cherry Fonts, plus $100 in connect time on GEnie, CIS, or Delphi.



FIFTH PRIZE: STEVE KALEITA, KALEITA ART

REVIEW

The Ultimate Boot-Manager

X-Boot 2.59

by Peter Donoso

DESK ACCESSORIES AND AUTO-FOLDER programs are great ways to add functionality to your Atari computer system. If you're like most Atari users, you've probably accumulated a basic working set of DAs and AUTO programs that are pretty stable, working seamlessly with one another and with all your major software. Occasionally, however, you'll run across an ACC or AUTO program that conflicts with a favorite application, and must be disabled each time that program runs. Or you may acquire a special set of accessories or patches that help you use your computer in a particular context, such as DTP, but have no practical value for word processing, telecommunications, or other common tasks.

When this happens, the usual drill is to "rename and reboot," manually altering the names of unwanted auxiliary programs to prevent automatic loading. Though familiar, the procedure is laborious, time-consuming, and error-prone; and programmers have devised a wide variety of ways around it. "Boot managers" of various types are perennial favorites on the utility and shareware scene.

This said, would one ever wish to pay real money for a boot-management utility? Only if it was the best on the market. And in today's ST market, there's only one real contender: X-Boot.

X-Boot is a GEM-based utility that, like other boot-managers, lets you decide at boot time which AUTO folder programs and desk accessories are loaded. But unlike the competition, X-Boot offers the advantage of a mouse-based user interface, and sports several other unique features.

X-Boot is engineered around the powerful and simple idea that users tend to coordinate DAs and AUTO programs in terms of "sets," each of which defines an environment optimized for a particular kind of computing task. Nor is X-Boot limited to considering only desk accessories and AUTO programs as aspects of a "set," but can extend the concept to "environmental" files of a wide variety of types: desktop resource and .INF files, GDOS ASSIGN.SYS files, and others.

Configuring the Configurer

A separate program, XB_CONF.PRG, is used to configure X-Boot prior to use. Among other options, XB_CONF lets you assign a "hotkey" that will bring up X-Boot's main screen at boot time, and define an optional password for securing entry to your system. User settings are saved as a .CNF file, which must be placed in the root directory of your boot drive.

X-Boot itself loads from the AUTO folder. Its

✔ X-BOOT 2.59
Requirements: Any ST or STe computer.
Summary: Versatile boot-manager lets you reconfigure your system with a click.
Manufacturer:
Gribnif Software
P.O. Box 350, Hadley, MA 01035
(413) 584-7887
Price: $39.95

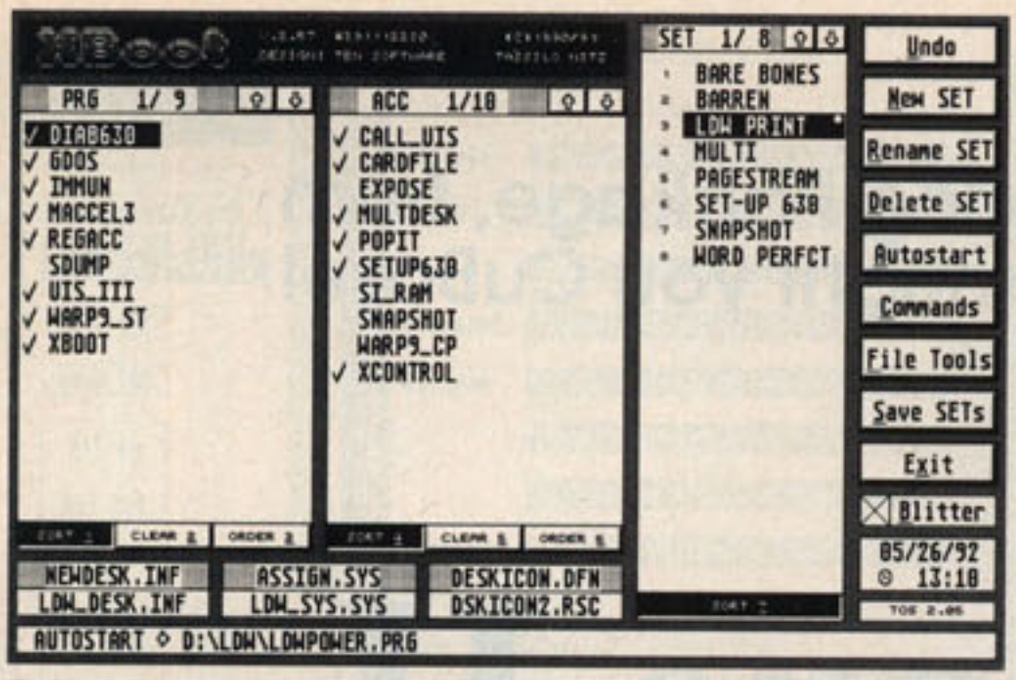


FIGURE 1. XBoot's Boot Manager lets you create working "sets" of AUTO folder and programs and .ACCs

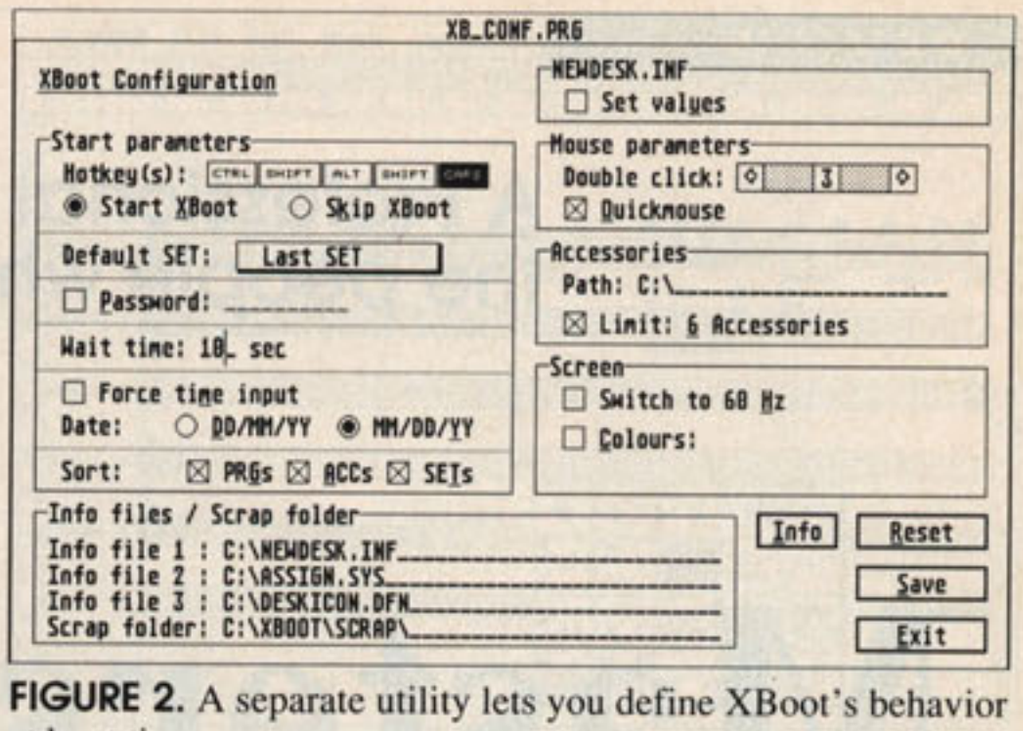


FIGURE 2. A separate utility lets you define XBoot's behavior at boot time.

main screen displays all AUTO folder programs and accessories associated with each set you have defined. Additional fields let you specify which DESKTOP or NEWDESK.INF, DESKICON.RSC, and ASSIGN.SYS files to use with each set, and let you select any program for auto-execution once its corresponding set is installed. Buttons at the left of the screen let you easily configure sets, and offer access to file-management and other program functions.

Alternatively, all program features may be accessed from the keyboard, and sets may be selected at boot time using function keys and Control/Fkey equivalents. More than twenty sets can be defined.

X-Boot comes with a fairly well-written manual, and once you start to use all the features it has to offer, you'll wonder how you ever got along without it. ■

REVIEW

A Professional Scoring Package, from the people who brought you CuBase!

Masterscore II

by Fadi Hayek

STEINBERG'S MASTERSCORE II IS A DESKTOP Score Publishing program that simplifies the complex and sometimes tedious task of scoring by implementing tools that have become commonplace in conventional DTP. Capable of recognizing note values as brief as 1/64th, Masterscore can load sequencer data in Cubase, Cubeat, MasterTracks Twentyfour and Twelve, and popular MIDI standard file formats, and is fully MROS compatible; permitting seamless interface with all Steinberg software.

Loading Sequences

Getting a sequenced file into Masterscore is fairly easy. Selecting Load Song from the File menu gives you a choice of the abovementioned formats. Once a sequence file is loaded, a window appears showing you all of the song's vital statistics, including tracks and parts with their respective names and lengths. Here, you can rename tracks and change their order, as well as assign complete tracks or sections to the song you want to score. Once you decide what parts to notate, Masterscore instantly transforms your sequence to traditional multi-stave notation.

Naturally, any machine translation of sequence to score will make mistakes—though most of these result from the program scoring imprecisely-played sections too literally. In any case, correcting errors in the initial transcription is a snap, since Masterscore offers many helpful editing tools.

A Tool for Every Job

Following in the footsteps of Cubase, Masterscore includes a comprehensive tool box. A click of the right mouse button reveals a pallette of icons, each of which represents from one to several functions. There's a "Micromove" tool for changing the position of any symbol, a "Clef" tool for selecting various clefs, including drum notation. The "Select Key" tool can be used to set key signatures or change them, anywhere in the score.

A specialized "Stem Direction" tool lets you determine the direction of note stems—either manually, or as the result of an automatic pitch-based calculation. The preponderance of specialized tools for handling different aspects of note appearance and position is similar to note- and symbol-attribute-editing systems employed by competing products, such as C-Lab's Notator. Because Masterscore's system is controlled iconically, however, it seems both more responsive and easier to learn than products employing conventional, written menus.

✔ MASTERSCORE II
Requirements: Any ST w/1 MB RAM. Mono only. Hard drive and laser printer recommended.
Summary: Comprehensive music DTP package.
Manufacturer:
Steinberg/Jones
17700 Raymer St., Ste. 1001
Northridge, CA 91325
(818) 993-4091
Price: $495.00

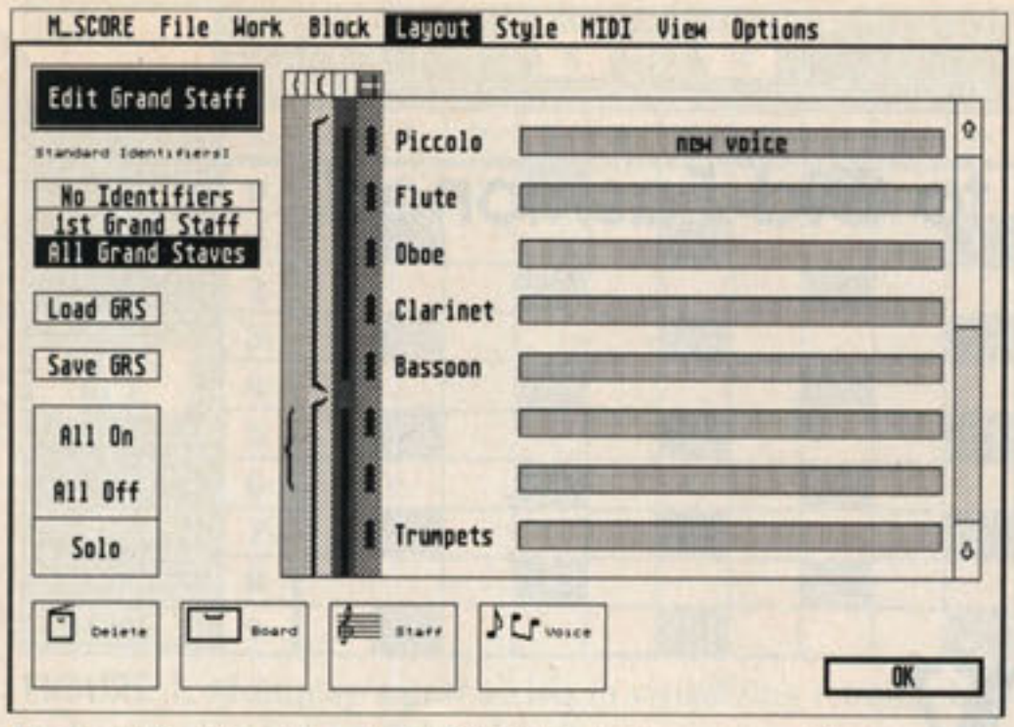


FIGURE 1. The Grand Staff Editor lets you configure your score and set voicings for different instruments.

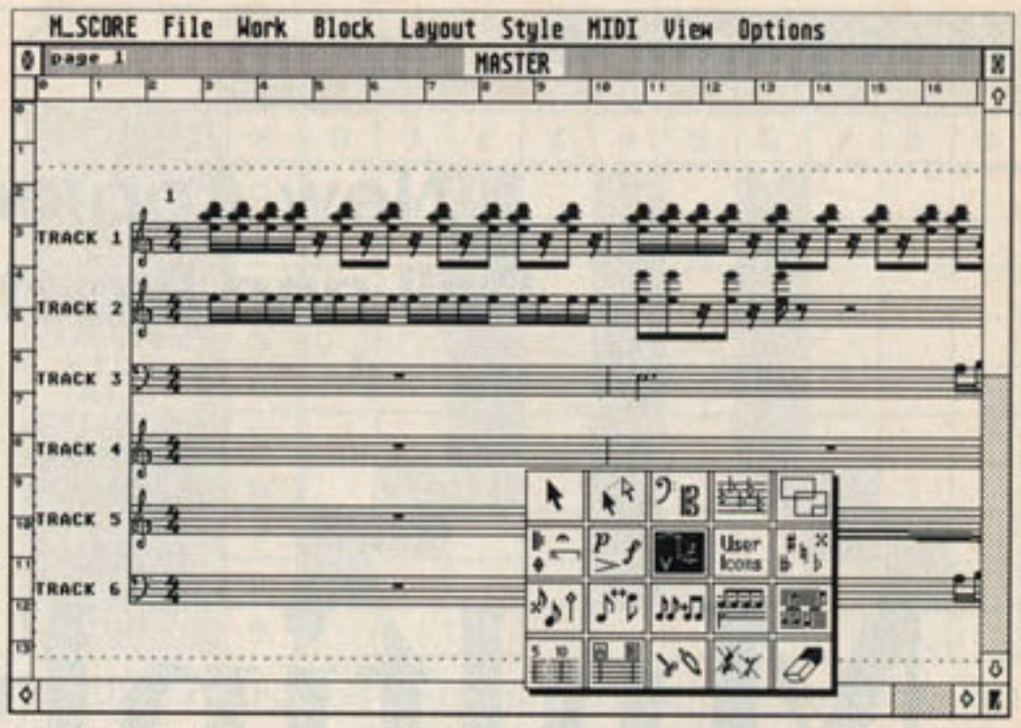


FIGURE 2. The pop-up Toolbox keeps note-entry and -editing facilities close to hand.

The Toolbox provides access to a wide variety of symbols, including dynamic marks, bars, coda marks, accidentals, fermatas, pluck marks, and other articulation symbols. Marks can be applied to individual notes, or to selected sections of a score.

Though Masterscore's basic library of symbols is attractive and cleanly-designed, Masterscore permits refinement of any symbol using its Icon Editor. Any change made to a symbol is instantly propagated throughout a score.

Score Genesis

Though Masterscore II's transcription capabilities are very strong, it's when using the program to create new scores that composers and copyists will stand up and shout Halleluia! Music can be input using the Atari keyboard, the mouse, or a MIDI Keyboard.

All these input methods have their advantages, though entering notes directly from a MIDI keyboard is by far the quickest and most direct interfacing method. When you hit a note or a chord, the appropriate marks appear on the screen. Masterscore's Remote Keys option lets you assign note-time values (whole, half, quarter, etc.) to different "hot keys" on your MIDI instrument, so most of the details of note-entry can be controlled entirely from the ivories.

Though Masterscore II's full capabilities can only be realized by ambitious orchestral-scoring types, the program includes features that appeal to more specialized needs, as well. Drum scorers, for example, can access a "Drum Map" feature that lets them assign input note values to an incredible variety of idiomatic symbols, and even offers the capability of creating entirely new note symbols (with the aid of the "Head Symbol" tool).

Unfortunately, Masterscore II is not documented in a fashion befitting the fluency and power of the program itself. Its professionally-bound manual, though of

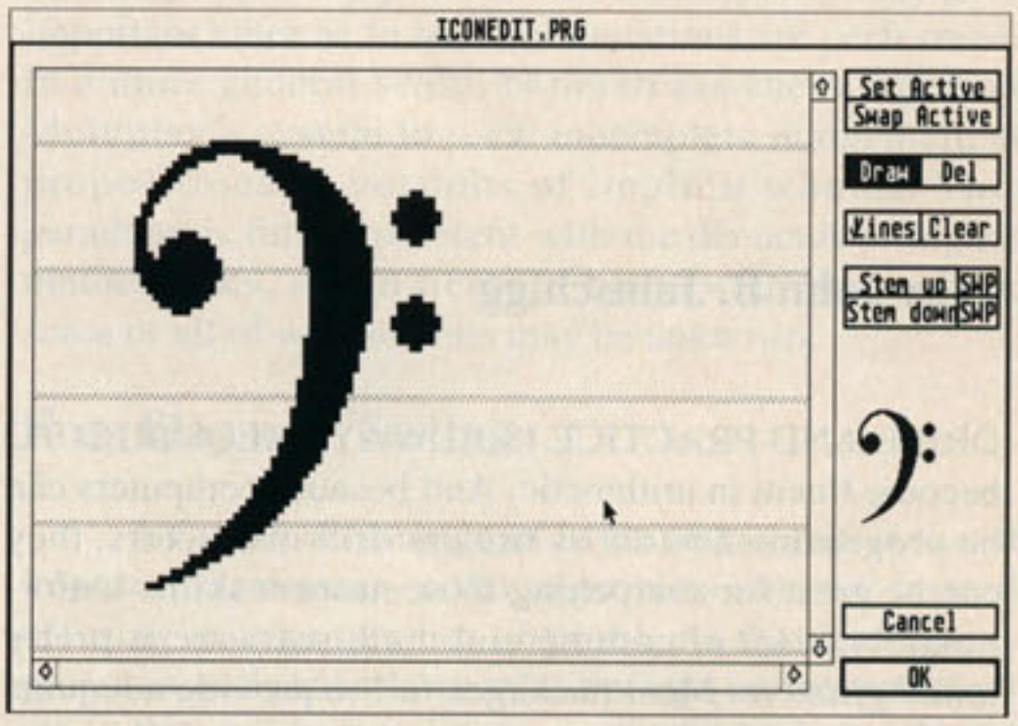


FIGURE 3. Masterscore II's Icon Editor lets you make changes to symbols throughout your score.

substantial size, does not provide enough real-world examples to be an efficient learning tool for the working musician. Luckily, the program is well-enough designed that minimal reference to the documentation is necessary in order to get up and running. However, we encourage Steinberg to address the documentation problem as soon as practical, in a future revision.

Another minor quibble: though the program is not copy-protected, it will not work unless a supplied "dongle" is inserted in the cartridge port. This may necessitate the purchase of a cartridge-port expander, particularly if a musician intends to acquire and use more than one piece of software that is protected in this fashion.

With an advanced sequencing/scoring program like Cubase under their belts, why would Steinberg bother with a dedicated scoring program? The answer is simple: Masterscore picks up where Cubase leaves off, taking scoring into the realm of desktop publishing in a fashion appropriate for the most demanding classical composers, arrangers, and copyists. ■

REVIEW

A New Approach to Old-Fashioned Drill and Practice

Multiplay

by John B. Jainschigg

DRILL AND PRACTICE IS ALWAYS REQUIRED TO become fluent in arithmetic. And because computers can be programmed to act as tireless drill instructors, they can be great for sharpening those nascent skills. Unfortunately, a lot of commercial math software is pretty unimaginative. Most packages fail to provide adequate motivation, dictate the pace of exercises in a fashion inconsistent with good retention, and—perhaps most important—fail to call attention to interesting patterns in the subject matter.

Multiplay, a drill package for addition and multiplication, recently released by D.A. Brumleve Software, is designed to solve these problems. The program's simple user interface creates an open-ended environment, allowing for self-paced discovery and creative play, as well as traditional drill, practice, and testing. As such, Multiplay can stand in, to some degree, for a wide variety of more traditional educational software, both in classroom and individual settings.

✔ **MULTIPLAY**
Requirements: 520 ST/STe, and double-sided drive (1040 ST/STe or TT required to teach numbers above range 0-19).
Summary: Powerful, open-ended addition/multiplication drill package.
Manufacturer:
D.A. Brumleve Software
P.O. Box 4195, Urbana, IL 61801
(217) 367-9084
Price: $40.00

As supplied, Multiplay is a powerful and comprehensive package for learning addition and multiplication, incorporating features for both drill and play. But like all Brumleve's software, Multiplay can easily be customized to present only a limited subset of features, appropriate to any particular learning situation.

