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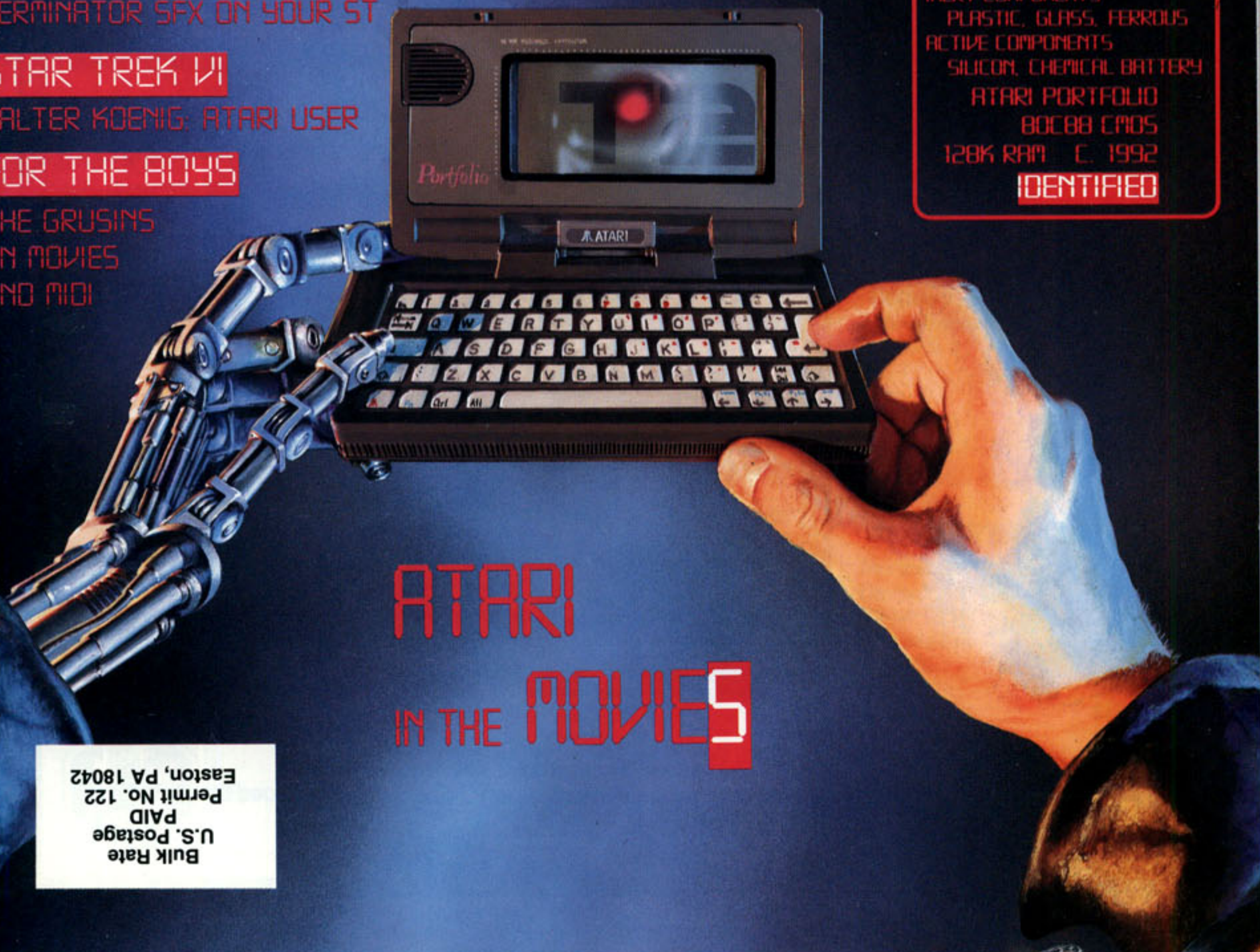
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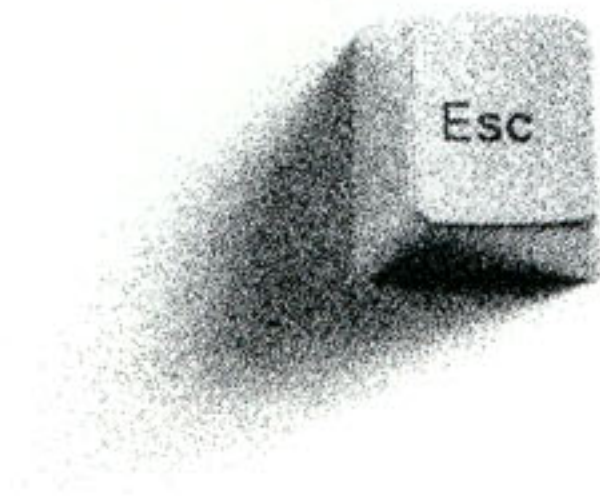
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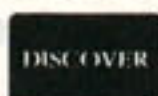
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EDITOR'S NOTE