With the help of an enclosed utility, copies of Multiplay can be created that teach only addition or multiplication, employing numbers from 0 to 9, 0 to 19, or 0 to 29. Additional options let you suppress "play-oriented" program features that might distract from disciplined drill, and disable Print and Exit functions that would otherwise give access to expensive hardware, valuable files, and powerful GEM desktop features. Copies of Multiplay can be made autobooting regardless of TOS version, so kids can learn to fire up the program without negotiating GEM. Among other "extras" included with the package are preprinted labels for marking user-created duplicates of each distribution disk—a charming addition, and one I've never before seen supplied with a commercial software package.

The Tabular Approach

Conventional drill-and-practice software usually works by presenting incomplete number sentences (e.g., 3 + 3 = ?) for solution. In "practice" modes, such programs will usually hint at or provide an answer if a child fails to enter a correct response within a certain period of time. "Test" modes alter this basic process very little, adding explicit score-keeping, accelerated pacing, and

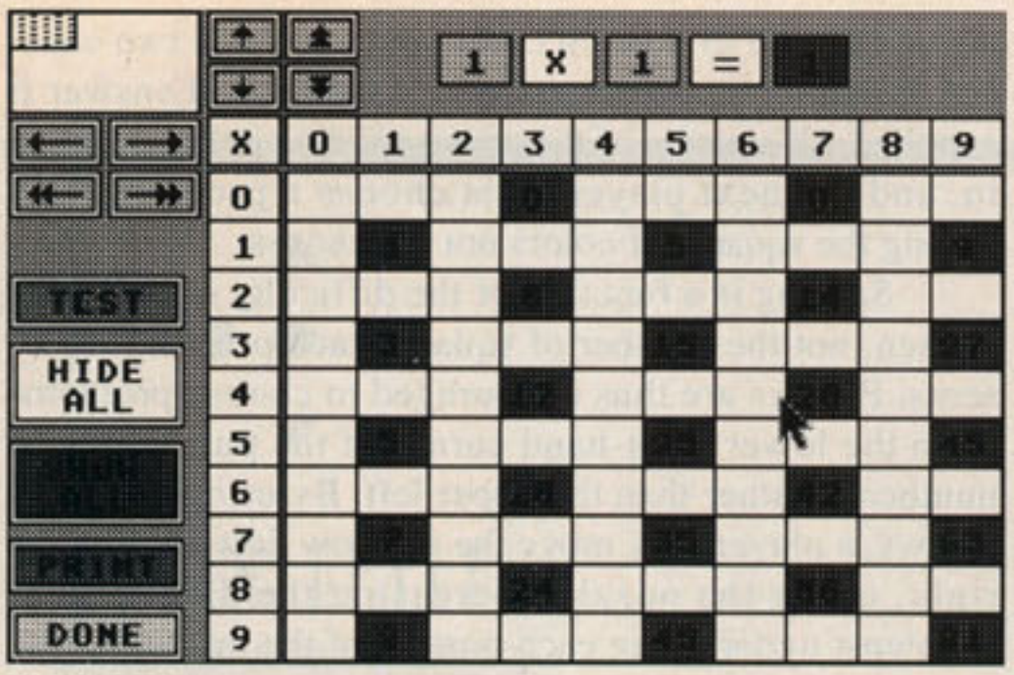


FIGURE 1. Multiplay's grid assists in visualizing relationships and patterns in basic number theory.

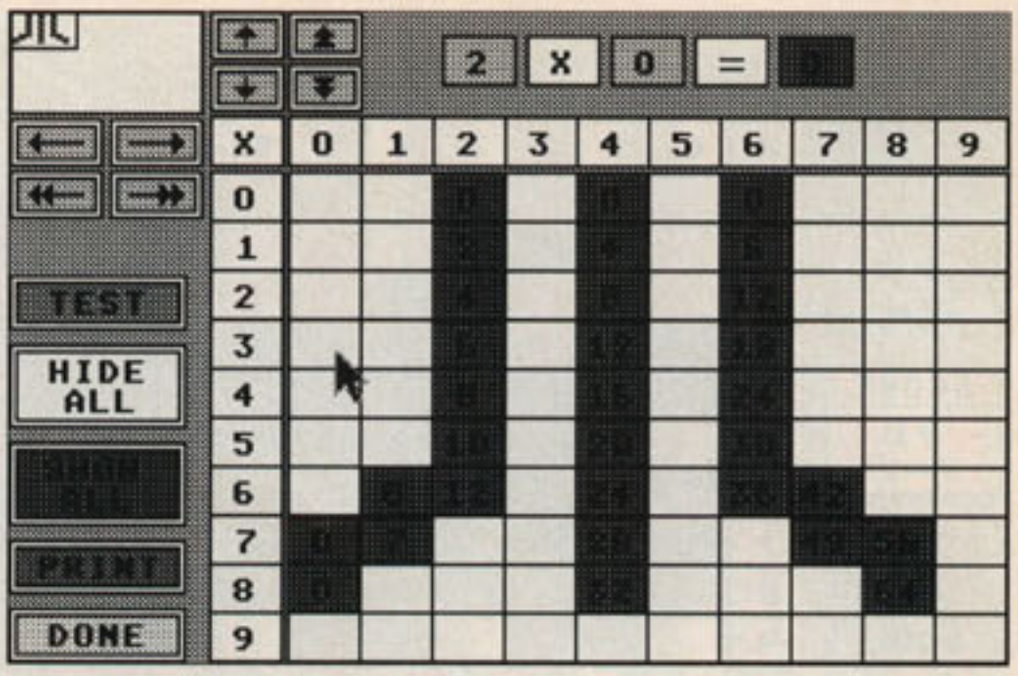


FIGURE 2. The grid's artistic possibilities are a powerful encouragment to regular exploration and learning.

various reward schemes.

Though seemingly innocuous, this approach to drill and testing can retard learning in many subtle ways. The norm of presenting "problems" for "solution" teaches kids to view math as a "test," with concomitant anxiety. Curiosity is discouraged because the machine will only deign to offer a "correct" result once the child has "failed" to supply a response. Finally, because problems are frequently generated at random or according to some arbitrary theory of "difficulty level," the child may be discouraged from discovering real patterns or making use of known facts to deduce new information.

The Master Grid

Multiplay's designers have recognized these shortcomings and mastered them by innovative user-interface design. The program's several modes of operation are united under a single basic interface mechanism: a grid with numbered rows and columns, set up like a dynamic addition or multiplication table. Depending on the range of values selected, the grid as a whole may occupy 10 x 10, 20 x 20, or 30 x 30 cells, though it is viewed through a scrollable, 10 x 10 display window.

On the "Pattern Screen," Multiplay's simplest mode, a child can click on any square to reveal the sum or product of its associated row and column values, concealing the answer with another click. Similar "one-click" functions toggle whole rows and columns (or the grid's entire contents) on and off. In self-paced drill, the child moves through the grid, guessing at (or computing) answers, then clicking on squares to confirm results. As answers are revealed, the program also displays each problem as a number sentence (e.g., 3 + 3 = 6), exposing the child peripherally to standard math notation.

It should immediately be noted that in this "practice mode," the child is not required to produce his own result before examining an answer. The ready availability of answers prevents anxiety, and encourages curiosity. Viewing problems in their totality may give important clues as to how computations are performed. In a more general sense, children are encouraged by Multiplay's system to view incomplete mathematical propositions as portions of implicit wholes. This paradigm is fully consistent with the demands of higher mathematics, which treats of homeostatic equations, some or all of whose terms may be unknown.

Free Play and Testing

A further advantage of Multiplay's grid is that it imposes no necessary order to problem-solving; instead offering a large number of problems that can be explored at will (but whose relationships are nevertheless made clear by the proximity and physical relationship of answer squares to one another). As any teacher will confirm, kids tend to grasp the mechanics of certain areas of the number space fairly quickly, and Multiplay lets them explore outward from this familiar ground without imposing arbitrary direction on what is essentially an organic process. Study is naturally and continually directed towards unexplored areas of the grid, without unnecessary coercion.

As a child works with the Pattern Screen, he will tend to leave a trail of answers exposed, and most children will quickly recognize that visibly-regular groups of answers are always associated by some regular algorithm. Unlimited exploration is possible: from learning to count by twos or threes to discerning the peculiar math of "Knight's Tour" and other complex series.

Because it is periodically necessary to evaluate progress, Multiplay's Pattern Screen does offer a "Test" facility. When Test is selected, Multiplay lets the child click on any square whose answer is not presently revealed, displays the associated problem, then gives the child two chances to enter an answer before showing the result and incrementing an on-screen score display. A correct answer turns the answer square black, providing a visual record of progress and preventing the square

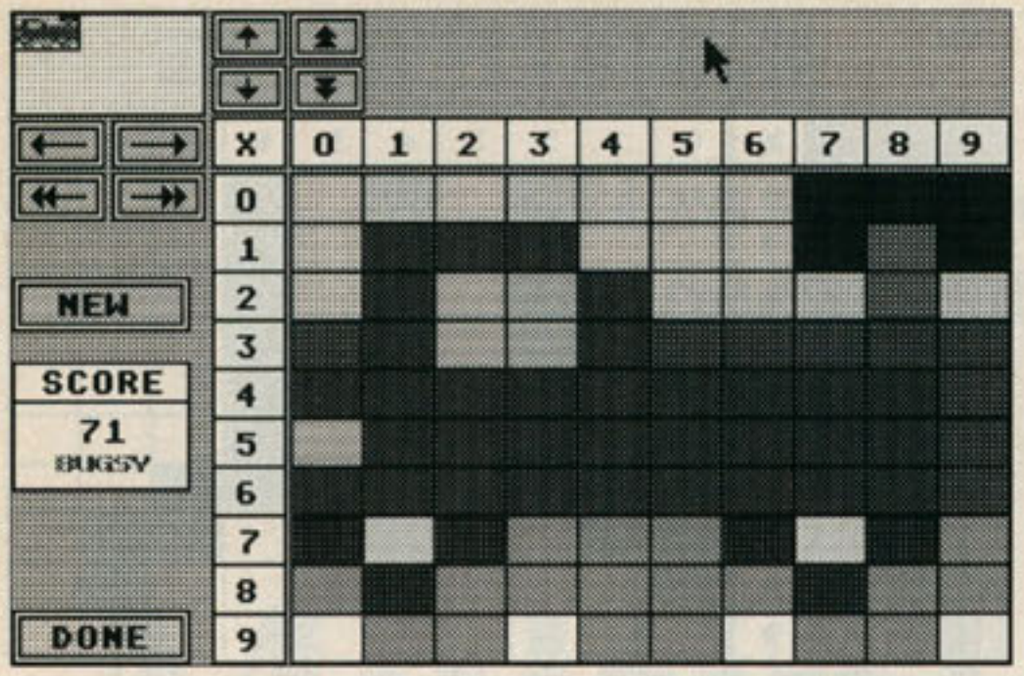


FIGURE 3. On the Puzzle Screen, players work to complete a design by solving more and more difficult groups of problems.

from being included in future tests during the same work-session, should it be desirable to administer tests in series. Multiplay presents only up to ten problems in this fashion, so tests are not long drawn-out affairs, but only a small part of the overall learning process. Moreover, a test may be interrupted and resumed without difficulty.

Because Multiplay test questions can only be selected from among blank answer squares, testing tends to encourage the child to explore new territory. However, since the choice of problems is left to the child's discretion, testing is not perceived as frustrating or coercive. Thanks to Multiplay's simple user interface, parents or teachers can design and administer tests with great speed and ease, facilitating the creation of short test-series that reinforce familiar material, evaluate specific areas of competence, or teach higher-level concepts. In this and other ways, the program is an ideal tool for one-on-one tutoring.

Patterns Plus

On the Pattern Screen, Multiplay's grid interface functions as a convenient and information-rich gateway to arithmetic and number-theory—largely through the fact that it renders abstract mathematical relationships both visible and concrete. A side-effect of the interface: the fact that you can actually make pictures out of highlighted answer squares—is exploited on the Puzzle Screen: second of Multiplay's basic operating modes.

The Puzzle Screen presents a game for one or two players. The goal of the game is to complete a 10 x 10 picture puzzle by solving addition or multiplication problems. Several default puzzles are included with Multiplay, and up to 50 additional puzzles can be created with the Make Puzzle Screen—an additional mode of program operation.

A puzzle is made up of squares in up to 16 different colors, each of which represents a problem. When the puzzle is loaded, players take turns clicking on an answer square of a given color, and are given two chances to supply a correct answer. If the correct answer is supplied, all squares of the corresponding color are filled in, and the next player must choose a problem from among the squares of colors not yet chosen.

Scoring is a function of the difficulty of problems chosen, not the number of squares each problem represents. Players are thus encouraged to choose problems from the lower right-hand corner of the puzzle (larger numbers), rather than the upper left. By using the scroll arrows, a player may move the window down and to the right, under the puzzle, increasing the difficulty of problems underlaying each portion of the puzzle figure. The same answer square that represents the problem 9 x 9 when the window is displaying the upper left-hand corner of the grid may represent the problem 29 x 29 when the window is scrolled to the opposite corner. By this means, children are induced to solve more and more difficult problems in an effort to make higher scores. If scores are ignored in favor of the number of problems solved correctly, the system also makes possible some degree of competition between young beginners and older math experts.

As in testing on the Pattern Screen, the Puzzle Screen offers a variety of options; among them, the ability to display each chosen problem in vertical or horizontal format. The vertical format is useful if a player is seeking to solve problems in two digits. A High Scores feature maintains the best scores achieved, as an additional inducement to performance.

In the related Make Puzzle mode, 10 x 10 puzzles may be created with a pallette of up to 16 colors, each color corresponding to one problem in the final product. Up to 50 puzzles may be saved to disk. A separate Puzzle Editor utility is included to facilitate the review and deletion of unwanted puzzles.

The Manual

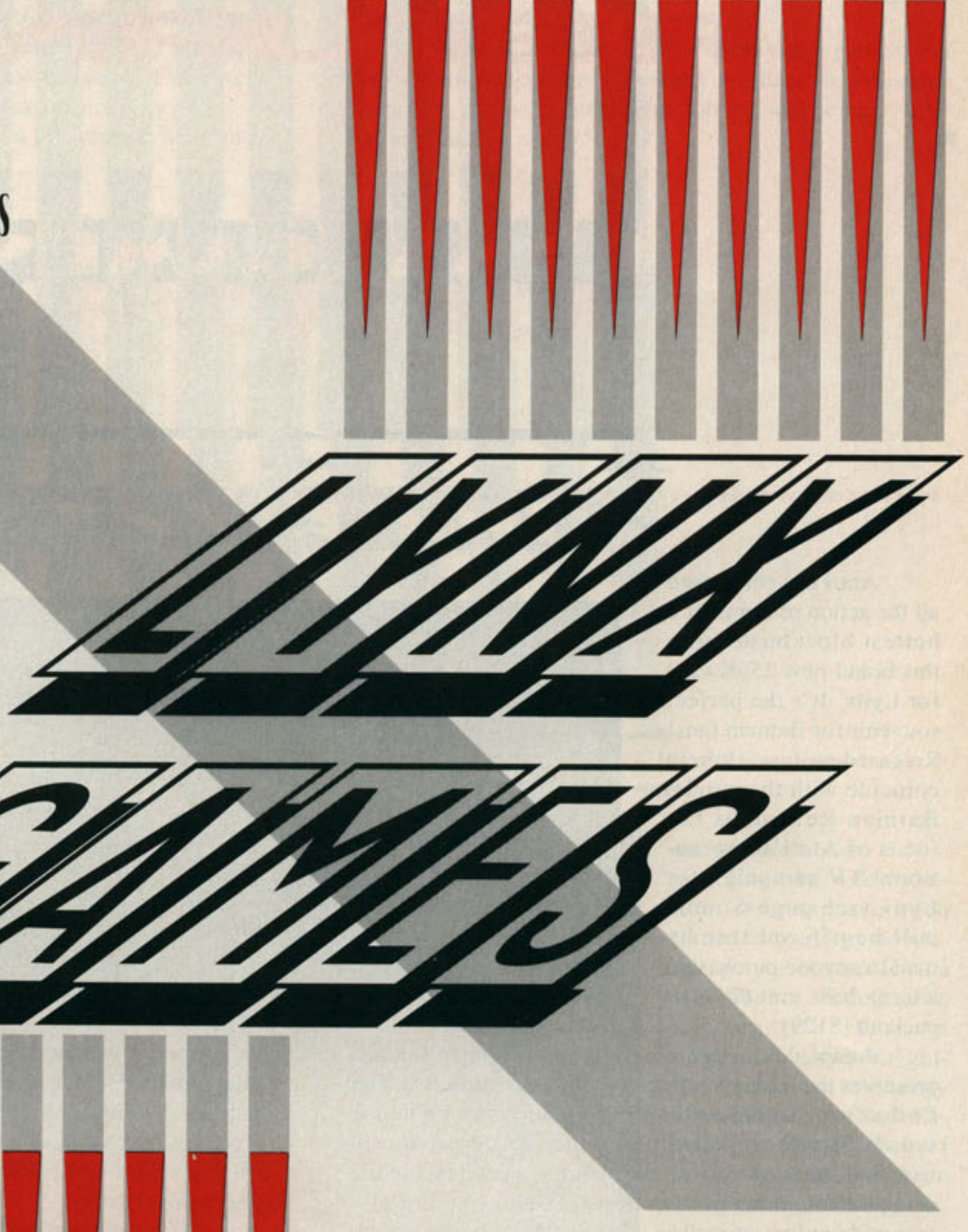
Multiplay's manual is exceptionally well-written and complete. It begins with extensive instructions to parents and teachers, detailing how to install the program and create custom copies for different purposes. Chapters are then presented that detail each of Multiplay's modes of operation; and the manual concludes with a fairly long discussion of how the program may be pressed into service to achieve various learning goals. Parents who may themselves suffer from a degree of math phobia need not fear being left to explore Multiplay without a Baedeker—any adult with some competence in arithmetic should be able to "administer" use of the program to their child's benefit.

Adults with a love of mathematics, on the other hand, will not fail to delight in Multiplay. The program's simple and intriguing design will help you open doors for your child and share your fascination with the mysteries of number. ■

new for LYNX!

BATMAN RETURNS

KUNG FOOD



BY
MAURA
FITZGERALD

BATMAN RETURNS

LYNX GAMES

Atari has condensed all the action of Summer's hottest blockbuster into this brand-new 256K card for Lynx. It's the perfect souvenir for Batman fans! Released on June 19th, to coincide with the movie, Batman Returns is the focus of Atari's new national TV campaign for Lynx (see page 6), and will be offered free by mail to anyone purchasing a Lynx base unit ($99) or packout ($129).

Adapted directly from the rushes, Batman Returns preserves the movie's intricate plot while respecting Tim Burton's menacing aesthetic. Animation throughout is superb. Figures are carefully designed to suggest dimension and detail (hey, this Batman has muscles!) while using the minimum number of pixels, allowing fast motion without loss of realism. Fine points of rendering are handled beautifully—for example, when Batman jumps, his cape billows out around him like a pair of leathery wings.

Controls are simple: the joypad is used to make Batman run left or right, or duck to avoid danger. Button B makes him leap, and Button A makes him use his current weapon (selected by pressing Option 1). Besides his iron fists, used for close-in fighting, Batman can be equipped with a limited number of Batarangs and Acid Vials. Though these are twice as effective as punches, you'll want to learn to make your fists count, since long-range weapons can be replenished only at certain points.

The controls may be simple, but the action in Batman Returns is anything but! In each wave, Penguin and Catwoman toss a different crowd of opponents in the Caped Crusader's path: In Wave #1, Batman faces the infamous Red Triangle Circus Gang, cohorts of the mischevious Penguin. Fight through ranks of stunt motorcyclists, suicide clowns, knife-throwing Indian maids, machine-gun-equipped organ grinders, and bomb-bowling funnymen! But remember not to waste your Batarangs! You'll need them at wave's end, when the Penguin himself appears, mounted on a giant, mechanical ducky!

Wave #2 finds Batman running across Gotham City's stark skyline, menaced by police who have been induced to think he's a criminal. Leaping from rooftop to rooftop, ever in danger of plummeting to his death, the Caped Crusader must avoid a constant stream of pistol and shotgun fire. And should he survive the onslaught of Gotham's Finest, Catwoman is waiting at the end of the round. Her acrobatic whip-slinging makes her a formidable opponent.