John B. Jainschigg

EVERY YEAR, ABOUT THIS TIME, computer magazine editors begin a ritual pondering and post-mortem of the past twelve months, with an eye to labeling the year in question. Was 1991 "The Year of Direct-to-Press Solutions?" Was it "The Year of AEGIS and the Atari Professional Systems Group?" Hmmm ... 1991 saw the biggest Glendale and WAACE shows, ever; and the recent Chicago AtariFest broke new ground in Atari-sponsored events. Should we call '91 "The Year of User-Group Shows?"

What about hardware? During '91, Atari delivered on its promise to prioritize the U.S. market, bringing the Mega STe and Class-B certified TT030 to American users. FSM/GDOS is now in release, TT Unix V.4 has been shipped to developers, and the long-awaited CDAR CD-ROM drives have begun appearing in American hands. Was 1991, therefore, the year of "Atari in America?"

What about entertainment? The Atari Lynx made an extraordinary showing in 1991. Readers of *Videogames and Computer Entertainment* voted Lynx a two-for-one "must buy" favorite over Nintendo's Game Boy, and over 30 new titles are presently available for

the machine, with more on the way. Was 1991 "The Year of Lynx?"

Lights, Camera ...

This past Summer, Atari scored an extraordinary coup when its Portfolio pocket computer appeared in *Terminator 2: Judgment Day* — a sci-fi classic, and one of the top-grossing films in history. Timed to follow on the heels of T2's U.S. video release, this issue of Atari Explorer focuses on Portfolio's role in helping to articulate director James Cameron's probing and sophisticated vision of technology and human responsibility. Brian Gockley's critique of *Terminator 2* is pretty heady stuff, but well worth reading if you care about modern cinema, high tech, and the perils and promises of tomorrow.

T2's special video and computer-graphic effects made movie history — but did you know you could generate similar effects at home, on your ST? In an interview, Lee Seiler, award-winning computer animator and president of Lexicor software, tells how to use Chronos-3D Animator and companion products to generate *Terminator 2*-style morphing, "liquid metal," and other effects.

In other movie news, December saw the release of *Star Trek VI: The Undiscovered Country*, starring the original crew from Gene Roddenberry's classic TV Series. And guess what? Walter Koenig, who as Chekov, plays a central role in *Star Trek VI*, is an Atari user! In a probing interview, Atari's Mike Fulton talks with Koenig about *Star Trek* and other current projects, and learns why the Mega STe is such a favorite of star

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LETTERS

Psygnosis Comes Through!

Dear Editor,

Thank you for reviewing Psygnosis Ltd. software under ST Game Reviews in your Summer, 1991 issue. I had a problem with a Psygnosis game. I had written to Psygnosis in the U.K., but the software remained unusable. Then I saw Psygnosis' U.S.A. distributor's address in your magazine.

I wrote to them, and they were quick to resolve the problems with my game! Thank you, Psygnosis U.S.A., for your solution — it allowed me to see just how good Psygnosis games are: well worth the price! And thanks, Atari Explorer, as I would still have an unplayable

game, had it not been for your magazine!

Warren Schilling
Hercules, CA

We agree that Psygnosis games are well worth the price! This innovative company is planning some amazing new games for '92, and we'll be reviewing them as soon as they hit U.S. shores. Stay tuned!