Wave #3 takes Batman beneath Gotham City, where he confronts the Penguin's brainwashed namesakes: tiny penguin commandos trained to carry

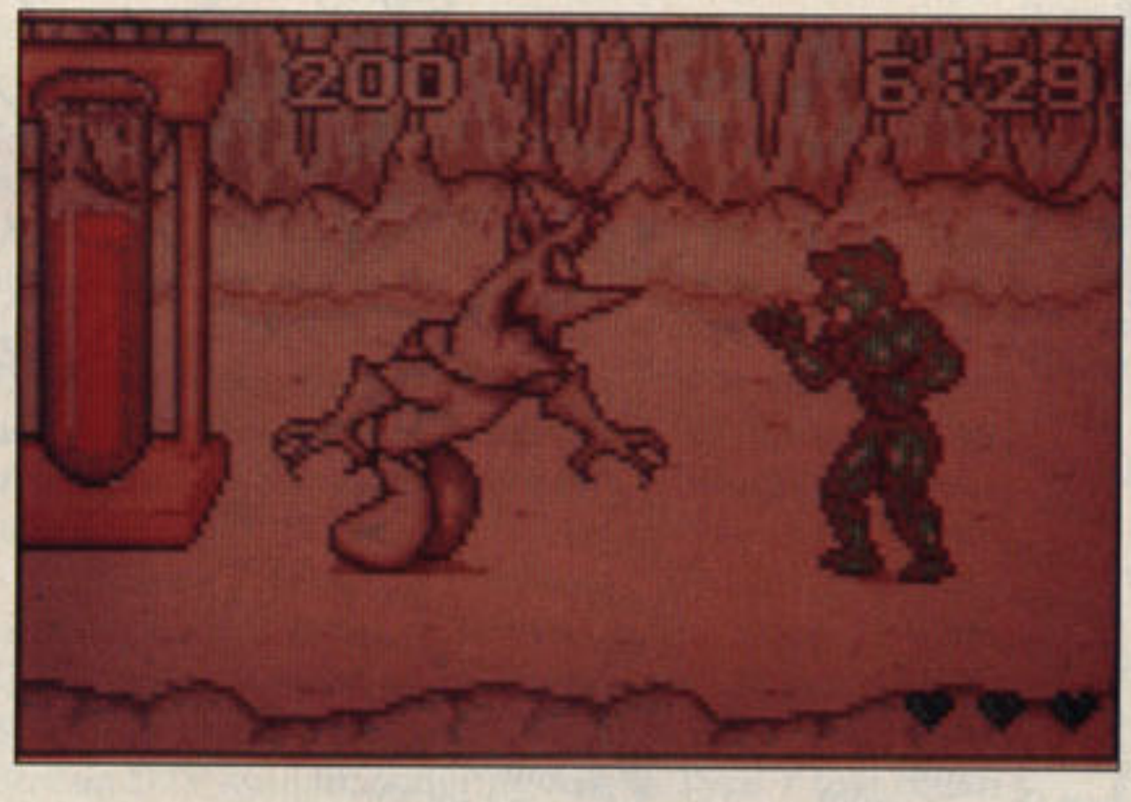
rocket launchers. These little guys are cute, but merciless: laying down an unpredictable field of fire. Batarangs and acid vials help big-time to knock them out before they can get off too many rocket potshots. But watch your step! Pools of toxic industrial waste can sap Batman's energy swiftly, making him easy prey.

In the final wave, Batman locates and penetrates the Penguin's secret lair: the Arctic World exhibit at the old Gotham City Zoo. But the cold-hearted Penguin is virtually invincible!

More of a challenge than most video games, Batman Returns for Lynx demands eye-hand coordination, strategy, and persistence. But nobody said being a superhero would be easy!($49.99) ■

KUNG FOOD

LYNX GAMES



Food Fi-i-i-ight! But this is no simple matter of pelting your friends with the cafeteria's inedible vegetable-du-jour. This is the real thing, buddy—jump-kicking giant killer kohlrabi with the finesse of a kung-fu master. At stake (as usual): the fate of the entire world!

As a research scientist at the Odnet Videogames Center (Tendo, spelled backwards, as if you didn't know!), you've inadvertently created a deadly new substance—"Rynoleum" (mere coincidence that this game was produced by Steve Ryno of Atari's Chicago Games Division)—capable of deforming any and all life it touches. Now, the Rynoleum has transformed the contents of your refrigerator into minor players from Kurosawa's Seven Samurai. It's also turned you into miniature swamp-thing Kung-fu super-hero, ready to do battle with the vicious comestibles

Luckily, a few random crumbs have been turned into energy power-ups, so you have at least a slim chance of defeating the veggie hordes. An energy bar, screen right, shows how your energy diminishes with each encounter. Keep track of power-ups, and consume them strategically. Grabbing one when your energy is at maximum won't do you any good! Start in the freezer, and work your way down through the shelves, assassinating edibles until you reach ... (gasp!) ... the vegetable bin!

Okay, okay, it sounds ridiculous. But if you pause to laugh, it's doomsville, baby! The bloodthirsty blueberries, cantankerous cranberries, dastardly dates, enraged eggplants, ghoulish grapes, and other denizens will have your hash! I mean, is it any wonder that kids resent having to eat their vegetables? ($34.99) ■

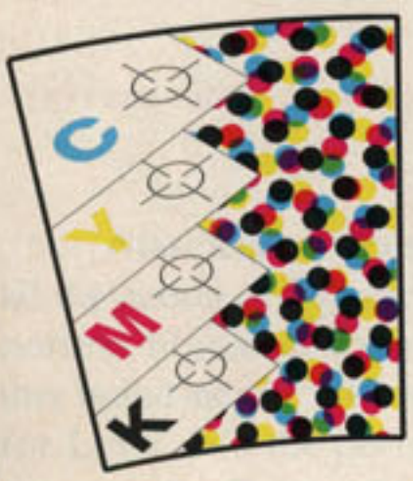
WHAT YOU NEED IS WHAT YOU GET

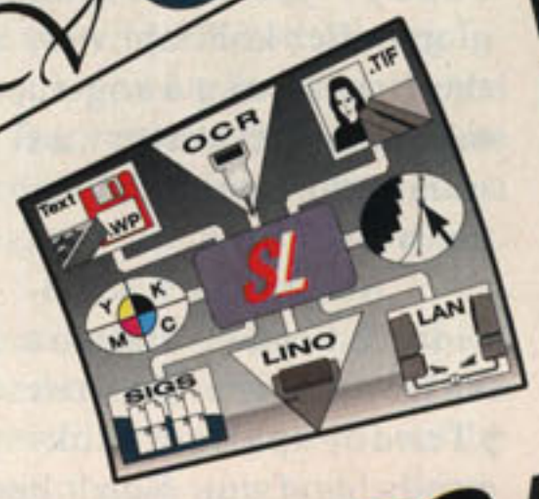
Color separate with full UCR and gamma control, specify accurate line screens, edit and modify 24-bit images in CYMK, create and edit color vector art and text effects, autotrace and translate graphics from one format to another... Calamus SL's own proven outline font technology, gives you, 100% true WYSIWYG. With Calamus, what you see on your screen is precisely what you get.

Calamus SL uses the Atari TT 68030-based CPU, loaded with 36 megabytes of RAM. Graphics coprocessors and cache memory make for fast screen redraws. LAN support allows the easy transfer of files from other platforms. This union of sophisticated high-value hardware and software is what Calamus SL is all about. Serious pre-press power at a realistic price while allowing easy addition of new capabilities as you need them.

Calamus SL...
What you NEED is what you GET!

This page was produced and color separated entirely within Calamus SL, using an Atari TT workstation.





Calamus SL is the new WYNIWYG desktop publishing environment, *what you NEED is what you GET*. Our fully modular DTP environment allows you to customize your publishing needs to suit your specific application or budget.

The core of the system is Calamus SL itself; our sophisticated, modular, page layout and design program. Calamus SL has accuracy to 100,000th of an inch, magnification to 99999%, 360° rotation of frame elements, Focoltone color support and much more. Calamus SL modules expand the core program into a fully integrated pre-press environment.

Our "Printer 1:1" feature lets you kern text or manipulate graphics dot for dot at the resolution of your output device. Add to this thousands of quality Agfa Compugraphic®, Berthold®, ITC®, Letraset®, Linotype® and URW® fonts currently available and you get remarkable control over type, layout and design! Calamus SL is the perfect front end for micro imagesetters like the Linotype-Hell BridgIt® or Ultre Setter.

CALAMUS SL

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DMC Publishing

Calamus SL

by AE Technical Staff

Modular extensibility, virtual memory, and other high-performance features make Calamus SL the most powerful and versatile DTP package on the Atari platform.

DMC'S CALAMUS 1.X DESKTOP PUBLISHING system, flagship of a line of compatible products that includes Outline Art, Calamus Type Art, and others, has earned rave reviews since its introduction, four years ago. Among other innovations, Calamus was the first Atari DTP package to feature vector font and graphics technology, as well as the first to offer access to a large library of industry-standard fonts (from AGFA CompuGraphic). Along with its vaunted ability to output proof and finished copy at high-speed, these features have conspired to make Calamus a world standard for professional Atari DTP.

During 1990 and '91, however, products began appearing on the Atari scene that could compete with Calamus on one or more key points. In particular, SoftLogik introduced version 2.1 of their popular PageStream DTP system, featuring Adobe Type 1 font compatibility, enhanced PostScript output capability (which Calamus 1.x lacked), and other attractive options.

Clearly, an upgrade was needed if DMC wanted to retain the high ground. But in reviewing the current state of the market, and considering the imminent arrival of the TT and other high-powered Atari hardware, DMC's talented programmers decided that more than a simple upgrade was called for. As a result, though Calamus SL

COLOR

RETOUCHE PROFESSIONAL
COLOR CD DESIGN

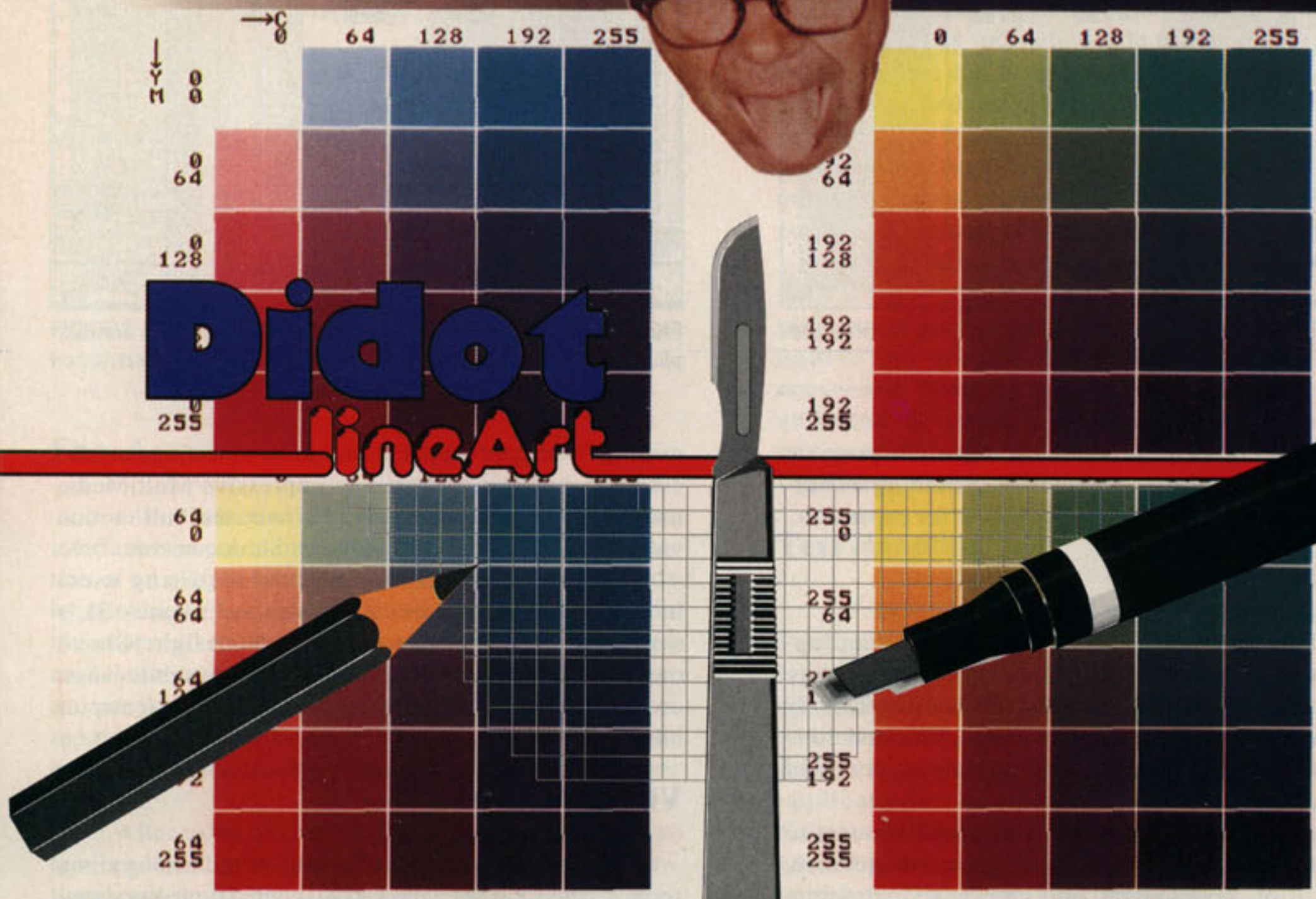
FAST

Didot PROFESSIONAL

This Ad Was produced on an Atari TT030

In case you were wondering why my uncle Norman has "$199" on his head.

$199 is the total cost of Didot line art, powerful yet affordable. It"s much better than what he normally has up there.



Didot lineArt

RETOUCHE PROFESSIONAL COLOR DESIGN CD

Didot PROFESSIONAL

This Ad was produced on an Atari TT030 using Retouche Pro CD, and Didot Pro CD. Our processor is now installed. So, we can offer final film to our Didot and Retouche customers in minutes instead of hours. Only one trip to the sevice bureau needed. I'm looking forward to making lots of money as a service bureau. Mac service bureaus have to wait all night for their expensive "RIP" processors to wade thru an image intensive layout. We have a file to "RIP" Calamus files as well. We want to get some other dealers to install imagesetters, and/or film recorders. This system can do things that no other system can do, and it's priced like a home computer. But, that won't mean anything unless we get more dealers on board. So, if you're a dealer, give me (Mark at SJC) a call, or call Don at Compu–seller West (708) 513–5220. There are a bunch more in the works, they should be on board by the next Ad. It's a great opportunity, and this stuff is a lot of fun. By the way, I have 36 TT030 computers in stock. So, now is a good time to make a deal.

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1278 Alma Ct. San Jose Ca 95112

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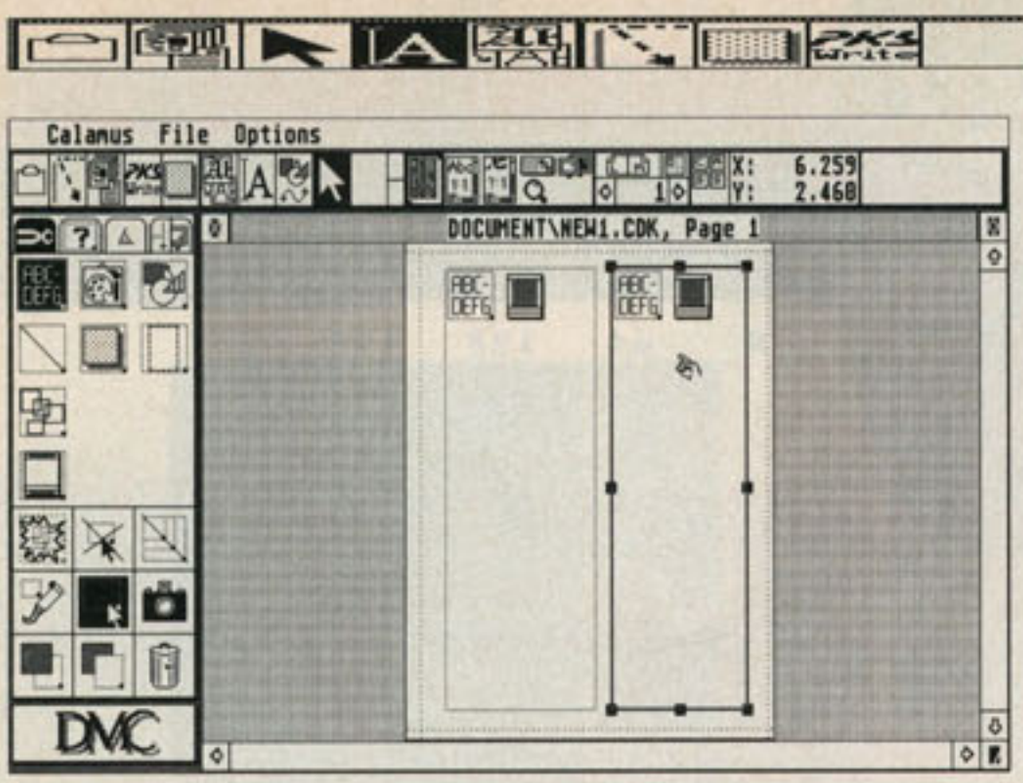

FIGURE 1. Calamus SL's main screen, showing the module-select bar at upper left.

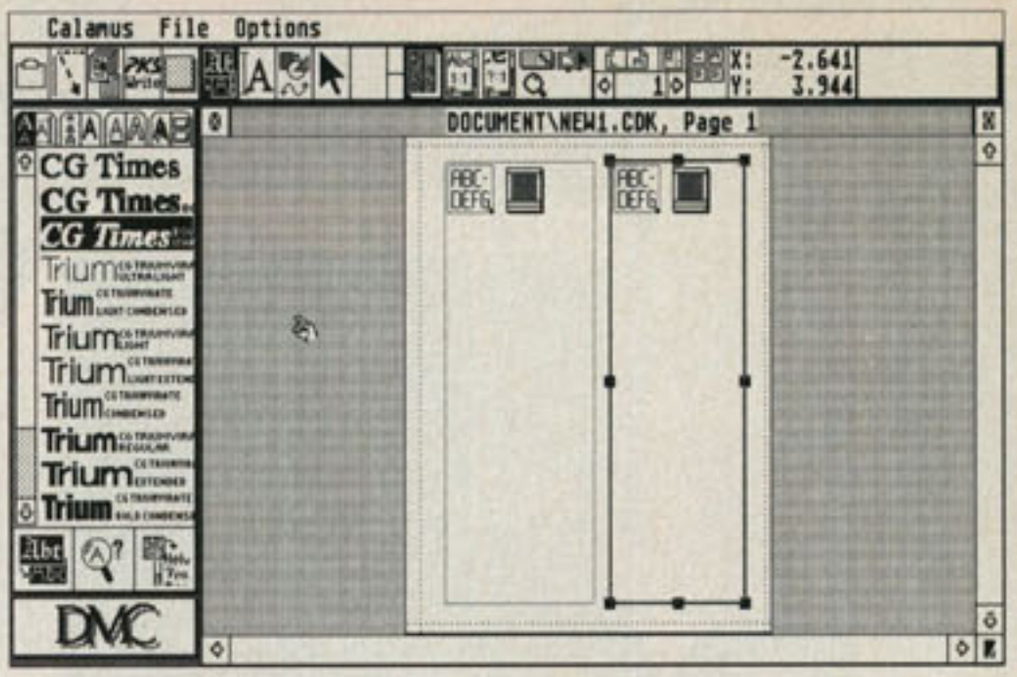

FIGURE 2. Text Styles' font-selection menu. Fonts are displayed for easy, visual selection.

is certainly compatible with prior versions, the program has been completely re-engineered, providing a user-upgradeable platform with huge potential for expansion.

Power to Spare

Calamus SL looks and works like a monolithic application. In fact, however, SL is a cooperative entity made up of function modules, grouped under a relatively simple "shell" providing data-, memory-, file-, and user-interface-management, screen and printer support, and other low-level services.

From what we can deduce, the shell is meant to provide only the minimal functions required to initialize, display, print, save to disk, and otherwise maintain a document. All other interaction with the document: entering text, specifying halftone fills, generating color separations, etc., is the business of a module dedicated to a range of related functions. Even global subsystems such as the configuration manager—subsystems that might seem properly to warrant hard-coding—have, instead, been modularized. The result is a flexible, field-upgradeable, almost obsolescence-proof system, of staggering functionality.

Though Calamus comes configured to load a set of standard modules on startup, the system may be customized at will. The shell provides space for more than 200 modules, each represented by an icon in its scrollable main control panel. Modules are included with the package to support all major DTP functions, including column management, fonts, text-entry and editing, hyphenation and justification, line, raster field, curve, and freeform vector graphics, color separation, data import, export, and conversion, etc., and DMC is actively preparing modules to enhance the system. Future releases include a module supporting use of the Focoltone color-matching system, which takes printing press hardware characteristics and individual ink chemistries into account to permit more accurate color-matching than the popular Pantone (PMS) system. A module permitting PostScript output is said to be in testing, and the company has demonstrated an impressive MultiMedia module, capable of incorporating frame and full-motion video and sound clips into Calamus SL documents.

While a full-service module requiring user-interface access will occupy a slot in Calamus SL's scrollable panel, it is also possible to design "silent" modules that enhance the program in more subtle ways, or that add their functionality transparently to master modules currently in use.

Virtual Memory

Supporting Calamus' modular technology is a sophisticated RAM cache and disk virtual memory system that maximizes system throughput while minimizing (if necessary) the demands placed on machine resources. Virtually any of Calamus broad range of data types, from text frames to raster objects, can be cached, eliminating the need to reproduce them from fundamental data when a document is altered. This makes for quick redraws when editing—a real luxury when compared to the snail-like pace at which most DTP systems redraw complex pages.

SL's virtual memory system enables the program to manipulate documents whose size or complexity exceed the capacity of available RAM. This is accomplished by "paging" portions of data rapidly to and from a virtual memory file on hard disk (for optimal performance, at least two megabytes of free hard disk space is required).

One of the most interesting advantages of Calamus' virtual memory scheme is that it permits functionally-equivalent Calamus configurations to reside on Atari systems of vastly-differing capacity. A designer who works with Calamus SL on a 26-megabyte TT030 at the office can maintain an identically-configured system at home on a Mega ST 2, provided that sufficient virtual memory space is available on the latter's hard drive.

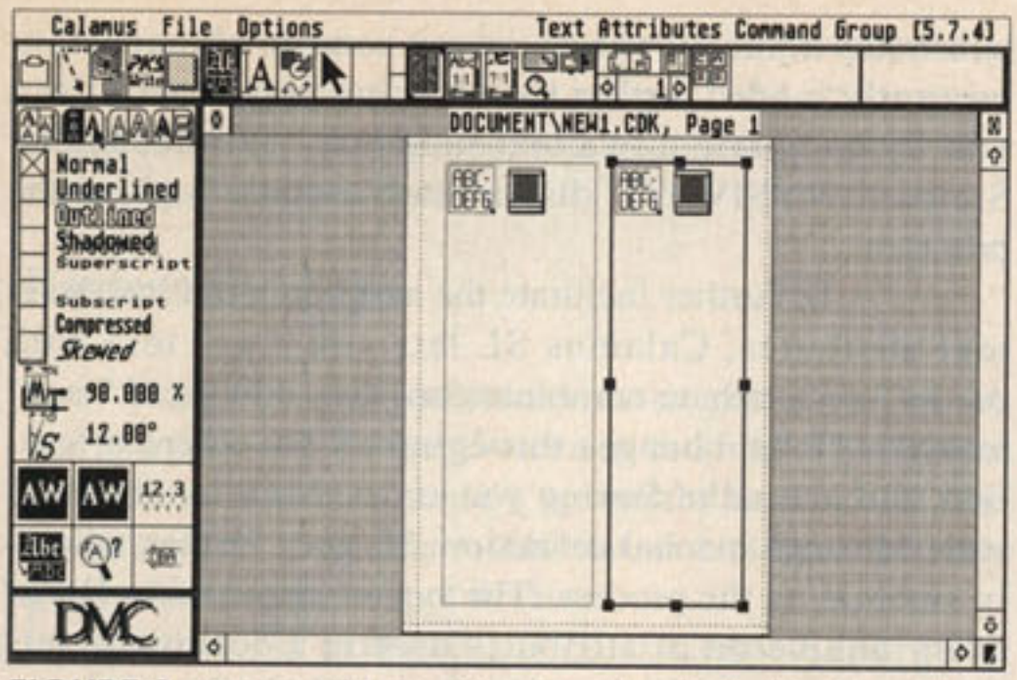

FIGURE 3. Every attribute of a character, including bounding-box characteristics, can be altered.

Easy Access

Like Calamus, SL sports a fully-iconic user-interface to most commonly-used DTP functions. Selection of an overall function type (i.e., a module) is made by clicking on an icon in a scrolling, horizontal bar in the upper left-hand corner of the work area. The called module then instantly reconfigures the subsidiary control panel at the left of the screen, throwing up icons that represent its major function groups and subgroups. No specific function lies more than three mouse clicks from top-level.

After using SL for a while, the iconic control system becomes limber and efficient in a way that conventional pull-down menus and dialog boxes cannot match. Calamus' picture-based menus place a multitude of functions within easy reach, letting an artist select modes and features at high speed. Menus are always visible, and functions can generally be accessed while maintaining full view of a document. A more subtle advantage: the largely-iconic menu system does not force the user to switch between "visual" and "verbal" thinking, as written menus do.

Still, until one is familiar with basic program modes and functions, Calamus' iconic menus can be confusing. To ease the learning curve, SL displays a written "label" in the upper right-hand corner of the screen whenever the mouse cursor passes over a function icon. Still, beginners should expect to spend some time with the manual before real fluency is achieved.

This should not, however, be taken as a criticism. It's important to remember that as a full-featured DTP environment, Calamus SL provides as much functionality as several typical applications. It should come as no surprise that such "feature laden" software will be challenging to master. The real question is: how productive can you be with the program, once mastery is achieved?

Like original Calamus, Calamus SL is an "object oriented" system: one that treats parts of a document (columns of regular or rotated text, raster (i.e. halftone) areas and dot-graphics, vector graphics (i.e., lines, curves, basic geometrics, and freehand "drawn" objects) plus such specialized items as headers and footers and "print tiles") as individually-manipulable objects, or "frames," that can be created, deleted, copied, moved, resized, stacked, etc. Frames can be manipulated freehand, or via a system of "computer assists" that allow partially- or completely-automatic placement, sizing, etc. They can be grouped and "linked," so that global position or attribute changes can be made conveniently.

The system conforms well to gut-level expectations about how layout "works" in the real world: components of a document can be treated as roughly-equivalent graphic "things," so long as this is convenient. When it comes time to address data-specific attributes (the size of a font, the width of a line, etc.) a battery of data-type-specific features is available to perform these manipulations.

Text Handling

Calamus SL is particularly strong in text-handling. It offers a powerful Text module, appropriate for entering captions, headlines, and patches; making small-scale editorial corrections; and handling details of formatting, within text frames. Also supplied is a much more powerful word-processing module, PKS-Write—effectively an application—which works in full compliance with Calamus and extends the user's ability to write, format, edit, and otherwise manage substantial amounts of text, outside the frame/object environment.

The Text module allows formatting at full text (multiple piped frames), paragraph, line, and word (or irregular section) levels, so you can adopt whatever formatting scheme best suits your need of the moment. Rulers are supported, allowing word-processor-like formatting of printed text by line, paragraph, or section—a much more efficient and usable scheme than having to highlight and assign formatting to individual text frames or highlighted text sections, as in PageStream. Ruler settings include the expected tabs, margins, etc., plus settings for absolute or relative line spacing, paragraph spacing, justification control, and automatic arbitration of "widows" and "orphans."

H&J Power Tools

Hyphenation, justification, and spellchecking are also performed within the Type module. The hyphenation system, in particular, is very powerful. Though generally rule-driven, the system permits development of an unlimited number of specialized "exception dictionaries," used to supply hyphenation patterns for words whose proper hyphenation does not conform to rules. Also supported is a feature that lets you designate given words as having "uncertain" hyphenation. When

such words are encountered during batch H&J, Calamus SL will pause and ask you to hyphenate them, manually. Text may be hyphenated on entry, on import, or by block, within existing text frames.

Spell-checking, on the other hand, is somewhat less well-supported in our review copy. SL's original spell-checker does not employ a dictionary, applying instead an algorithm that flags letter combinations that "look" incorrect. Given the English language's bizarre spelling rules, it's hard to see how this type of system can function reliably. Obviously, DMC agrees: their update, due for release July 8th, contains a brand-new spell-check module that is fully dictionary-based, and allows creation of user dictionaries for specific needs. The dictionary format is generic, to the extent that Calamus' spell-check can use virtually any spelling dictionary you may be able to obtain.

Rulers and Key Bindings

To further automate text formatting, Calamus SL's Text module supports a full macro facility that permits the coupling of text strings, defined rulers, and text styles to any key combination. Macro definition couldn't be easier, since Calamus will automatically define a macro according to format settings affecting the current piping chain, or format settings and text contained in any selected section.

Higher-level text formatting options, such as text runaround and frame-to-frame piping, are controlled within the Frame and Page modules. Text runaround is especially well-supported: SL can run text around any set of arbitrarily-shaped objects, producing striking effects. Frames can easily be inserted or removed from a piping chain, and piping can be extended to any number of frames in a document.

Text Styles

A separate Text Style module is used to assign lower-level attributes. Text Style offers several "command groups," allowing font selection, size selection, word and character spacing, text direction (yes, if you like, Calamus can write from right to left!), and "text effects" (outlining, underlining, shadowing, color, fill pattern, etc.) as well as extended subcommand groups giving fine control over text attributes (color of underlines or shadows, etc.).

Though the system provides for virtually infinite permutations, it's actually easier to set text-appearance variables in Calamus SL than in any other DTP system we've come across. Command groups are intelligently arranged so that you can quickly reach whatever parameter or sub-parameter you wish to define or change. Aesthetic decisions are made easier through the use of imagery embedded in the various command group control panels. For example, the Font Selection submenu actually shows you a sample of each font presently loaded, rather than forcing you to audition a font by assigning it to a text sample in your document. Similar "WYSIWYG" displays are used throughout the program.

To further facilitate the assignment of low-level text attributes, Calamus SL lets you "tag" text with predefined attribute combinations, then edit these "tags" to make global changes throughout a document or section. But instead of forcing you to develop your library of styles through manual definition, SL goes further; actually automating the process. The system maintains a list of every unique set of attributes used in a document, lets you tag text directly from this list, and gives you an opportunity to add a new text style entry, whenever you alter a parameter setting.

Given the space allotted for this review, it would be impossible to describe exhaustively the number of style parameters Calamus SL places at the designer's disposal. Underline parameters, alone, include color (selected from color list or specially defined in terms of present color-definition system: RGB, CMYK, etc.), fill pattern, underline thickness (specified in the current measurement system or as a percentage of font height), negative or positive offset from character baseline, and horizontal overhang, and let you determine if underlining will appear in front of characters, or behind them (foreground underlining lets you create "strike-through" effects when negative baseline offsets are used). Simply stunning!

Graphics

Basic lines and raster areas (boxes, borders, etc.) are defined using a simple set of dedicated modules that permit extensive parameterization of color, fill pattern, shadowing, and other effects. The accent, here, is on simplicity without loss of power or flexibility.

Truly complex graphics are the province of SL's powerful Vector Graphic module. Vector Graphics is, in effect, a simplified version of Outline Art, DMC's full-service vector drawing system (objects in whose format can be freely imported into SL, and vice-versa).It offers a library of 15 predefined vector shapes, and a toolkit that permits the design of original objects, as well as their systematic distortion, rotation, proportional resizing, and other modification. Vector graphics are defined in terms of vector paths, consisting of lines and Bezier curves in open or closed configurations, and further modified by the addition of attributes for color, fill, etc.

Import of raster graphics is controlled through the Frame module, which provides features for handling monochrome, grayscale, and color raster images. Color images can be converted to monochrome (given certain limitations), and the distribution of shades or colors in a grayscale or color raster image can be precisely adjusted using dynamic gradient curve or histogram controls.

Additional features permit the precise, proportional sizing and cropping of raster images, and allow exact sizing of images for optimal reproduction at a particular screen or printer resolution.

Rasters and Seps

High-powered and precise raster generation is carried out with the Raster Generator module. The system permits definition of rasters optimized to produce particular effects given the resolution, dot shape, and other specs of a specific output device.

Similarly powerful is SL's Color Separation module, which allows exact, graphic control of color and black levels in generated separations. Separation parameters can be set for specific frames, pages, or an entire document. Control lines permit precise setting of individual color intensities for Cyan, Magenta, Yellow, and Black, which can be further modified by negative "undercolor removal" parameters.

Calamus SL fully supports 16-bit, 24-bit, and 32-bit color definitions, making it capable of working directly with the majority of 24- and 32-bit color boards and monitors. Internally, colors may be defined in terms of RGB, IHS, CYM, or CMYK parameters, allowing full compliance with Pantone Matching System and other color-specification standards, such as Focoltone (see above).

A wide variety of printer drivers is included with Calamus, allowing direct output to parallel and serially-interfaced dot-matrix and laser proofing hardware. Also supported, naturally, is the DMA-interfaced SLM laser printer series from Atari. Additional drivers will permit Calamus to output directly via the DMA port to Linotron and CompuGraphic imagesetters, via a special hardware interface.

Documentation

SL's handsome manual (naturally, produced with Calamus) provides a full tutorial introduction and discussion of basic DTP and printing concepts—enough information to get beginners up and running fairly quickly. More advanced users will appreciate the complete index and precise, module-by-module, feature-by-feature breakdown of program functions.

Documentation is well-written and copiously illustrated. Nevertheless, all but the most advanced professionals may have to acquire additional documentation in order to understand and make use of Calamus SL's more advanced features, particularly those for raster generation and color separation. A minimal ancillary library might include Pantone's Process Color System Guide and International Paper's venerable Pocket Pal print production handbook. Since the program is distributed with only a minimum selection of standard serif and sans-serif fonts, users will also wish to contact ISD

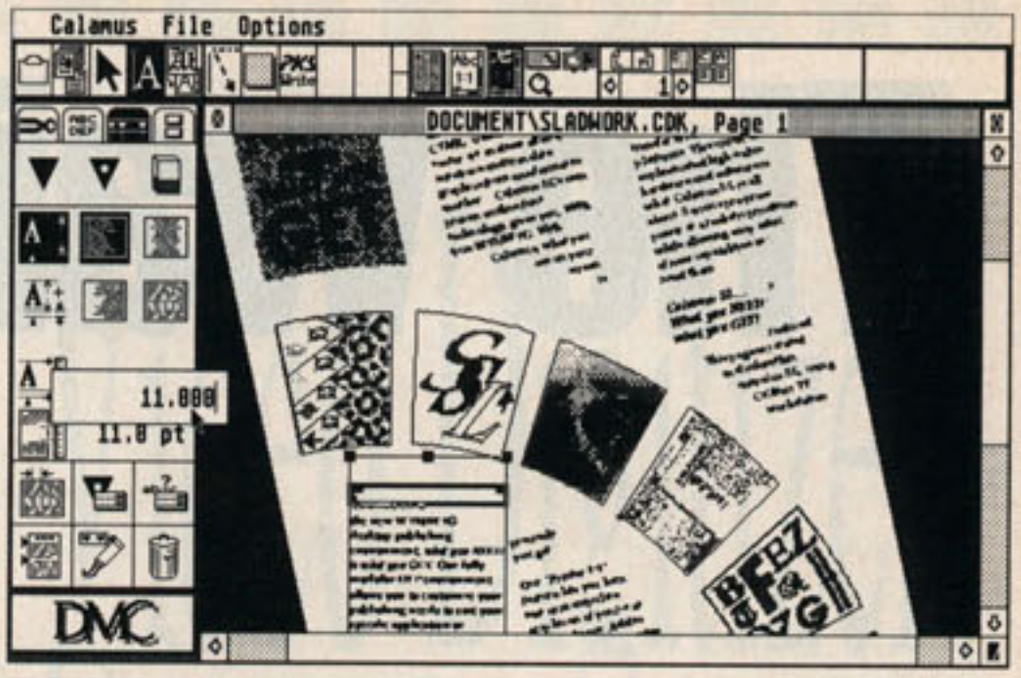

FIGURE 4. Paths give precise control of frame placement, allowing unique effects.

to purchase such additional fonts as are required for their needs.

Service and Support

Always a company to focus on service, ISD has recently formed an independent subsidiary to support distribution of the Calamus line of products in the Americas. This company, DMC Publishing, has begun an aggressive series of update releases to registered users. Though not received in time for this review, the most recent upgrade mailout included such significant enhancements as the consolidation of Text-module features, a full spelling dictionary, and additional incremental improvements, as well as corrections and addenda to documentation. DMC's "User to User" program makes over 600K of user-developed hints, tips, and productivity tricks available to Calamus users at a nominal charge. The company also maintains a constant and attentive presence on major information services, particularly GEnie. Telecommunicating users can expect to have even difficult questions answered quickly.

The only complaint one can reasonably level against Calamus SL is the present unavailability of its PostScript output module, now in testing. Once SL is fully PostScript-capable, it will be, without any serious question, the finest desktop publishing system available on any computing platform. ■

✔ CALAMUS SL
Requirements: Any ST/STe/TT computer w/2 MB RAM. Mono only. Hard disk recommended.
Summary: State-of-the-art DTP package.
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DMC Publishing, Inc.
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Markham, Ontario
Canada L3R 2W5
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A Build-it-Yourself Video Digitizer!

Dij-It

by Paul Swanson

Part One of a Three-part Series

AUTHOR OF THE NITE-LITE BBS SYSTEM AND designer/marketer of the popular Lantech Local Area Network, electronics and programming wiz Paul Swanson keeps stretching the envelope of ST/TT technology.

In this fascinating three-part series, Swanson describes how to build an inexpensive and flexible video digitizer: Dij-It. Compatible with any ST or TT computer, Dij-It captures clear 160 pixel-per-line scans across eight grey levels, from any NTSC video source (VCR or camcorder). Though based on state-of-the-art components, Dig-It is easy to build and understand; and offers a friendly introduction to the mechanics of realtime video signal processing.

The original reason for building this digitizer was to test the idea that TTL logic circuits, instead of conventional "comparators," could be used to convert analog signals to digital values. The result is Dij-It, a monochrome video digitizer that converts each line of a video image into 160 pixels, using seven grey levels.

In this first article, I'll explain how Dij-It operates and give a brief, painless introduction to video signal processing theory. Next issue, we'll present the schematic and assembly instructions, along with a description of software required for testing. The series will conclude by presenting Dij-It's operating software, which captures images in realtime through the ST's cartridge port.

Composite Video

The NTSC (National Television Standards Committee) video standard, used in the United States and Canada, describes the characteristics of the signal you get from a monitor output, such as the one on the back of a VCR or camcorder. NTSC devices transmit 60 video pictures (or "frames"), each second, creating the illusion of on-screen motion by rapidly replacing one frame with the next.

Each frame is composed of 262.5 "scan lines," which are displayed from left to right, top to bottom, just as lines are printed on a page by a dot matrix printer. The video signal encodes all the information required to display the picture—timing, color, and intensity—in terms of variable voltage levels.

The simplest way to begin analyzing the video signal is to look at a single scan line. Figure 1 shows a scan line as a plot of voltage vs. time in microseconds (millionths of a second). The line is introduced by a signal level of zero volts that lasts about two microseconds: called the "front porch." This is followed by a negative deflection of 0.25 volts, lasting about five microseconds. This so-called "horizontal sync pulse" is used to mark the exact start of each line. The sync pulse is followed by the "back porch," a period of about 5 microseconds, during which time voltage rises again to zero.

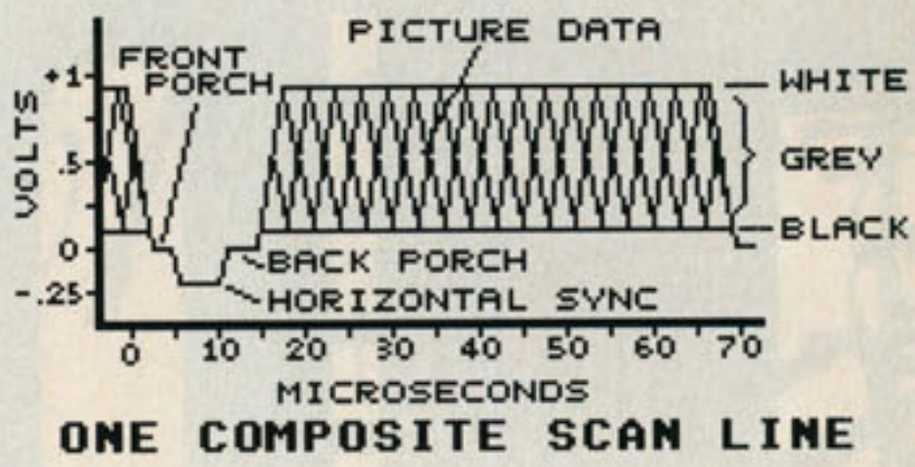
This series—front porch, hsync, back porch—is found at the beginning of every line in the signal. As noted above, 262.5 lines make up a single frame. A little math shows that NTSC video ends up transmitting 60 x 262.5 = 15,750 lines per second. Inverting this shows that each line takes place in about 1/15,750 = 63.5 microseconds.

The 12 microseconds taken up by the porches and horizontal sync pulse leave about 51.5 microseconds for actual picture data. Of that, about 4 or 5 microseconds worth of data fall beyond the screen margins, so visible picture information for a single line is transmitted in about 48 microseconds. During that time, 160 "color clocks"—minimal units of a color TV signal—are transmitted, and our circuit must take one sample per color clock to produce images of acceptable resolution (we're assuming that most people will be using Dij-It to digitize pictures from a color video source). 160 samples allows us a total sample time of 48/160 = only 0.3 microseconds per sample.

The Atari ST can read a word (16 bits of data) from the cartridge port every 1.5 microseconds. This tells us two things. First, it implies that the digitizer will have to supply the ST with more than one sample per read cycle. In fact, it must store and transmit at least 1.5/0.3 = 5 samples per read cycle, so that the ST doesn't lag behind. Second, dividing the word size through by the number of samples per "read" tells us that each sample must occupy a maximum of 16/5 = 3 bits (discounting the one-bit remainder). A 3-bit sample can represent one of 8 (2 x 2 x 2) possible states. Dij-It uses these eight states to represent seven grey-scale values, and one "sync" pulse value.