Monterey Bay

Dear Editor,

I am particularly interested by the article "Power-BASIC for Portfolio" in your September issue. The software package for using a Tandy Portable Disk Drive 2 with the Portfolio is also very tempting. I would be obliged if you could forward the address of Monterey

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NEWS & NEW PRODUCTS

CODEHEAD ANNOUNCES GENUS FONT EDITOR, ACQUIRES CHERRY FONTS

CODEHEAD GT has announced the next release in their new line of graphics tools — Genus, a full-featured font editor for Calamus typefaces! To go with the new font editor, CodeHead has also acquired the Cherry Font collection, a complete line of top-notch Calamus fonts.

Genus features a Calamus-like user interface, with on-screen command icons and pass-over help displays. You manipulate fonts simply by dragging points, lines, and curves around. And many of Genus's features are specially designed to aid in the creation of vector fonts, like the ability to automatically generate smooth curves with one simple command, as well as unique global and optical kerning methods. Genus offers easy cross-hair and alignment rulers, four user-alterable zoom levels, the ability to load two fonts at once and

transfer characters between them, a full-function calculator for determining rotation, italics, mirroring, and expansion/condensation parameters, the ability to load scanned bitmap images for tracing, and more! The program comes with five free fonts, including Calais Medium and Italic, Cherry Stems (dingbats), Chisel Nib Black, and Punch. (\$175)

The Cherry Font collection, which Gribnif will now be distributing, is one of the best-known collections of Calamus fonts. Each scalable outline font has been carefully drawn by type professionals and hand-spaced for best appearance. (\$42.95 per font pack; 13 packs)

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GBUG

IS IT A NEW VIRUS? A high-tech mouse? No, it's a user group for those of us that are buggy about GFA Basic. The acronym stands for GFA Basic User's Group and members receive a bi-monthly "diskazine." That is to say a newsletter plus 3-1/2" DSDD disk with news, programming, tips, members' feedback and lots of GFA Basic source code.

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MAXWELL C.P.U.'S Silhouette

MAXWELL C.P.U. has announced Silhouette, a bit-image vector-graphics program with an auto-tracing feature that allows you to convert bit-image drawings to vector graphics in GEM or DXF formats, allowing compatibility with vector graphics packages such as Calamus. Silhouette can load and modify Degas, .IMG, MacPaint, and TINY bit-image files. Version 1.05, which runs on the ST and TT in ST High Resolution, is now shipping, and inexpensive upgrades are promised on a regular basis! (\$69.95)

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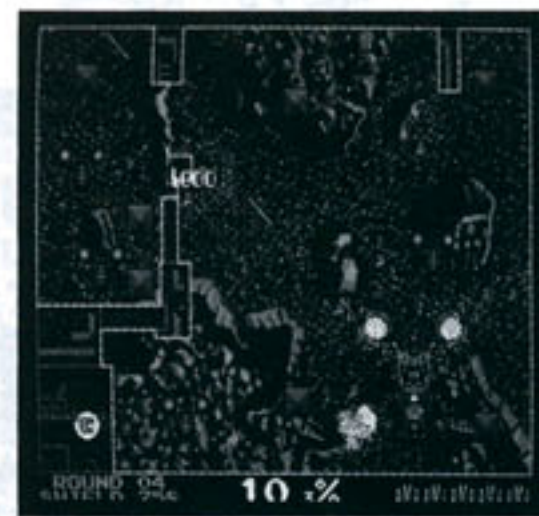
HOW MUCH more straightforward can you get? GOOD Backup Utility is the name of this full-featured hard disk utility from Tidbit Software Engineering. Tidbit's program offers an easy-to-use interface that lets you copy data from any active hard drive partition to a saveset on a single or double sided floppy, to a removable cartridge drive, or to a shadow partition on another hard disk unit. Backing up goes quickly because the program will only copy files that have actually been changed and because write back disk cache technology is used to minimize hard disk head motion. Backups can even be interrupted and resumed! (\$29.95)

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READYSOFT PRESENTS ...

MORE EMPIRE SOFTWARE! Fresh from the success of Team Yankee, which premiered last Summer, Readysoft has announced release of four more Empire Software games: Volfied, Sleeping Gods Lie, Eye of the Storm, and International Sports Challenge. All are priced from \$39.95 to \$49.95. Volfied is a brilliant conversion of the action sci-fi arcade classic. Sleeping Gods is a fantasy adventure, featuring 94 landscapes through which you must travel to find the Ring of Annihilation. Eye of the Storm is a surrealistic future scenario in which you must penetrate a "law-free" zone set aside by a complacent populace hungry for violent entertainment. International Sports Challenge is a comprehensive sports simulation, featuring 6 sports and 21 separate events, including swimming, diving, cycling, horseback riding, shooting, and running.

**READYSOFT, INC., 30 Wertheim Court, Unit 2
Richmond Hill, Ontario, Canada, L4B 1B9, (416) 731-4175**



VOLFIED

TT Touch from Best

A NEW ST KEYBOARD enhancement was introduced by Best Electronics at the Glendale Atari Show. The enhancement, called TT Touch, gives a slightly firmer feel to the keyboard and returns a positive "click" when a key is pressed. According to Brad Koda, the enhancement will decrease the number of missed keystrokes due to lack of tactile feedback in the unmodified keyboard. Installation is said to be no more difficult than changing a tire.

TT Touch replaces the ST's keyboard contacts with high grade silicone units. Installation requires removing the keyboard from the case, which will void any remaining warranty. Using a Phillips screwdriver, approximately 27 screws are then removed from the back of the keyboard. All of grey/black contacts are removed and the red "TT" silicone contacts are put in their places. (\$44.95)

**BEST ELECTRONICS, 2021 The Alameda, Suite 290
San Jose, CA 95126, (408) 243-6950**

LYNX Newsletter Debuts!

A NEW ATARI LYNX newsletter has hit the stands. Gamemaster. Published by Computer Publications, Ultd. (ST Connection), the newsletter includes reviews, "Tips, Hints and Secrets" and game ratings as provided by reader mail.

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STERLING Qwikforms

STERLING CONNECTION is officially announcing a new product it released last year: Qwikforms for PageStream, a collection of ready-made forms and layouts designed to simplify the production of standard business forms, legal forms, newsletters, charts, flyers, brochures, calendars, resumes, stationery, greeting cards, menus, and other formulaic printed matter. Requires PageStream 1.5 or later. (\$39.95)

**THE STERLING CONNECTION
Box 4850, Berkeley, Ca 94704
(510) 655-2355**

FROM A TO Z'S BY ZUBAIR

SOME OF YOU MAY ALREADY be familiar with Z-Keys, by Zubair Interfaces, a hardware device that allows you to hook up an IBM keyboard to your Atari ST or STe. To get full use of the IBM enhanced keyboard, Z-Keys has now added a companion software driver that maps HELP and UNDO functions to the F11 and F12 keys. It also activates the numeric keypad so that users can take advantage of calculator-style programs. Z-Keys is currently on special for \$79.95. A combo package of Z-Keys plus an IBM keyboard is specially priced at \$129.95. If you are already a registered user of Z-Keys, you will be getting a free updated disk with the new software driver in the mail.

Zubair is also announcing the release of an STe version of ST/ime, their internal hardware clock/calendar module. Z-Ram board prices have also been reduced, making a solderless memory upgrade, complete with one-year warranty, even more affordable.

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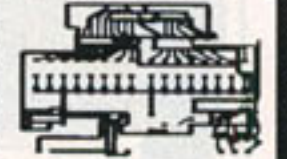
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A convenient address-book/calendar that works as program or accessory

CardFile 3

by Dave Plotkin

Gribnif's CardFile 3 is an address book and appointment calendar program with a well-designed user interface and some innovative features. It can be installed either as a program or as an accessory, though certain of its features — notably the ability to export address text directly to a running application — are available only in the latter case.

The main window of CardFile 3 displays the current address card. Underneath are a set of buttons that let you move forward or backward through all cards currently in memory (or merely those of a selected group — see below). At the right are option buttons that let you edit and delete cards, set a card filter (see below), work with files, print, dial the phone, move to the calendar portion of the product, and configure the program.