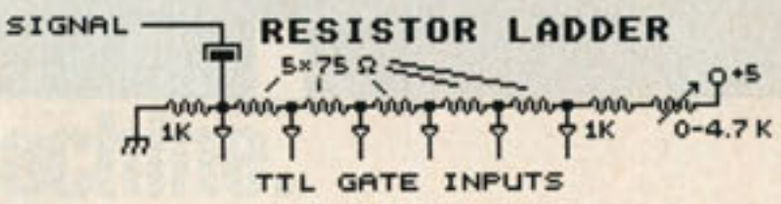
1. Graph of video signal voltage over time.
2. Resistor ladder, used to digitize signal voltage.
3. Input signal, graphed as input to resistor ladder.
4. Separate circuit used to digitize sync signals.
5. TTL input to binary data conversion logic.

1



ONE COMPOSITE SCAN LINE

2



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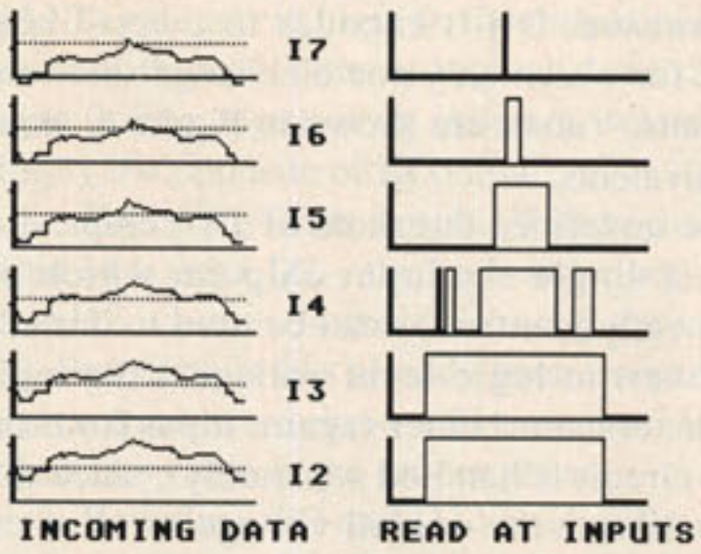

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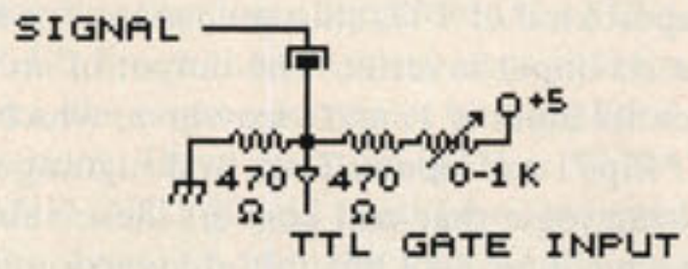

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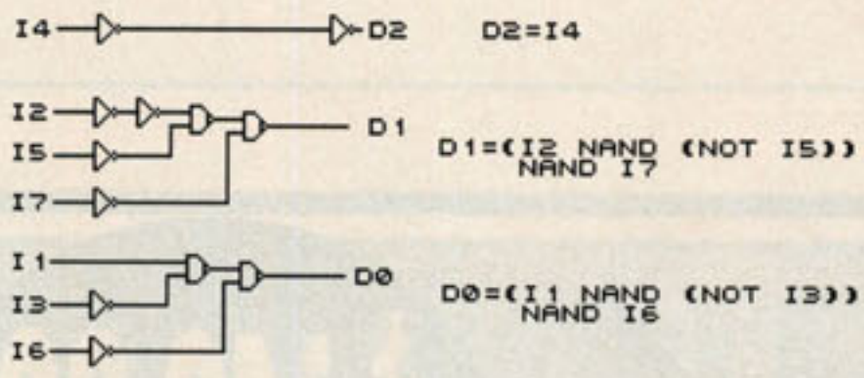


Signal Detection

To digitize a sample, Dij-It has to figure out how much voltage is being passed during a 0.3 second interval and express this as a 3-bit value. For reasons explained below, the relationship established by Dij-It's circuitry between voltage level and output value is actually non-linear. However, for the time being, it's enough to understand that a 3-bit sample provides 8 distinct "states" for differentiating voltage levels.

All analog-to-digital circuits assess voltage by comparing it against so-called "threshold" values, determining whether signal voltage is above or below a prescribed level. One type of circuit commonly used to perform this function is called a "comparator," which works by adjusting its threshold over several steps in response to signal voltage, using a process called "binary search." In the first step, the comparator sets its threshold in the exact center of the voltage range, determining if the signal voltage lies above or below this value. Next, the comparator divides in half the voltage range in which the signal voltage falls, again determining if it lies above or below the midpoint. By continuing to halve the range of voltages under examination over succeeding steps, the comparator can "home in" on the signal's exact voltage level.

The comparator's binary-search algorithm can determine one bit of the desired result, from high- to low-order, with each step. But the number of extra components needed to support a sufficiently-fast comparator would be unwieldy for this homebrew project. For this reason, Dij-It employs a different method for assessing signal voltage. It uses an ascending ladder of resistors to subdivide input voltage into the proper number of domains (seven, in this case, requiring six resistors). Output from each "step" in the ladder (the node between two resistors) is used to condition the inputs of a TTL (Transistor-Transistor Logic) chip (see Figures 1 and 2), which produce logical output voltages when their input thresholds are exceeded. Minimal additional logic processing converts the TTL output directly to the bit-values we want.

One problem must be surmounted, however, before the above-described circuit can be made to function. TTL chips are specified to have an input threshhold of somewhere between 0.8 and 1.8 volts—which is both higher than our signal voltage, and initially undefined. Luckily, within a single, six-input TTL chip, all input thresholds are very close together, so it's unnecessary to adjust the voltage provided to each TTL input on a separate basis. Instead, we can simply adjust the overall signal voltage upwards (without distorting the waveform), by passing the input signal through a capacitor. This removes the DC component and allows us to shift signal voltage in uniform fashion, using a potentiometer.

Figure 3 shows what this circuit does by diagramming the signal as voltage vs. time at each of the input points on our ladder of resistors. Note how the thresholds of the inputs, assumed to be 1.2 volts in these diagrams, cross the signal at different levels.

The only part of the digitizing circuit not shown is a simple filter that consists of a coil and a capacitor. What this does is "smudge" out the higher frequency color information, leaving only the lower frequencies that define a monochrome signal. If this were not done, bands of shading would appear on the digitized image as the result of the digitizer trying to interpret color information as differences in grey levels. Even with this filter, some digitized pictures may show banding if a sample point is positioned in exactly the right place in an area that is pure red, green or blue.

The sync signal is detected by a separate, though similar, circuit shown in Figure 4. Its negative-going voltage cannot conveniently be mapped into the range of

domains provided by our primary resistor ladder.

Data Encoding

The detection circuits provide seven outputs (six, corresponding to grey shades, derived from the resistor ladder and one, corresponding to sync pulse, from the sync-level detection circuit described above) whose voltage is either less than, or greater than the amount required to trigger TTL. Our next step is to take these seven inputs and encode them into 3-bit values, using TTL logic. Unfortunately, we can't just convert them into a linear series of binary numbers 0 (sync) to 7 (white)—the upper seven of which would constitute a true "grey scale."

This is because when TTL circuitry transits from 1 to 0, it does so about twice as fast as from 0 to 1. From sample to sample, voltage level tends to change fairly gradually. But if you examine the binary numbers from 1 to 7, you see that at several points along the way (for example, from 3 (011) to 4 (100)), all three bits may have to change to encode a consecutive value shift. In this example, the delay imposed by the slower transition from 0 to 1 in the high-order bit can result in the production and capture of a spurious intermediate sample value (000, where the 1's have changed to 0's, but the 0 hasn't yet changed to a 1)—causing a black dot to appear in the picture.

For this reason, Dij-It encodes to a non-linear series of values for which only one bit changes between consecutive inputs. Values are shown in Figure 6, along with binary equivalents.

Due to the undefined threshold of TTL chips, discussed above, a single six-input chip (in which all thresholds are nearly identical) must be used to initially "digitize" (convert to logic-level voltages) the input voltage from the resistor ladder (again, input from the sync-detection circuit is handled separately), since this permits us to calibrate the overall voltage level of the input to the threshold voltage of the chip, using a single control.

The cheapest kind of TTL chip we can use for this initial step is a six-input inverter. The output of an inverter is 0 when its input is 1, and vice-versa, which in logical terms, "flips" our inputs. Thus in designing the further processing logic that will convert these values into 3-bit codes, we must take this initial inversion into account.

The remaining processing is performed by four NAND gates (contained in a single 74LS00 quad

NAND-gate chip), and two additional inverters from a 74LS04. These subcomponents are combined in the circuits shown in Figure 5. When either or both inputs of a NAND gate are at logic 0, the output is at logic 1. Only when both inputs are at logic 1 does the output go to logic 0. The input of an inverter—as noted above—is simply the opposite of its output.

Encoding D2 is simple. With regard to Figure 5, if input I4 is zero, D2—the high-order bit—is zero. Otherwise D2 is a one. I4 then is exactly the value needed for D2. But since I4 has already been inverted (in the initial digitization), we must add a second inverter to "re-invert" its value to the proper phase.

Encoding D0 and D1 are slightly more involved. D1 is encoded using I2, I5 and I7. D1 must be logic one when I7 is one or when I2 is one while I5 is zero. Translating that to a logic equation, D1 = (I2 AND (NOT I5)) OR I7. Since the circuitry uses inverters and NAND gates, the expression must be translated to use NAND functions. The translation is D1 = (I2 NAND (NOT I5)) NAND (NOT I7). I2 must be re-inverted to get its true value, upstream from the first NAND gate. However, we need not re-invert I5 and I7, since their "flipped" values are equivalent to the inputs NOT I5 and NOT I7, required by the expression.

The encoding of D0 subjects I1, I3 and I6 to the same basic method. Here, the logical expression is D0 = (I1 NAND (NOT I3)) NAND (NOT I6). Note that I1 is not digitized at this point. Since it is not detected by the main resistor ladder, it has not had to pass through initial digitization by our inverter (nor could it have, since our six-input inverter has no inputs left!). For this reason, it has remained in proper phase and can be fed directly to the NAND gate input, which, in effect, performs the digitization required. Again, the "flipped" versions of inputs I3 and I6, produced by the inverter, are equivalent to the inputs NOT I3 and NOT I6, and can be fed to the circuit directly.

Figure 5 and the explanation are included for anyone who wants to try changing the encoding of the bits. If you do change the encoding, you will also have to change the logic by which the control software interprets input.

Figure 5 also reveals one small flaw in the circuit. The "paths" for each input to its respective output go through different numbers of gates. Each gate takes 7 to 15 nanoseconds to respond to its input. Using a value of 11 nanoseconds as representative shows that a change in I2, for example, would take 44 nanoseconds to change the output D1. But a change in I5 would take only 33

FIGURE 6. Logical input to Dij-It's encoding scheme, and resulting output grey codes. Binary equivalents are shown for comparison.

7654321	Input Binary	Grey Code
0000000	000	000
0000001	001	001
0000011	010	011
0000111	011	010
0001111	100	110
0011111	101	100
0111111	110	101
1111111	111	111

nanoseconds to change its respective output, and a change in I7 would take only 22 seconds to do the same. When a sudden change from very dark to very light picture intensity occurs—for example, from where I2 is zero to where I2 is one and I5 is one, such as happens when sequential samples change from level 1 to level 6—can produce a false value.

Looking at the timing involved in such a change shows that it is unlikely, since going from level 1 to level 6 produces a signal change that would be absorbed by the filter before it got to this part of the circuit. If you increase the contrast, using a method described in part two of this series, to where such a change is more likely, you will see the effect as random white dots on your digitized picture. If this happens you will either have to decrease the contrast or change the filter to cut off at a lower frequency.

Storage and Output

Once sample encoding is complete, the three bits are then fed into three five-bit shift registers, which will always contain the most recent five samples taken. The circuit actually uses the upper five bits of three 8-bit shift registers (74LS164's), since five-bit shift registers (74LS96's) are hard to find.

One bit of each three-bit sample value is delivered to each shift register, each time a sample is taken. A clock oscillator produces a pulse between samples, causing each shift register to shift its contents by one bit, making room for a bit from the next sample. To produce this pulse, we need a crystal that produces one pulse every 3.3333 MHz, which is not a "stock" crystal value. However, we can approximate this value by using a television colorburst crystal with a frequency of 3.579545 MHz. Testing has shown that this value is close enough. An alternative could be use of a 10 MHz crystal, producing a pulse every 0.1 microseconds. A counter could then be used to count these pulses and send out its own pulse every time it receives three pulses from the oscillator. However, I did this and found that it did not improve picture quality.

The only other parts required are for interfacing directly to the Atari ST data lines on the cartridge port. This is done using tri-state buffers—devices that can be turned "on" or "off" by one signal line. When a tri-state buffer is "on," the data at the input is placed on its output. When "off," the outputs go into what is called a "high impedence" state, which means that no signal appears on the output. The tristate buffers are turned on by a signal from the Atari ST, applied when it is ready to read data from its cartridge port. The shift registers are wired to the buffers so as to re-order the collected bits into a sensible sequence, the way the control software expects to see them.

Voltage Dividers

The part of this circuit that actually determines which value is assigned to each incoming voltage level depends on a voltage divider—our "ladder" of resistors. For the adjustments suggested in part two of this series, it is important to understand exactly what the voltage divider does and how to calculate the values of components contributing to its operation.

A voltage divider is simply a series of resistors connected between two known voltage levels. In this case, we have several resistors, connected in series, between ground (0 volts) and +5 volts. In the absence of video signal voltage, we can precisely calculate the voltage at each of the points where resistors connect together. The important values are the differences in voltages at pairs of these points.

Each consecutive pair of input points has one 75-ohm resistor between them. The 75-ohm resistor is part of the complete voltage divider, which makes it possible to figure out directly what the difference in voltage between the two inputs will be. This value is a simple proportion. The total resistance in the entire voltage divider, divided by the total voltage of +5, is equal to this resistance, 75, divided by this voltage difference. This particular voltage difference is the sample interval, which indicates quite a bit about the operation of the digitizer.

To calculate this value it is necessary to estimate the resistance of a particular setting of the variable resistor (potentiometer) used to control brightness. Assuming that the pot is set at 1.2K (Kilohms), the total resistance of the entire voltage divider will be 470 ohms from resistor to ground, plus 75 ohms times 5 resistors for the "ladder," plus the 1K that connects the ladder to the variable resistor, plus 1.2K for the variable resistor. This adds up to 3,045 ohms. Cross-multiply the proportion, and the sample interval can be calculated as 5 x 75 / 3,045, or about 0.123 volts.

Note from this calculation that, if the brightness control is set at a higher resistance, the sample rate actually increases. This will darken the picture, which

means that the darker the digitized picture, the more contrast it actually shows. If you increase the variable resistor to 2K, for example, the total resistance becomes 5 x 75 / 3,845, which is about 0.098 volts. Increasing that resistor that much will produce a picture that is far too dark, so this is not the best way to increase contrast. Instead, part two of our series will offer two other methods of changing this proportion to increase or decrease contrast.

Next Issue

Part two of our series will present the schematic and parts list that shows exactly how all this goes together. The eight-chip circuit uses only three chips to digitize the signal and encode it into the grey scale. One of those two chips also generates the clock pulses the shift registers require. The other five chips comprise the three shift registers and two octal tri-state buffers.

Most of these components can be purchased at Radio Shack or other electronics retailer. Radio Shack will also be able to sell you a kit that will allow etching of the printed circuit board required, a diagram for which will be given, next issue. Circuit-board etching is fairly easy, provided you follow the instructions, so even relative beginners need not be frightened by the prospect.

The only complicated thing about Dig-It's circuit board is that one end of it must be cut into a tongue bearing 40 metal fingers (20 per side, 2 mm. on center), so that it will plug reliably into the ST's cartridge port. Cutting may be carried out with a simple jigsaw, the circuit board clamped firmly in a padded vise.

TTL and other more unusual components can be purchased locally or by mail from specialized dealers. One of the least expensive is JDR Microdevices, at (800) 538-5000.

If you prefer, instead of searching for all the parts required to build Dij-It, you can order a kit that contains a three-chip version of this interface instead of the eight-chip design presented in part two. The three chips are custom chips programmed with functions identical to the eight chips in the schematic, and naturally take up far less space than their stock equivalents.

You can order the kit by sending $40 plus $5 for shipping and handling for any US address ($10 shipping and handling if you are in Canada) to the author, Paul Swanson, at 12 Shedd Road, Billerica, MA 01862. Your kit will be shipped within two weeks of receipt of your order.

The kit contains the three custom chips, a printed circuit board that contains the fingers for the cartridge port, the coil for the filter, instructions for assembling the kit version, and a diskette containing the software for the interface. The remaining parts, which are listed in the instructions, are all readily available. All can be purchased at Radio Shack or other electronics store. ■

Portfolio Programming

Mixed-Mode Graphics and Character-Set Programming

Part 4 of a series / by BJ Gleason

Character-set programming lets you mix text and graphics, and opens the door to animation and other advanced applications.

IN ORDER TO KEEP THE SIZE OF THE PORTFOLIO TO AN ABSOLUTE minimum, several tradeoffs needed to be made. One of these tradeoffs involved implementing a non-PC-compatible graphics screen, on which text and graphics cannot be mixed in any of the Portfolio's native graphics modes. While this is not always a problem, it's easy to imagine cases where this lack might be troublesome. Game programs are only one possible example.

As noted in an earlier article, several of the more popular Portfolio programming languages (including PowerBASIC for the Portfolio from Spectra Publishing, and PBASIC from Thin Air Labs) offer the ability to mix text and graphics. But even if you write in a more fundamental language such as C or Pascal, it's relatively easy to add this capability to your Portfolio programs.

The Real Trick

The trick to mixing text and graphics is (drum roll) — that you're really not mixing text and graphics at all! Instead, the usual method is to produce a bitmap (i.e., graphic) representation of your character set, along with routines to "print" these characters on the Portfolio screen, pixel by pixel.

Creating the bitmap character set table is fairly challenging. The Portfolio character set is based on a 6 x 8 template, as shown in Figure 1. In order to form a character, we color in the pixels in the template, as shown. To convert the template to data the Portfolio can use, we substitute a '1' for the filled-in pixels, and a '0' for the empty pixels, turning each of the six columns of the template into one, eight-bit, binary byte whose high-order bit is at the bottom, and whose low-order bit is at the top. To see what kind of data results, it's easier to turn the character template on its side, as in Figure 2. Our upper-case 'A' is represented by the sequence of hex values: 7E, 11, 11, 11, 7E, and 00.

In designing characters, we normally leave the rightmost column empty, since this is the space between each character. We also tend to leave the bottom row blank, since it serves as the separator between lines. This column and row may, however, be used when we're creating graphic characters, such as line-drawing characters.

FIGURE 1. The basic 6 x 8 character template.