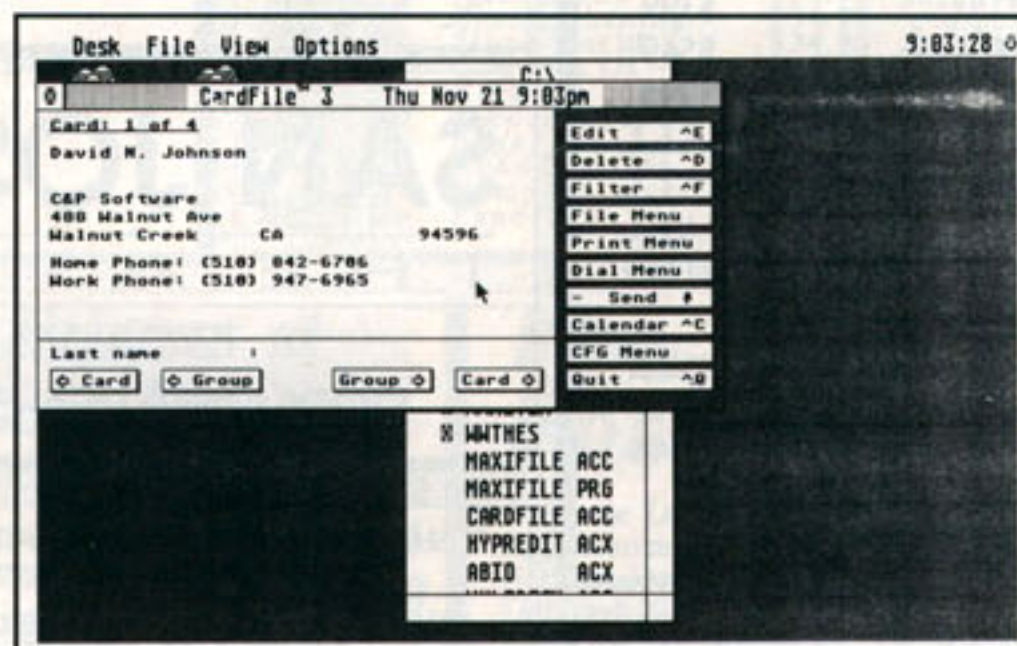


FIGURE 1. The address book portion of CardFile 3 lets you enter names and addresses for future use.

MANUFACTURER:
Gribnif Software
P.O. Box 350
Hadley, MA 01035
(800) 284-4742
PRICE: \$39.95

Address Book

CardFile's address form has spaces for name, title, company, address, two phone numbers, comment, and group — the last a text field, used to identify related cards (family members, employees of the same company, providers of a common service, etc.) Though the empty form bears a passing resemblance to a dialog box with editable fields, CardFile's editor has certain convenience features the GEM editor lacks — for example, you can move from one field to another, using the arrow keys. Once you have chosen to edit, buttons are displayed that let you create a new card or edit the current card. Modified cards can replace original records, or be added to the database as new items.

Searching and subgroup selection is carried out by setting a card filter: filling in fields on a blank card, and telling CardFile to select cards meeting any or all of the values entered. Partial matches (e.g., entering "Li" in the filter's name field will match with "Lisa") are required, though the system does not let you search for a range of values, multiple values for the same field, or use subtler "wildcard" expressions. Once a subset of cards has been marked, all further operations (such as printing) will only affect selected cards.

CardFile's File menu lets you load and save card files, purge sections of files from memory, and merge multiple files together. The Print menu lets you print out the contents of your address book in four formats: a pocket address book suitable for carrying, a phone list, labels, and batch envelopes. Report formats can be configured to print on any size stock, though because the print function is tersely documented, using it can be challenging.

Calendar

CardFile's calendar displays the current month, with the current date highlighted. Buttons let you move to other months or years. By clicking on a date, you open an address book page on which you can enter appointments, each on a single line, along with a time. Once an appointment is entered, it cannot be edited — to change it, you must delete and reenter it. Daily agendas can be printed, though there is no way to collectively print all agendas for a week or month. The calendar function supports a reminder function that works when you boot your computer (or when you run CardFile in its program version). If the reminder function is active, a series of alert boxes pop up to remind you of the day's appointments.

Overall, CardFile 3 is a very useful program for tracking names, addresses and phone numbers, as well as appointments. As mentioned above, there are some things that could be easier to use, but this program/accessory will definitely make you more productive. ■

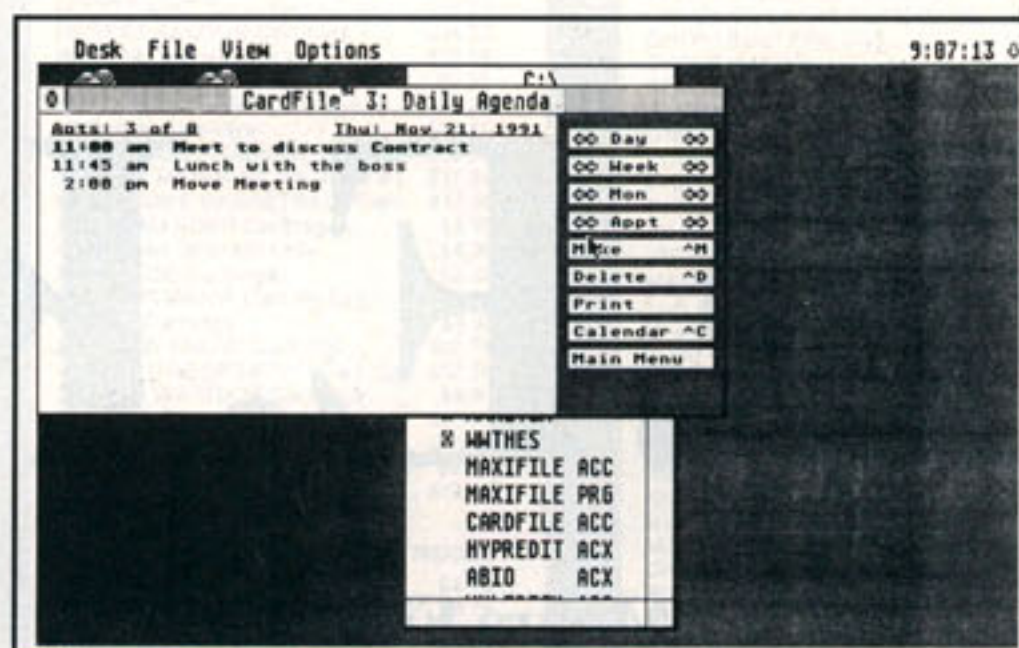


FIGURE 2. The agenda card (which you reach from the calendar) lets you put down all your appointments for the day.

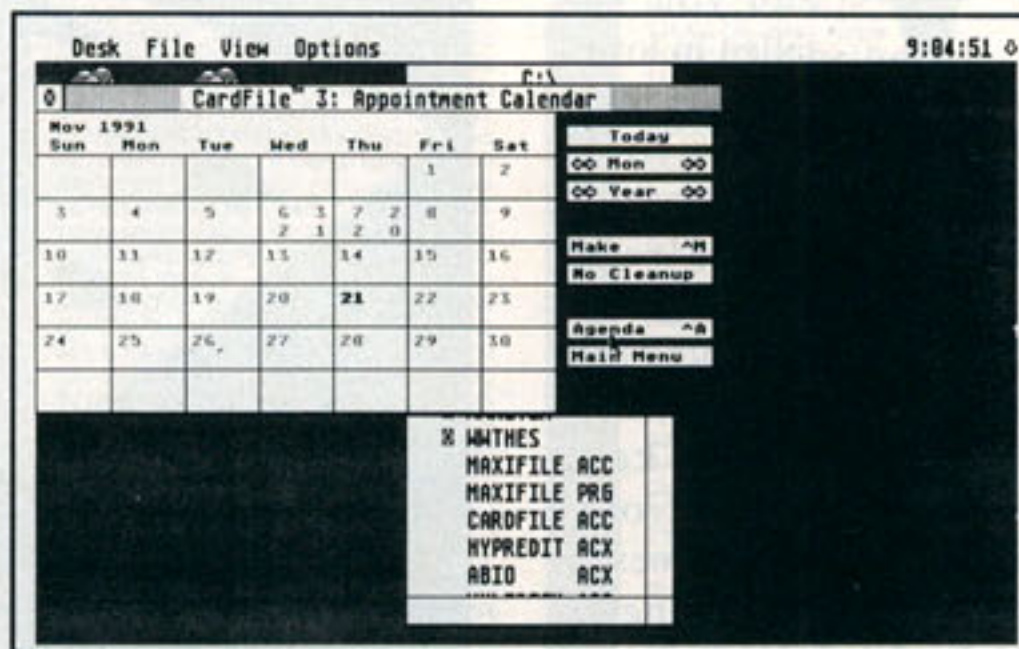


FIGURE 3. The calendar shows the days for the currently-selected month and lets you go to the agenda to input appointments.