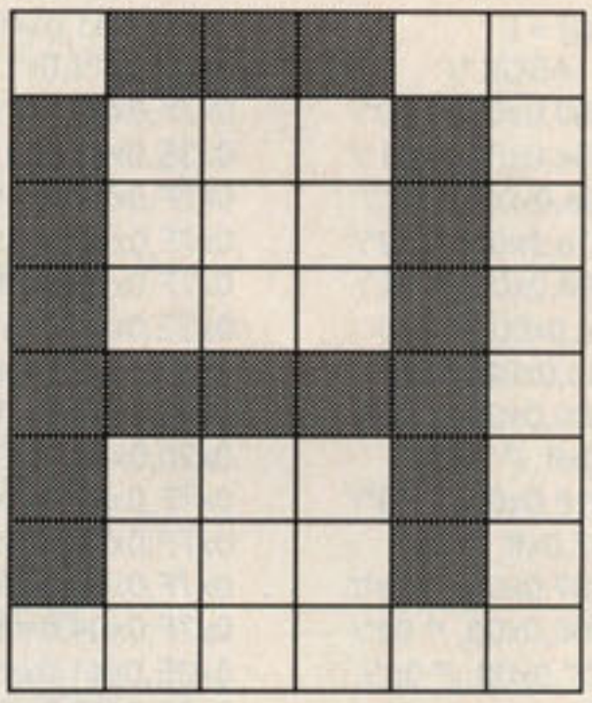
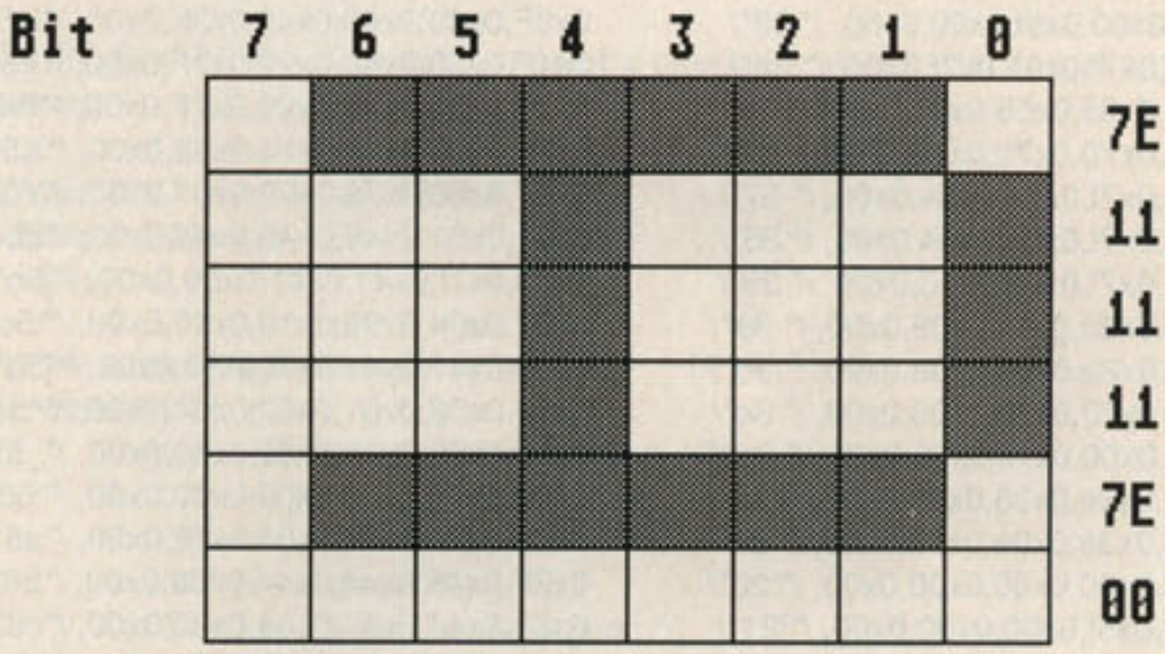


FIGURE 2. Converting the template to a byte sequence.



The complete character set requires 6 bytes per character times 256 characters, or 1,536 bytes total — larger than some of the more popular Portfolio programs! While this is not really very big, it is possible to reduce the size of the character set table. For example, you could include only the characters that your application needs to print out.

Figure 3 contains a complete table for the ASCII characters. It is represented as an array written in Turbo C 2.0 from Borland. It should work with any implementation of C, and would not be too hard to convert to another language. On disk, this would be stored in the files CHARS.C.

Printing Out

Now that we have the table of characters, we want to print them out on the graphics screen. To do this, we will need two routines, PLOT_BYTE and GPSTR. PLOT_BYTE will print a single byte from the table on the screen, at a specified X,Y coordinate. GPSTR will print a string of characters on the screen, starting at a specified X,Y coordinate.

PLOT_BYTE requires three parameters, the upper left X,Y screen coordinate, as well as the bit pattern for the current column. The

☛ Programs presented in this series are available for download from CompuServe's Atari Portfolio Forum (GO APORTFOLIO at any CompuServe system prompt)—an official Portfolio support site. For more information about joining CompuServe, call (800) 848-8199 and ask for Operator 198.

FIGURE 3. An ASCII character set table, in C.

```
unsigned char char_table[] = {
/* A   B   C   D   E   F  ASCII */
0x00,0x00,0x00,0x00,0x00,0x00, /* 00*/
0x3e,0x55,0x51,0x55,0x3e,0x00, /* 01*/
0x3e,0x6b,0x6f,0x6b,0x3e,0x00, /* 02*/
0x1e,0x3e,0x7c,0x3e,0x1e,0x00, /* 03*/
0x08,0x1c,0x3e,0x1c,0x08,0x00, /* 04*/
0x1c,0x5f,0x67,0x5f,0x1c,0x00, /* 05*/
0x1c,0x5e,0x7f,0x5e,0x1c,0x00, /* 06*/
0x00,0x00,0x18,0x18,0x00,0x00, /* 07*/
0xff,0xff,0xe7,0xe7,0xff,0xff, /* 08*/
0x00,0x18,0x24,0x24,0x18,0x00, /* 09*/
0xff,0xe7,0xdb,0xdb,0xe7,0xff, /* 0a*/
0x30,0x48,0x4d,0x4b,0x37,0x00, /* 0b*/
0x06,0x29,0x79,0x29,0x06,0x00, /* 0c*/
0x60,0x60,0x3f,0x05,0x07,0x00, /* 0d*/
0x60,0x7f,0x05,0x35,0x3f,0x00, /* 0e*/
0x2a,0x1c,0x77,0x1c,0x2a,0x00, /* 0f*/
0x7f,0x3e,0x1c,0x08,0x08,0x00, /* 10*/
0x08,0x08,0x1c,0x3e,0x7f,0x00, /* 11*/
0x14,0x36,0x7f,0x36,0x14,0x00, /* 22*/
0x00,0x5f,0x00,0x5f,0x00,0x00, /* 33*/
0x06,0x09,0x7f,0x01,0x7f,0x00, /* 34*/
0x00,0x4a,0x55,0x55,0x29,0x00, /* 35*/
0x70,0x70,0x70,0x70,0x70,0x00, /* 36*/
0x54,0x76,0x7f,0x76,0x54,0x00, /* 37*/
0x04,0x06,0x7f,0x06,0x04,0x00, /* 38*/
0x10,0x30,0x7f,0x30,0x10,0x00, /* 39*/
0x08,0x08,0x2a,0x1c,0x08,0x00, /* 3a*/
0x08,0x1c,0x2a,0x08,0x08,0x00, /* 3b*/
0x3c,0x20,0x20,0x20,0x00,0x00, /* 3c*/
0x08,0x1c,0x08,0x1c,0x08,0x00, /* 3d*/
0x20,0x38,0x3e,0x38,0x20,0x00, /* 3e*/
0x02,0x0e,0x3e,0x0e,0x02,0x00, /* 3f*/
0x00,0x00,0x00,0x00,0x00,0x00, /* 20*/
0x00,0x00,0x5f,0x00,0x00,0x00, /*!21*/
0x00,0x03,0x00,0x03,0x00,0x00, /*"22*/
0x14,0x7f,0x14,0x7f,0x14,0x00, /*#23*/
0x24,0x2a,0x6b,0x2a,0x12,0x00, /*$24*/
0x23,0x13,0x08,0x64,0x62,0x00, /*%25*/
0x36,0x49,0x55,0x22,0x50,0x00, /*&26*/
0x00,0x00,0x05,0x03,0x00,0x00, /*'27*/
0x00,0x1c,0x22,0x41,0x00,0x00, /*(28*/
0x00,0x41,0x22,0x1c,0x00,0x00, /*)29*/
0x14,0x08,0x3e,0x08,0x14,0x00, /**2a*/
0x08,0x08,0x3e,0x08,0x08,0x00, /*+2b*/
0x00,0x00,0x50,0x30,0x00,0x00, /*,2c*/
0x08,0x08,0x08,0x08,0x08,0x00, /*-2d*/
0x00,0x00,0x60,0x60,0x00,0x00, /*.2e*/
0x20,0x10,0x08,0x04,0x02,0x00, /*/2f*/
0x3e,0x51,0x49,0x45,0x3e,0x00, /*030*/
0x00,0x42,0x7f,0x40,0x00,0x00, /*131*/
0x42,0x61,0x51,0x49,0x46,0x00, /*232*/
0x21,0x41,0x45,0x4b,0x31,0x00, /*333*/
0x18,0x14,0x12,0x7f,0x10,0x00, /*434*/
0x27,0x45,0x45,0x45,0x39,0x00, /*535*/
0x3c,0x4a,0x49,0x49,0x30,0x00, /*636*/
0x01,0x01,0x79,0x05,0x03,0x00, /*737*/
0x36,0x49,0x49,0x49,0x36,0x00, /*838*/
0x06,0x49,0x49,0x29,0x1e,0x00, /*939*/
0x00,0x00,0x36,0x36,0x00,0x00, /*:3a*/
0x00,0x00,0x56,0x36,0x00,0x00, /*;3b*/
0x00,0x08,0x14,0x22,0x41,0x00, /*<3c*/
0x14,0x14,0x14,0x14,0x14,0x00, /*=3d*/
0x41,0x22,0x14,0x08,0x00,0x00, /*>3e*/
0x02,0x01,0x51,0x09,0x06,0x00, /*?3f*/
0x3e,0x41,0x49,0x55,0x0e,0x00, /*@40*/
0x7E,0x11,0x11,0x11,0x7E,0x00, /*A41*/
0x7F,0x49,0x49,0x49,0x36,0x00, /*B42*/
0x3E,0x41,0x41,0x41,0x22,0x00, /*C43*/
0x7F,0x41,0x41,0x22,0x1C,0x00, /*D44*/
0x7F,0x49,0x49,0x49,0x41,0x00, /*E45*/
0x7F,0x09,0x09,0x09,0x01,0x00, /*F46*/
0x3E,0x41,0x51,0x51,0x72,0x00, /*G47*/
0x7F,0x08,0x08,0x08,0x7F,0x00, /*H48*/
0x00,0x41,0x7F,0x41,0x00,0x00, /*I49*/
0x20,0x40,0x41,0x3F,0x01,0x00, /*J4a*/
0x7F,0x08,0x14,0x22,0x41,0x00, /*K4b*/
0x7F,0x40,0x40,0x40,0x40,0x00, /*L4c*/
0x7F,0x02,0x0C,0x02,0x7F,0x00, /*M4d*/
0x7F,0x04,0x08,0x10,0x7F,0x00, /*N4e*/
0x3E,0x41,0x41,0x41,0x3E,0x00, /*O4f*/
0x7F,0x09,0x09,0x09,0x06,0x00, /*P50*/
0x3E,0x41,0x51,0x21,0x5E,0x00, /*Q51*/
0x7F,0x09,0x11,0x29,0x46,0x00, /*R52*/
0x26,0x49,0x49,0x49,0x32,0x00, /*S53*/
0x01,0x01,0x7F,0x01,0x01,0x00, /*T54*/
0x3F,0x40,0x40,0x40,0x3F,0x00, /*U55*/
0x1F,0x20,0x40,0x20,0x1F,0x00, /*V56*/
0x7F,0x20,0x18,0x20,0x7F,0x00, /*W57*/
0x63,0x14,0x08,0x14,0x63,0x00, /*X58*/
0x07,0x08,0x78,0x08,0x07,0x00, /*Y59*/
0x61,0x51,0x49,0x45,0x43,0x00, /*Z5a*/
0x00,0x7f,0x41,0x41,0x00,0x00, /*[5b*/
0x02,0x04,0x08,0x10,0x20,0x00, /*\5c*/
0x00,0x41,0x41,0x7f,0x00,0x00, /*]5d*/
0x04,0x02,0x01,0x02,0x04,0x00, /*^5e*/
0x80,0x80,0x80,0x80,0x80,0x00, /*_5f*/
0x00,0x03,0x05,0x00,0x00,0x00, /*`60*/
0x20,0x54,0x54,0x54,0x78,0x00, /*a61*/
0x7F,0x48,0x44,0x44,0x38,0x00, /*b62*/
0x38,0x44,0x44,0x44,0x20,0x00, /*c63*/
0x38,0x44,0x44,0x48,0x7f,0x00, /*d64*/
0x38,0x54,0x54,0x54,0x58,0x00, /*e65*/
0x08,0x7e,0x09,0x09,0x02,0x00, /*f66*/
0x08,0x54,0x54,0x54,0x3c,0x00, /*g67*/
0x7F,0x08,0x04,0x04,0x78,0x00, /*h68*/
0x00,0x44,0x7d,0x40,0x00,0x00, /*i69*/
0x20,0x40,0x44,0x3d,0x00,0x00, /*j6a*/
0x7F,0x20,0x10,0x28,0x44,0x00, /*k6b*/
0x00,0x41,0x7f,0x40,0x00,0x00, /*l6c*/
0x7c,0x04,0x18,0x04,0x7c,0x00, /*m6d*/
0x7c,0x08,0x04,0x04,0x78,0x00, /*n6e*/
0x38,0x44,0x44,0x44,0x38,0x00, /*o6f*/
0x7c,0x14,0x14,0x14,0x08,0x00, /*p70*/
0x08,0x14,0x14,0x14,0x7c,0x00, /*q71*/
0x7c,0x08,0x04,0x04,0x08,0x00, /*r72*/
0x48,0x54,0x54,0x54,0x24,0x00, /*s73*/
0x04,0x3f,0x44,0x44,0x20,0x00, /*t74*/
0x3c,0x40,0x40,0x20,0x7c,0x00, /*u75*/
0x1c,0x20,0x40,0x20,0x1c,0x00, /*v76*/
0x3c,0x40,0x30,0x40,0x3c,0x00, /*w77*/
0x44,0x28,0x10,0x28,0x44,0x00, /*x78*/
0x4c,0x50,0x50,0x50,0x3c,0x00, /*y79*/
0x44,0x64,0x54,0x4c,0x44,0x00, /*z7a*/
0x00,0x08,0x3e,0x41,0x41,0x00, /*{7b*/
0x00,0x00,0x77,0x00,0x00,0x00, /*|7c*/
0x41,0x41,0x3e,0x08,0x00,0x00, /*}7d*/
0x02,0x01,0x03,0x02,0x01,0x00, /*~7e*/
0x60,0x50,0x48,0x50,0x60,0x00, /* 7f*/
0x0e,0x51,0x51,0x71,0x0a,0x00, /*80*/
0x38,0x41,0x40,0x21,0x78,0x00, /*81*/
0x38,0x54,0x56,0x55,0x58,0x00, /*82*/
0x20,0x56,0x55,0x56,0x78,0x00, /*83*/
0x20,0x55,0x54,0x55,0x78,0x00, /*84*/
0x20,0x55,0x56,0x54,0x78,0x00, /*85*/
0x20,0x54,0x55,0x54,0x78,0x00, /*86*/
0x58,0x64,0x64,0x24,0x10,0x00, /*87*/
0x38,0x56,0x55,0x56,0x58,0x00, /*88*/
0x38,0x55,0x54,0x55,0x58,0x00, /*89*/
0x38,0x55,0x56,0x54,0x58,0x00, /*8a*/
0x00,0x49,0x78,0x41,0x00,0x00, /*8b*/
0x00,0x4a,0x79,0x42,0x00,0x00, /*8c*/
0x00,0x49,0x7a,0x40,0x00,0x00, /*8d*/
0x79,0x24,0x24,0x24,0x79,0x00, /*8e*/
0x78,0x24,0x25,0x24,0x78,0x00, /*8f*/
0x7c,0x56,0x55,0x44,0x44,0x00, /*90*/
0x24,0x54,0x38,0x54,0x48,0x00, /*91*/
0x7c,0x0a,0x09,0x7f,0x49,0x00, /*92*/
0x30,0x4a,0x49,0x4a,0x30,0x00, /*93*/
0x30,0x49,0x48,0x49,0x30,0x00, /*94*/
0x30,0x49,0x4a,0x48,0x30,0x00, /*95*/
0x38,0x42,0x41,0x22,0x78,0x00, /*96*/
0x38,0x41,0x42,0x20,0x78,0x00, /*97*/
0x4c,0x51,0x50,0x51,0x3c,0x00, /*98*/
0x39,0x44,0x44,0x44,0x39,0x00, /*99*/
0x3d,0x40,0x40,0x40,0x3d,0x00, /*9a*/
0x18,0x24,0x66,0x24,0x00,0x00, /*9b*/
0x48,0x7e,0x49,0x42,0x20,0x00, /*9c*/
0x15,0x16,0x7c,0x16,0x15,0x00, /*9d*/
0x7f,0x05,0x05,0x7a,0x10,0x00, /*9e*/
0x20,0x48,0x3e,0x09,0x02,0x00, /*9f*/
0x20,0x54,0x56,0x55,0x78,0x00, /* a0*/
0x00,0x48,0x7a,0x41,0x00,0x00, /*!a1*/
0x30,0x48,0x4a,0x49,0x30,0x00, /*"a2*/
0x38,0x40,0x42,0x21,0x78,0x00, /*#a3*/
0x7a,0x12,0x0a,0x0a,0x72,0x00, /*$a4*/
0x7d,0x09,0x11,0x21,0x7d,0x00, /*%a5*/
0x00,0x12,0x15,0x17,0x00,0x00, /*&a6*/
0x00,0x12,0x15,0x12,0x00,0x00, /*'a7*/
0x30,0x48,0x45,0x40,0x20,0x00, /*(a8*/
0x38,0x08,0x08,0x08,0x08,0x00, /*)a9*/
0x08,0x08,0x08,0x08,0x38,0x00, /**aa*/
0x13,0x08,0x44,0x6a,0x59,0x00, /*+ab*/
0x13,0x28,0x34,0x7a,0x41,0x00, /*,ac*/
0x00,0x00,0x7d,0x00,0x00,0x00, /*-ad*/
0x08,0x14,0x2a,0x14,0x22,0x00, /*.ae*/
0x22,0x14,0x2a,0x14,0x08,0x00, /*/af*/
0xaa,0x55,0xaa,0x55,0xaa,0x55, /*0b0*/
0x55,0xff,0xaa,0x55,0xff,0xaa, /*1b1*/
0xff,0x6d,0xff,0xdb,0xff,0xb6, /*2b2*/
0x00,0x00,0xff,0x00,0x00,0x00, /*3b3*/
0x08,0x08,0xff,0x00,0x00,0x00, /*4b4*/
0x14,0x14,0xff,0x00,0x00,0x00, /*5b5*/
0x08,0xff,0x00,0xff,0x00,0x00, /*6b6*/
0x08,0xf8,0x08,0xf8,0x00,0x00, /*7b7*/
0x14,0x14,0xfc,0x00,0x00,0x00, /*8b8*/
0x14,0xf7,0x00,0xff,0x00,0x00, /*9b9*/
0x00,0xff,0x00,0xff,0x00,0x00, /*9ba*/
0x14,0xf4,0x04,0xfc,0x00,0x00, /*;bb*/
0x14,0x17,0x10,0x1f,0x00,0x00, /*<bc*/
0x08,0x0f,0x08,0x0f,0x00,0x00, /*=bd*/
0x14,0x14,0x1f,0x00,0x00,0x00, /*>be*/
0x08,0x08,0xf8,0x00,0x00,0x00, /*?bf*/
0x00,0x00,0x0f,0x08,0x08,0x08, /*@c0*/
```

```
0x08,0x08,0x0f,0x08,0x08,0x08, /*Ac1*/
0x08,0x08,0xf8,0x08,0x08,0x08, /*Bc2*/
0x00,0x00,0xff,0x08,0x08,0x08, /*Cc3*/
0x08,0x08,0x08,0x08,0x08,0x08, /*Dc4*/
0x08,0x08,0xff,0x08,0x08,0x08, /*Ec5*/
0x00,0x00,0xff,0x14,0x14,0x14, /*Fc6*/
0x00,0xff,0x00,0xff,0x08,0x08, /*Gc7*/
0x00,0x1f,0x10,0x17,0x14,0x14, /*Hc8*/
0x00,0xfc,0x04,0xf4,0x14,0x14, /*Ic9*/
0x14,0x17,0x10,0x17,0x14,0x14, /*Jca*/
0x14,0xf4,0x04,0xf4,0x14,0x14, /*Kcb*/
0x00,0xff,0x00,0xf7,0x14,0x14, /*Lcc*/
0x14,0x14,0x14,0x14,0x14,0x14, /*Mcd*/
0x14,0xf7,0x00,0xf7,0x14,0x14, /*Nce*/
0x14,0x14,0x17,0x14,0x14,0x14, /*Ocf*/
0x08,0x0f,0x08,0x0f,0x08,0x08, /*Pd0*/
0x14,0x14,0xf4,0x14,0x14,0x14, /*Qd1*/
0x08,0xf8,0x08,0xf8,0x08,0x08, /*Rd2*/
0x00,0x0f,0x08,0x0f,0x08,0x08, /*Sd3*/
0x00,0x00,0x1f,0x14,0x14,0x14, /*Td4*/
0x00,0x00,0xfc,0x14,0x14,0x14, /*Ud5*/
0x00,0xf8,0x08,0xf8,0x08,0x08, /*Vd6*/
0x08,0xff,0x08,0xff,0x08,0x08, /*Wd7*/
0x14,0x14,0xff,0x14,0x14,0x14, /*Xd8*/
0x08,0x08,0x0f,0x00,0x00,0x00, /*Yd9*/
0x00,0x00,0xf8,0x08,0x08,0x08, /*Zda*/
0xff,0xff,0xff,0xff,0xff,0xff, /*[db*/
0xf0,0xf0,0xf0,0xf0,0xf0,0xf0, /*\dc*/
0xff,0xff,0xff,0x00,0x00,0x00, /*]dd*/
0x00,0x00,0x00,0xff,0xff,0xff, /*^de*/
0x0f,0x0f,0x0f,0x0f,0x0f,0x0f, /*_df*/
0x3c,0x42,0x42,0x3c,0x42,0x00, /*`e0*/
0x7e,0x15,0x25,0x25,0x1a,0x00, /*ae1*/
0x7F,0x01,0x01,0x01,0x07,0x00, /*be2*/
0x02,0xfe,0x02,0xfe,0x02,0x00, /*ce3*/
0x41,0x63,0x55,0x49,0x63,0x00, /*de4*/
0x3c,0x42,0x3e,0x02,0x02,0x00, /*ee5*/
0x40,0x3e,0x08,0x10,0x0e,0x00, /*fe6*/
0x04,0x02,0x7e,0x04,0x02,0x00, /*ge7*/
0x49,0x55,0x77,0x55,0x49,0x00, /*he8*/
0x3e,0x49,0x49,0x49,0x3e,0x00, /*ie9*/
0x5c,0x62,0x02,0x62,0x5c,0x00, /*jea*/
0x32,0x4d,0x49,0x31,0x00,0x00, /*keb*/
0x18,0x24,0x18,0x24,0x18,0x00, /*lec*/
0x5c,0x32,0x2a,0x26,0x1d,0x00, /*med*/
0x1c,0x2a,0x49,0x49,0x49,0x00, /*nee*/
0x7e,0x01,0x01,0x01,0x7e,0x00, /*oef*/
0x49,0x49,0x49,0x49,0x49,0x00, /*pf0*/
0x44,0x44,0x5f,0x44,0x44,0x00, /*qf1*/
0x40,0x51,0x4a,0x44,0x40,0x00, /*rf2*/
0x40,0x44,0x4a,0x51,0x40,0x00, /*sf3*/
0x00,0x00,0xfe,0x01,0x01,0x00, /*tf4*/
0x20,0x40,0x3f,0x00,0x00,0x00, /*uf5*/
0x08,0x08,0x2a,0x08,0x08,0x00, /*vf6*/
0x44,0x22,0x66,0x44,0x22,0x00, /*wf7*/
0x02,0x05,0x02,0x00,0x00,0x00, /*xf8*/
0x00,0x00,0x18,0x18,0x00,0x00, /*yf9*/
0x00,0x00,0x10,0x00,0x00,0x00, /*zfa*/
0x20,0x40,0x7f,0x01,0x01,0x00, /*{fb*/
0x07,0x01,0x06,0x00,0x00,0x00, /*|fc*/
0x09,0x0d,0x0b,0x00,0x00,0x00, /*}fd*/
0x00,0x00,0x3c,0x3c,0x00,0x00, /*~fe*/
0x00,0x00,0x00,0x00,0x00,0x00  /* ff*/
};
```