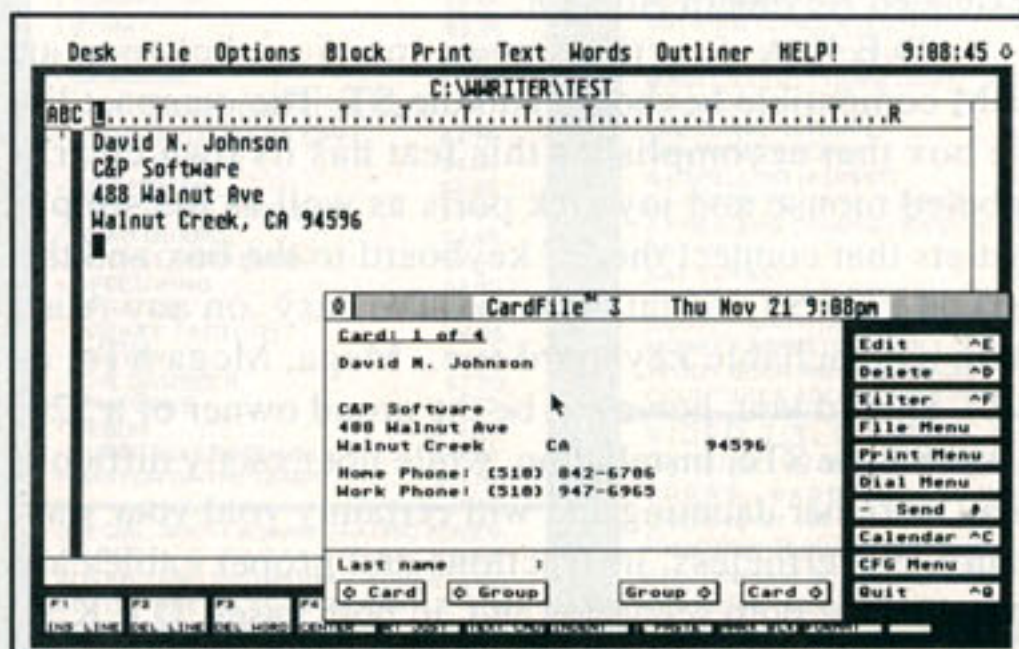


FIGURE 4. With the SEND command, you can automatically put a name and address into a word processor document.

Connect a PC-compatible keyboard to your ST!

D.E.K.A.

by Maura Fitzgerald

You're an incredible touch typist and you've fallen in love with the feel of your IBM compatible keyboard. Or, perhaps you're a lousy typist and your fingers get frustrated by the different placement of the backspace key when you switch from one keyboard to the next. Well, if you're finding it tricky for any reason to switch back and forth from one machine to the other, you can now hook up your AT or XT keyboard to your Atari ST using D.E.K.A.—the Detachable Extended Keyboard Adaptor.

D.E.K.A. functions as an interface between an IBM compatible keyboard and the ST. The compact little box that accomplishes this feat has its own clearly labeled mouse and joystick ports as well as the simple outlets that connect the PC keyboard to the box and the box to your ST. Installation is quite easy on any Atari with a detachable keyboard (i.e., Mega, Mega STe, or TT). Should you, however, be the proud owner of a 520, 1040 ST, or STe, installation, while not exactly difficult, may be rather daunting and will certainly void your warranty. Nevertheless, instructions and proper cables are supplied for both scenarios and, in both cases, D.E.K.A. performs seamlessly.

The manufacturers have tested D.E.K.A. with a variety of PC compatible keyboards with great success. They have taken careful note of any slight irregularities, however, and dutifully pass on the information to you in



their instruction manual. A one-year parts and labor warranty is provided.