FIGURE 4. PLOT_BYTE: a routine to plot a single byte from a character set table bitmap, starting at a given X,Y location.

```
void plot_byte(int x, int y, int c) {
   int i;

      /* plot the column bit by bit      */
      for(i=0;i<8;i++) {
           /* set up for pixel write    */
           _CX = x;
           _DX = y;
           _BH = 0;
           /* extract a single bit      */
           _AX = 0x0c00+(c&1);
           /* write bit to the screen   */
           geninterrupt(0x10);
           /* shift byte to next bit    */
           c = c>>1;
           /* increment row position    */
           y++;
      }
}
```

FIGURE 5. GPSTR: A routine to print a character string, starting at a given X,Y location.

```
void gpstr(int x, int y, unsigned char *gs) {
   unsigned char z;
     int i;

   /* While there is a character in the string     */
     while (*gs) {
          /* get the bit map column by column    */
          for(i=0; i!=6;) {
              /* get a column for the character */
              z=char_rom[(*gs * 6)+i++];
              /* and now, plot it on the screen */
              plot_byte(x++,y,z);
          }
          /* point to the next character in the */
          /* string.                  */
          gs++;
     }
}
```

byte is then printed in a loop, pixel by pixel, incrementing the Y coordinate each time.

GPSTR also requires three parameters, the upper left X,Y screen coordinate, and the string to be printed. This process requires two loops. The outer loop parses the string, character by character, while the inner loop extracts column values for the individual characters. When a column pattern is extracted from the CHAR_TABLE, it is sent, along with the current values of X and Y, to the PLOT_BYTE function.

Of course, before we can print, we need to set the screen to the proper graphics mode. For text, the monochrome screen value is 7, for graphics, we use the screen value of 6. Once you are in graphics mode, printing a string is as easy as including the statement: gpstr(x,y,"This is Text on a Graphics Screen");.

Notice that the screen coordinates are not character based, but

pixel based, so you could have overlapping characters. This can lead to spectacular effects in your programs. Figure 6 shows a complete program that displays text on the Portfolio's graphic screen. You should easily be able to adapt this to your own use.

Expanding Horizons

Now that you have the character tables and the routines to display them, why not get fancy? For example, to get double-width characters, print each column twice. If you try to print overlapping characters, the blank pixels of the character erase what is underneath them. If you want to eliminate that, simply avoid plotting any pixels that are of the value 0. Want to print sideways? Exchange the X and Y coordinates in the routines. How about half-height or half-width? Just display every other row or column, or both, for really tiny characters. The orientation and format of the characters are only limited by your imagination.

For an example of fancy printing on a graphics screen, download PBASIC from Compuserve, and run the sample program RUNMAN.BAS. This shows examples of underlining, reverse video, double width, double height, half width, half height, sideways and upside down printing. And the whole demo doesn't require much more code than what has been published here.

You can create different fonts or special characters for the Portfolio by changing the bit patterns in the CHAR_TABLE array. While a template of 6 by 8 will not allow for things like Old English Fonts, you can get Computer Text, OCR-Like fonts, and more. If you are really ambitious, you can make the individual characters as large as you like, though this will decrease the number of characters you can fit on the screen. On the other hand, reducing the width of the characters allows for more characters on a line.

Animation is another possibility. Just make a character bitmap for each "frame" in your animation, and print the characters in sequence on your Portfolio screen. That's how the little running man in RUNMAN.BAS was created. Another idea is proportionally-spaced fonts. Instead of printing out 6 columns for each character, which results in a monospaced display, just print columns until you reach a column with value 0. Narrow characters, such as 'I,' will occupy less horizontal space than fatter characters, such as 'M.'

To speed up the display of the characters on the screen, PLOT_BYTE and GPSTR could be combined into a single function. For best results, the code could be re-written in assembly language. ■

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FIGURE 6. A sample program that uses the above routines to print a message on the screen, in Portfolio graphics mode.

```
#include <dos.h>
#include "chars.c"

unsigned char get_video_mode(void) {
    _AH = 0x0f;
    geninterrupt(0x10);
    return(_AL);
}

void set_video_mode(unsigned char vm) {
    _AH = 0;
    _AL = vm;
    geninterrupt(0x10);
}

void plot_byte(int x, int y, int c) {
    int i;

      /* plot the column bit by bit      */
      for(i=0;i<8;i++) {
           /* set up for pixel write    */
           _CX = x;
           _DX = y;
           _BH = 0;
           /* extract a single bit      */
           _AX = 0x0c00+(c&1);
           /* write bit to the screen   */
           geninterrupt(0x10);
           /* shift byte to next bit    */
           c = c>>1;
           /* increment row position    */
           y++;
      }
}

void gpstr(int x, int y, unsigned char *gs) {
    unsigned char z;
      int i;

    /* While there is a character in the string     */
      while (*gs) {
           /* get the bit map column by column    */
           for(i=0; i!=6;) {
              /* get a column for the character */
              z=char_rom[(*gs * 6)+i++];
              /* and now, plot it on the screen */
              plot_byte(x++,y,z);
           }
           /* point to the next character in the */
           /* string.                            */
           gs++;
      }
}

void main() {
    unsigned char oldscr;  /* Save the Old Screen mode */

    oldscr = get_video_mode(); /* Save Screen Mode    */
    set_video_mode(6);         /* Switch to Graphics  */

    /* Display the message on the screen */
    gpstr(10,10,"This is a test");

    getch();                   /* Wait for a Keypress */
    set_video_mode(oldscr);    /* Reset Screen Mode   */
}
```

OBJECT-ORIENTED PROGRAMMING ON THE PORTFOLIO

by Zack Urlocker

ALTHOUGH MANY OF THE CONCEPTS OF OBJECT-ORIENTED programming originated on powerful workstations developed at Xerox Palo Alto Research Center (PARC), there's no reason they can't be used on even the tiniest of today's computers, including my favorite palmtop, the Portfolio. In this article, I'll explain the fundamental concepts of object-oriented programming and show how they're applied in writing a simple video poker game called Tahoe 5. The complete Tahoe 5 program and Turbo Pascal source code are available on the CompuServe Portfolio Forum (go APORTFOLIO from any CompuServe '!' prompt), or may be obtained directly from the author (see note at conclusion of article).

Why Objects?

Although structured programming goes a long way towards encouraging programmers to build efficient, reliable systems, these techniques ignore one important fact: it's generally easier to reuse something than to create something new from scratch. Object-oriented programming extends structured programming to allow you to create software components, known as objects, which can be reused across a variety of applications. The more reusable objects you have at your disposal, the less time you need to spend writing, testing and debugging new code.

There are three cornerstone concepts that describe object-oriented programming. These concepts are encapsulation, polymorphism, and inheritance. Encapsulation means that an object consists of both data and related functionality. We can think of an object as "smart data" since it has embedded functionality. For example, in the Tahoe 5 program, I defined a deck of cards as an object that contains data, including an array to keep track of the cards that have been dealt, and functionality in the form of procedures for initializing the deck and dealing the next card. In Turbo Pascal, an object definition is like a record definition, but it contains procedure headers for the object's functionality. For example, here's the definition of the deck as an object:

```
TDeck = Object
  dealt : array [0..52] of boolean;
  procedure init;
  function nextCard : integer;
end;
```

We can declare variables of type TDeck just like any other user-defined type. When we want to call one of the object's procedures, known as methods, we use the familiar dot notation. For example, I can declare a deck, initialize it and deal five cards as shown below.

```
Var
  MyDeck : TDeck;
Begin
  MyDeck.Init;
  for I := 1 to 5 do
    writeLn(MyDeck.NextCard);
...
```

Anything in a program that consists of data and related functionality can be defined as an object. In the Tahoe 5 program I created objects for the deck (TDeck), the cards (TCard), the poker game itself (TPokerHand), and for controlling the user interface (TDisplay). The most interesting of these is the TPokerHand object which contains the data for the game (such as the amount bet and cards dealt), plus the rules for dealing and evaluating the hand. The TDisplay object contains all of the code for managing the user interface, including handling keyboard input, displaying help messages, drawing the cards, etc. Since all of the user interface code is encapsulated into a single object, this is the only code that needs to be rewritten to port Tahoe 5 to another machine. The Cards and Poker units are shown

THE PORTFOLIO TURBO PASCAL UNIT

TAHOE 5 WAS WRITTEN USING BJ GLEASON'S Portfolio unit for Turbo Pascal. The Portfolio unit emulates many of the standard functions and procedures from the standard Crt unit and also provides many procedures to take advantage of the Port's unique capabilities. For example, there are functions and procedures for displaying menus, messages, changing the status line, and using the speaker. Some of the procedures are shown below.

```
PortBox (X1,Y1,X2,Y2,Border : Integer);
PortMessageWindow(X,Y : Integer; Title, Message :
String);
PortSetCursorMode (Mode : Integer);
PortStatusLine(X,Y,OnOff : Integer);
PortKeyClick;
PortDial(Number : String);
PortSound(Tone, Length : Integer);
```

In Tahoe 5, all of the user interface code is contained in the TDisplay object. This object uses mostly standard Crt procedures such as gotoXY, writeLn, readKey, etc. I also used a few of the Portfolio-specific procedures to provide more control over the cursor and to add some music. For example, if you win big, you'll hear a lively tune played as follows:

```
procedure soundWin2;
begin
  portSound(50, 15);
  portSound(48, 15);
  portSound(48, 15);
  portSound(50, 15);
  portSound(52, 30);
  portSound(52, 30);
end;
```

—Z.U.

in Listings 1 and 2, respectively.

Poly-what?

Polymorphism, the second cornerstone concept, comes from Greek and means literally "many shapes." We use the term to describe the fact that different objects can respond to the same generic method call in different ways. For example, I could have a different type of card deck, perhaps a pinochle deck, which would define its own init and nextCard procedures. Even though a pinochle deck might be stored differently in memory (using a larger array), it can use the same names for its methods.

In one sense, you can think of polymorphism as allowing us to define objects that share a common protocol of methods, much like you might have different hardware components that all connect to a standard serial interface. The benefit of polymorphism is that you can create objects that are "plug compatible," since they respond to the same method calls. That allows you to write more maintainable code, since you tell the objects what to do using a generic method call, and the objects themselves handle the details of how to do it. Polymorphism is implemented in Pascal by declaring methods to be "virtual," so that a generic method call can be used.

Inheriting Code

The third cornerstone concept is inheritance. Inheritance allows us to create new objects from existing ones. This makes it easy to create objects that are just

Listing 1. The Cards unit from Tahoe 5

```
Unit Cards;

const faceDown  = 0;
      hearts    = 1;
      diamonds  = 2;
      clubs     = 3;
      spades    = 4;

type

{ Card object }
TCard = Object
  face : 0..13;
  suit : 0..4;
  procedure init;
  function val : integer;
  procedure setCard(f, s : integer);
  procedure setVal(v : integer);
end;

{ Card deck object for dealing cards }
TDeck = Object
  dealt : array [0..52] of boolean;
  procedure init;
  function nextCard : integer;
end;

implementation

{ Initialize a new card face down }
procedure TCard.Init;
begin
  face := faceDown;
  suit := faceDown;
end;

{ Return a numeric card value 1..52 or 0 for face down }
function TCard.val : integer;
begin
  if face = faceDown
  then
    val :=  faceDown
  else
    val := (suit - 1) * 13 + face;
end;

{ Set a particular card }
procedure TCard.setCard(f, s : integer);
begin
  face := f;
  suit := s;
end;

{ Set a particular card value }
procedure TCard.setval(v : integer);
var adj : integer;
begin
  face := (v mod 13);
  if face = 0  then
  begin
    face := 13;
    adj := 1;
  end
  else
    adj := 0;
  suit := (v div 13) + 1 - adj;
end;

{ Initialize a new shuffled deck so all cards exist }
procedure TDeck.Init;
begin
  randomize;
  fillchar(dealt, sizeOf(dealt), false);
end;

{ Draw the next card from the deck }
function TDeck.NextCard : integer;
var card : integer;
begin
  repeat
    card := random(51)+1;
  until not dealt[Card];
  dealt[Card] := true;
  nextCard := card;
end;

begin
end.
```

FIGURE 1. Tahoe 5 on the Portfolio. Do you feel lucky?

like existing ones, but a little different. For example, if I wanted to create a poker game that plays "deuces wild" instead of 5 card poker, I could just create a new object that inherits from the standard TPokerHand object and defines different methods for evaluating the hand. The rest of the code, for dealing, holding, initialization, etc., would be inherited automatically.

Here's how we declare an object type that inherits from an existing one:

```
{ An object which inherits much of its behavior }
TDeucesWildHand = Object(TPokerHand)
  procedure eval; { evaluate the hand differently}
end;
```

Note that we don't have to copy any of the code from the ancestor object type TPokerHand. The compiler takes care of these details for us.

Inheritance makes it possible to easily customize applications for different needs without rewriting code. The more you use object-oriented programming, the more adept you become at creating reusable objects that can be extended via inheritance.

Learning More

The concepts of object-oriented programming are straightforward and, in some ways, deceptively simple. The real challenge comes in applying the concepts to a programming problem and creating your own reusable objects.

I invite you to explore the code for Tahoe 5 and come up with your own variations by using the three cornerstone concepts of encapsulation, polymorphism, and inheritance. If you've been waiting to break into object-oriented programming, or programming your Portfolio, now you've got a perfect reason to do both. ■

ABOUT THE AUTHOR

Zack Urlocker is product manager for Turbo Pascal at Borland International and has taught object-oriented programming to thousands worldwide. The author appreciates the kind support of BJ Gleason for his Turbo Pascal Portfolio unit. The Tahoe 5 program and source code may be obtained by sending $10 US to the author at P.O. Box 67301, Scotts Valley CA, 95067 USA. Add $5 for shipping outside North America.

Listing 2. The Poker unit from Tahoe 5.

```
Unit Poker;

interface

uses Cards;

const
  nothing      = 0;
  jacks        = 1;
  twoPair      = 2;
  threeKind    = 3;
  straight     = 4;
  flush        = 5;
  fullhouse    = 6;
  fourKind     = 7;
  straightflush = 8;
  royalflush   = 9;

type

{ The poker hand game as an object }
TPokerHand = Object
  deck : TDeck;
  Balance : integer;
  cards : array[1..5] of TCard;
  held : array[1..5] of Boolean;
  val : 0..9;
  bet : integer;
  procedure init;
  procedure deal;
  procedure hold(card:integer);
  procedure eval;
end;

implementation

{ Deal 5 cards face down from new deck}
procedure TPokerHand.init;
var i : integer;
begin
  deck.init;
  bet := 10;
  for i := 1 to 5 do
  begin
    cards[i].init;
    held[i] := false;
  end;
end;

{ Deal new cards for those not held }
procedure TPokerHand.deal;
var i : integer;
begin
  for i := 1 to 5 do
    if not(held[i]) then
      cards[i].setVal(deck.nextCard);
end;

{ Hold or discard a particular card }
```

```
procedure TPokerHand.hold(card:integer);

begin
  held[card] := not(held[card]);
end;

{ Evaluate the hand }
procedure TPokerHand.eval;
var i,j,k,m : integer;
    diff,acesHigh : integer;
    flushed, straighted : boolean;
    Locard, HiCard : TCard;
    diffs : array[0..4] of boolean;
    MatchFace : array[1..2] of integer;
    MatchLen  : array[1..2] of integer;
    match : integer;
    matchedYet : boolean;

begin
  val := nothing;
  { Check for flush }
  flushed := true;
  for i := 1 to 5 do
    flushed := (cards[i].suit = cards[1].suit) and flushed;
  if flushed then
    val := flush;

  { Check for straight }
  HiCard.init;
  LoCard.init;
  LoCard.setval(52);
  for i := 1 to 5 do
  begin
    if cards[i].face > HiCard.face then
      HiCard := cards[i];
    if cards[i].face < LoCard.face then
      LoCard := cards[i];
  end;
  fillChar(diffs, sizeOf(diffs), 0);
  straighted := true;

  if (LoCard.face = 1) and (HiCard.face = 13) then
    AcesHigh := 1
  else
    AcesHigh := 0;
  for i := 1 to 5 do
  begin
    diff := AcesHigh + HiCard.face - cards[i].face;
    { Treat Ace as high card if necessary }
    if (cards[i].face = 1) and (Hicard.face = 13) then
      diff := 0;
    if diff > 4 then
      straighted := false
    else
      if not diffs[diff] then
        diffs[diff] := true
      else
        straighted := false;
  end;

  if straighted then
    val := straight;
  { Check for straight flush, royal flush }
  if straighted and flushed then
    val := straightflush;
  if (val = straightflush) and (AcesHigh = 1) then
    val := royalflush;

  { Check for 2, 3 or four of a kind }
  match := 0;
  fillChar(matchLen, sizeOf(matchLen), 0);
  fillChar(matchFace, sizeOf(matchFace), 0);

  for i := 1 to 5 do
  begin
    for j := 1 to 5 do
    if (cards[i].face = cards[j].face) and (i <> j) then
    begin
      matchedYet := False;
      k := 1;
      while (k <= match) and not(MatchedYet) do
      begin
        if matchFace[k] = cards[i].face then
          matchedYet := True;
        inc(k);
      end;
      if not(MatchedYet) then
      begin
        inc(match);
        matchFace[match] := cards[i].face;
        inc(matchLen[match]);
      end
      else
        inc(matchLen[match]);
    end;

  end;

  { flush is better than 2 pairs }
  { Check for two pair, full house }
  { MatchLen will be n*(n-1) for any sequence of n }

  if (match=2) then
    if matchLen[1] + matchLen[2] = 8 then
      val := fullhouse
    else
      if not flushed then val := twopair;

  if (match=1) then
  begin
    if (matchLen[1] = 2) and
      (matchFace[1] = 1) or (matchFace[1] > 10) then
      val := jacks;
    if (matchLen[1] = 6) then
      val := threekind;
    if (matchLen[1] = 12) then
      val := fourkind;
  end;
end;

begin
end.
```

REVIEW

Liven up that document or report with this impressive graphics package.

1st Graph

by Peter Donoso

REPORT-WRITERS AND SUSHI-CHEFS AGREE: raw data is like raw fish. Unless you cut it up and make it pretty, people won't want to have anything to do with it. Luckily, it's a lot easier to produce attractive presentations than it is to turn loathsome sea-borne dead things into chrysanthemums; especially when you've got your trusty Atari—and 1st Graph—on hand.

1st Graph starts out by giving you a leg up on data analysis: accepting raw numeric data and churning out a wide variety of charts and graphs. These basic forms can then be sized, scaled, labeled, colored, and otherwise enhanced to produce presentation-quality illustrations.

GDOS Required

1st Graph requires GDOS (or a compatible product, such as CodeHead's G+Plus) in order to perform its sophisticated text- and graphics-handling, and will not run if this software enhancement is not installed. Performance will improve under Font GDOS, Atari's latest revision (recently made available for download from the GEnie information service), and will reach new heights under FSM/GDOS, when Atari releases the eagerly-awaiting font-scaling upgrade, later this year.

1st Graph's work area comprises a data window where numbers and text can be entered and a graph window where output is displayed and graphic editing takes place. The data window is divided into columns, each of which permits entry of a single datum and its associated label. Only twelve characters may be entered per column field, though this is more of a problem for labeling than data-entry, since exponential notation is supported for very large or very small values. Additional columns can easily be added, letting you graph more elements than the program's defaults allow. And cut-and-paste functions let you move data from column to column, controlling the location of bars, columns, etc. in the final graph.

Selecting "Graph It!" causes the appearance of an icon menu from which one of 16 basic graphs can be selected. Next, you're shown a window where you can determine whether your data will be displayed on the X or the Y axis. Depending on the type of graph selected, data sets with negative or missing values may be impossible to display; and warnings may appear to inform you of an invalid graph selection. If all choices are valid, your data will be transformed almost instantaneously, and the resulting graph will appear in a window. The process of graph type selection and data orientation is sufficiently rapid that you are encouraged to "audition" several types of graph before selecting the one that best displays your data.

✔ 1ST GRAPH
Requirements: 1 MB RAM, double density disk drive.
Summary: First-class presentation graphics!
Manufacturer:
ABC Solutions
4040 Creditview Road, Unit 11-151
Mississauga, Ontario, Canada L5C 3Y8
(416) 824-8484
Price: $79.00

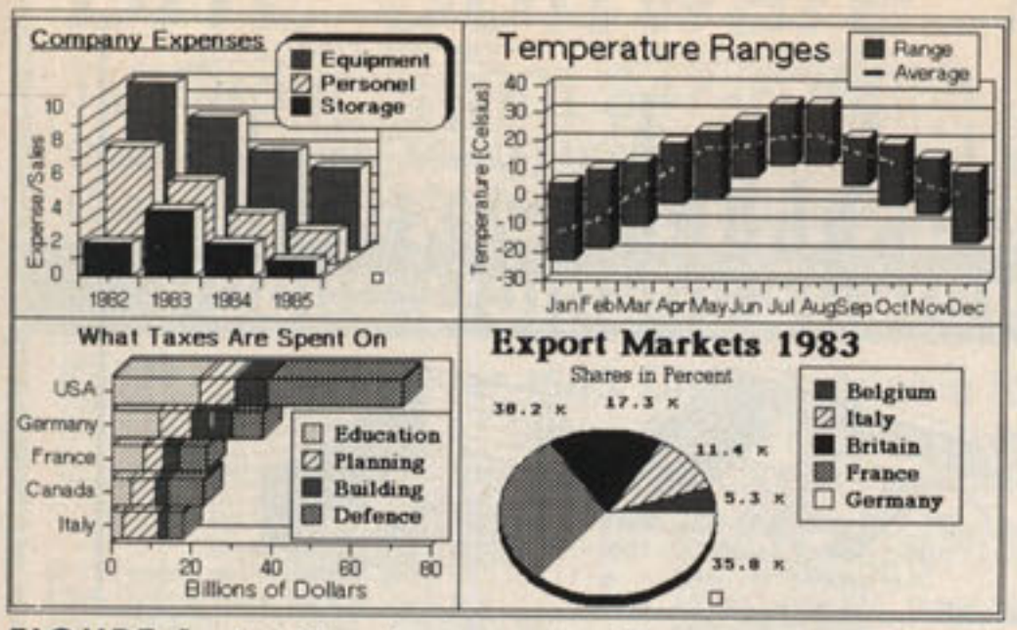

FIGURE 1. 1st Graph supports all common styles of presentation graphics: bar, stagger, pie charts, and more.

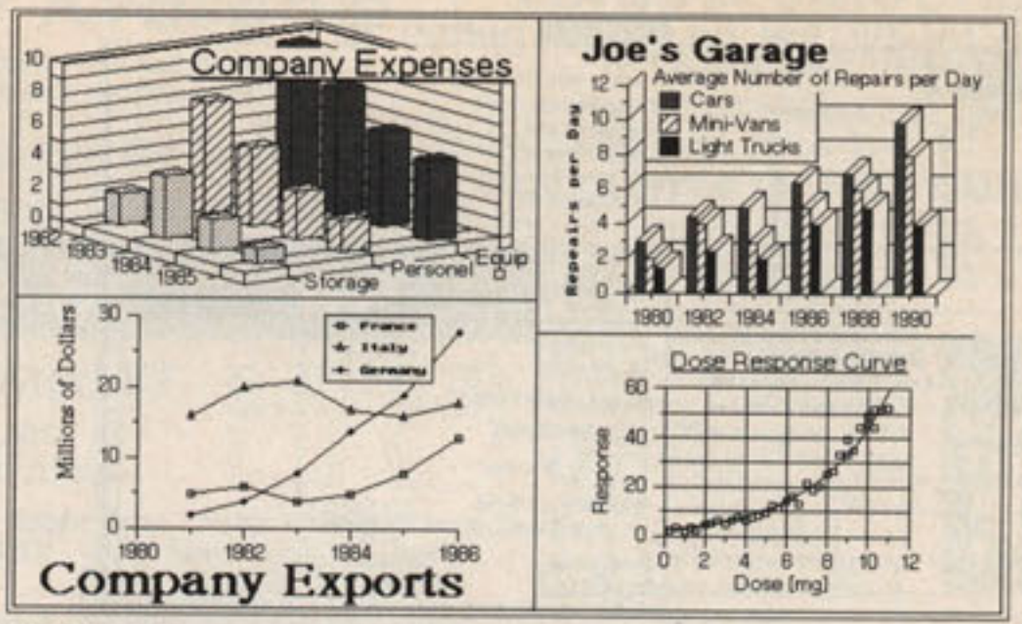

FIGURE 2. More advanced types of graph are also supported. Full 3-D and scientific curve-fit graphs are a snap!

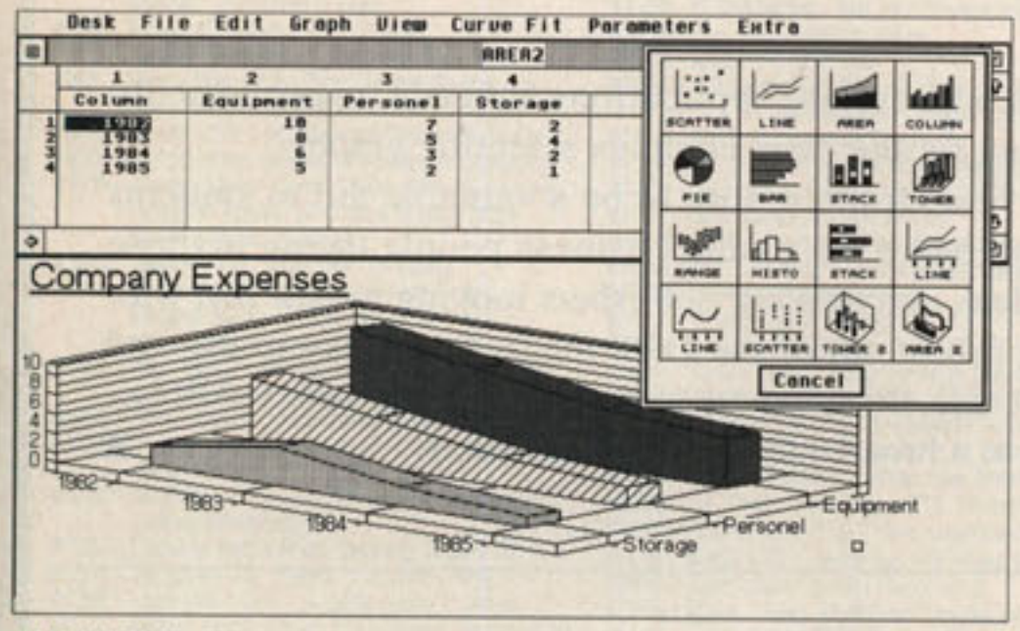

FIGURE 3. From data-entry to graph is just one step (plus a jump through the graph-type selection dialog).

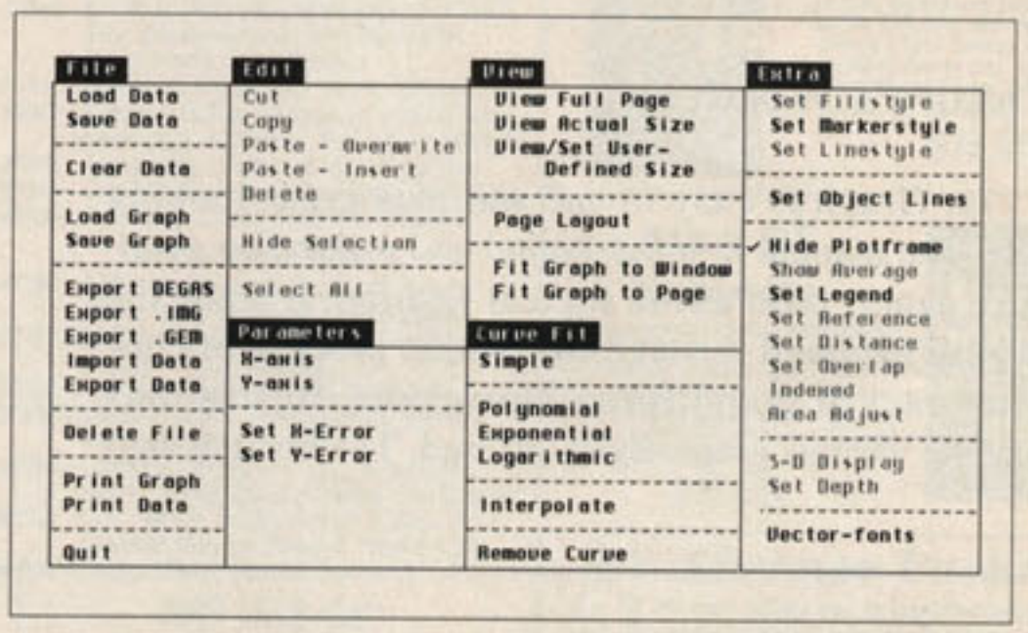

FIGURE 4. Depending on the type of graph you select, certain menu options may or may not be selectable.

Labels and data values entered in the data window become fixed aspects of the resulting graph, and can only be changed by editing the original values and regenerating the graph from scratch. However, a wide variety of "post-editing" features are available for adding further information to a basic graph, and enhancing its appearance. You can alter the size and position of the graph on the virtual page, add titles or other text, and produce a "legend" or "key" that identifies fill, cross-hatch, and other patterns in the final product. These patterns can be edited at will, as can line styles, colors, marker types, and other graphic elements.

1st Graph also offers a set of higher-level functions that assist in producing certain specialized types of graph. A Curve Fit function, which works only with Scatter-plots, helps you locate curves relating different sets of data points. A 3-D toggle function, relevant to tower and area graphs, transforms flat images into 3-D perspective views by adding shadows. The 3-D view can then be refined by altering shadows, item spacing, and other elements used to create the impression of depth.

Certain 3-D-enhanced graphs can be further adjusted by rotating them through 360 degrees, finding an angle at which foreground objects do not obscure background objects. Rotation is managed via a simple, click-and-drag mouse interface.

Text and Printing

Thanks to GDOS, 1st Graph offers spectacular text-handling capabilities. Horizontal or rotated text can appear plain or in boldface, outlined, underlined, or in italics; and any standard GDOS font can be used to add text to a graph, provided an equivalent printer font is available.

Fonts and their attributes are selected from a dialogue box that pops up automatically when you double-click on your graph to establish a text-insertion point. There's no apparent limit (except for legibility) to the amount of text you can add. In anticipation of FSM/GDOS, 1st Graph even provides an internal vector font that can be used as a placeholder when preparing graphs for export as GEM metafiles. This text can be replaced with more attractive vector fonts when the output metafile is imported to a vector drawing program.

Printing is also accomplished through GDOS, so 1st Graph can support the maximum resolution of your output device, producing clear, detailed output. In addition, 1st Graph can export graphs as Degas .PI2 and .PI3 files, monochrome .IMG files, and the abovementioned GEM metafiles, as well as files in its own format. Only these last, however, can be loaded by 1st Graph for further editing.

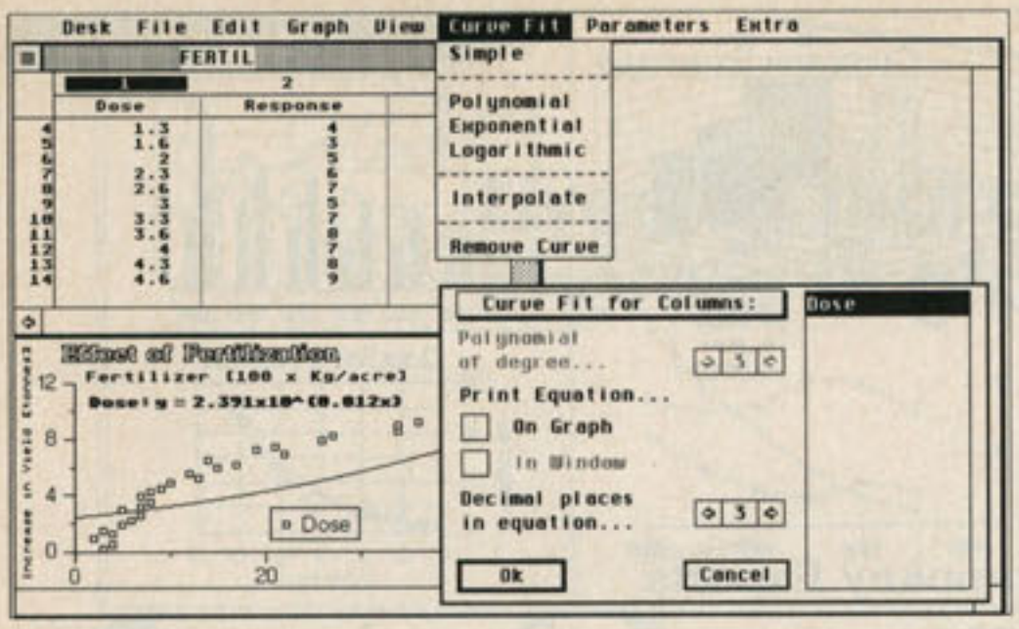

FIGURE 5. The Curve Fit menu offers an impressive number of options for displaying data.

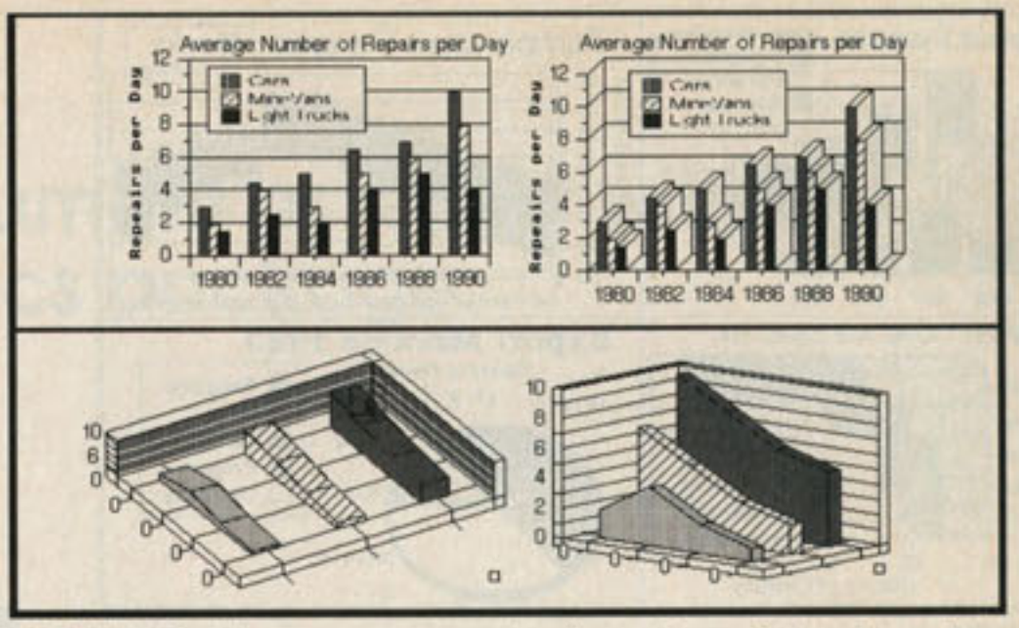

FIGURE 6. Change perspective from 2- to 3-D, then alter viewpoint with a mouse-click (and drag).

A Picture's Worth ...

1st Graph is easy to use and gets great-looking results. The manual is spiral-bound and printed on good-quality paper. Laid out in logical fashion, it leads the reader by the hand through the simple process of converting data to graph form. Numerous illustrations clarify the various graph styles offered. The manual suggests appropriate applications for each, especially important for the more complex scientific graphs.

1st Graph is sure to be a valuable aid to students trying make the grade, business people trying to close the deal, and desktop publishers looking to pull that winning rabbit out of the DTP magic hat! Easy to use and powerful, this general-purpose graphing utility will appeal to a broad audience of Atari users. ■

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#514 - Monochrome Emulator V3.0
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#1267 - Atari Advanced Hard Disk Utilities
#1300/1301 - *Atari ST Topics* (Book) Programs
#1304 - GFA Basic Utilities
#1310 - Virus Killer Programs
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#895 - PageStream V1.8 Demo (DBL)
#935 - *Desktop Publishing Utilities*
#1028 - ***PageStream Font Editor V0.8***
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#1297 - FP Print - Speeds up PageStream output
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#1436/1437 - Megapaint Pro Demo 4.0 (Mono/DBL)
#1438 - Genus Font Editor Demo for Calamus Fonts
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#599 - Binner, Futura Black, Hal, Lubalin, Futura Extra Bold Condensed
#870 - Atari, Baby Teeth, Lucida, Old English
#1044 - Adverse, Barnum, Burlington, Oblique, Caligraphy 2, Celtic, Chancery, Chicago, Dingbat, Flash, Harloe, Olympia, Souvenir Medium, Souvenir Medium Italic
#1094 - Architect, Avant Guard, Bookman, Broadway, Chancery, Dingbat, Kibo, Oakville, Palatino, Western
#1336 - PageStream V2.1: Roosth, Saintf, Sansser, Sharkt, Style, Toulouse, Windsor, Zalesk

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#1341 - Flintstone, Franktimes, Helena, Griffdin
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#1356 - Ambrocap, Dubiel, Flinstone, Middleton

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#1150 - Architect, Broadway Engraved, Counter Point, Fancy Chancery, Swiss Medium
#1153 - Lucifer, Bodoni, Bodoni Italic, Drurylane, Drurylane Italic, Hallbats
#1179 - Complete Glib font from FontAbility
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#1223 - Chicago, Cornet, Cursive, Gaudy Cond, Gallia, Gillies, Goudy, Legend, Old English
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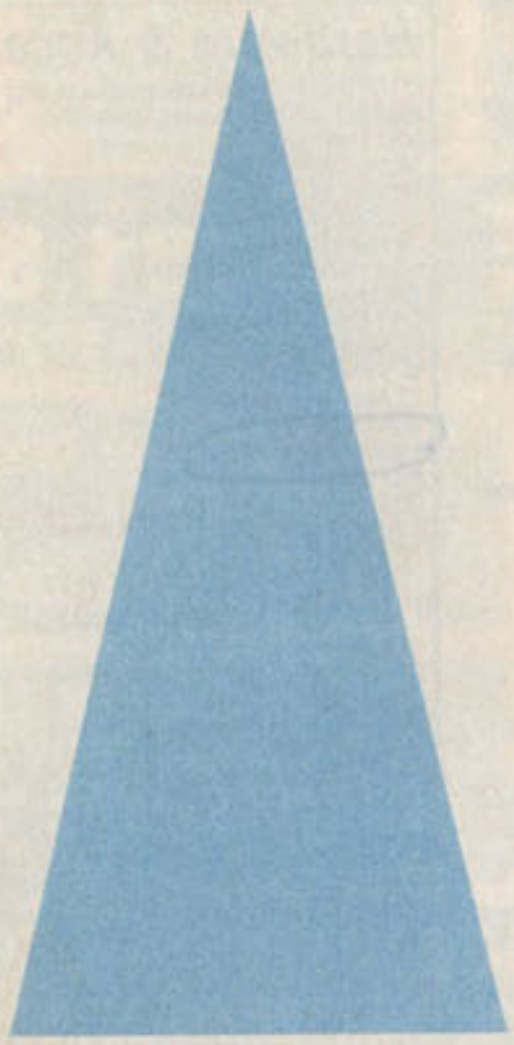

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