I had the opportunity to hook up my Fountain XT (a lesser known but reliable clone) enhanced keyboard, via D.E.K.A., to one of our office Mega's and am happy to report that the experiment proceeded without incident.

Keyboard mapping takes advantage of the F11 and F12 keys on enhanced keyboards, and German and UK keyboards are supported as well. Optional add-ons include bar code support, a battery backed clock and a K-Switch that will allow you to switch back and forth between your original Atari keyboard and the PC compatible keyboard. ■

MANUFACTURER:

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Data Diet

by Ed Krimen

Hard drives are looking smaller every day. Simple file proliferation, and the increased data-storage requirements of contemporary software (especially for graphics and audio applications) conspire to fill even the biggest hard drives with alarming speed. While the ultimate solution is to buy a larger drive or daisy-chain a second unit, many budget-conscious Atari owners would appreciate a less-expensive short-term option.

Data Diet, from Double Click Software, addresses the problem of disk space in software: transparently compressing and decompressing files as they are used by applications. The program works on any Atari ST computer with at least 512K of RAM and a single-sided floppy drive. It consists of several utilities — each less than 14K, and written in pure 68000 assembly language.

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The programs and desk accessories that comprise the Data Diet package are easy to set up, easy to use, and almost foolproof. If you want, you can configure Data Diet once and basically forget about it; though the desk accessories included with the package let you maintain and monitor your dietized (compressed) data files with precision and assurance.

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Double Click Software
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(713) 977-6520

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DATADIET.INF, a simple ASCII text file, also goes into the AUTO folder, telling Data Diet which portions of your system shouldn't be dietized. Directories, individual files, and groups of files with a common extender can be exempted from compression in this manner. Double Click has (rightly) assumed that most users of Data Diet will wish the majority of files on their drive to be compressed, but will wish to retain certain files or directories in uncompressed form — either for the sake of security, or for improved loading speed.

Once installed, Data Diet goes to work. When Data Diet is not set for realtime operation, each time you create a new file or read in a dietized file, an uncompressed temporary copy of that file is stored in a work directory and updated. Once you quit your application, files in the work directory are compressed, and copied back to their proper locations. By de- and re-compressing a file only once per session, when set normally, Data Diet increases throughput while maintaining the security of an automatic backup. Data Diet can create its work directory automatically, though the manual explains that you can improve overall throughput by creating a work directory in an optimal location on your drive.

The other programs included in the package can be used as such, or renamed and used as desk accessories. DATADIET.APP gives you a list of currently-accessed files, indicating which are dietized and which normalized. File status can be changed, so that the next time you save a particular document or data file, it will be compressed or uncompressed, as desired.

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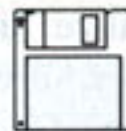
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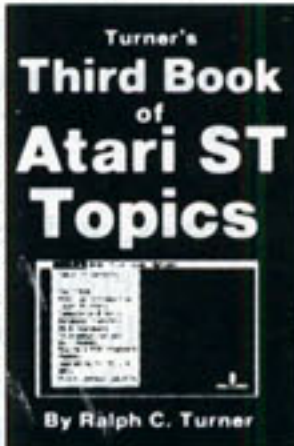
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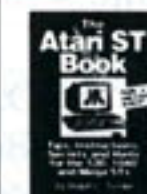
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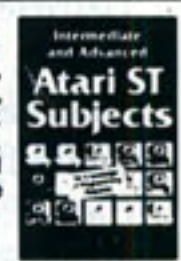
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The ST Xformer allows you to run 8 bit programs on your ST. Includes cable, manual, and two versions of the software. With the Xformer cable, you can run 8 bit programs directly from 5 1/4" 8 bit disks or transfer between 5 1/4" 8 bit disks and 3 1/2" ST disks. Please call our Customer Service Department concerning compatibility with 8 bit software.

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- #988 - Fast Copy III, NX-1000 Set Up
- H.P. Deskjet Print Utility V1.4
- #991 - Label Printing for H.P. Deskjet & Avery 5260 Labels, Desktop Formatter, Disk Sector Edit.
- #1008 - ICONDESK - Set up different looking icons
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- #1130/1332 - DC P.O.W. Utilities - Disk full of handy utilities from Double Click Software.



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The .APP (or .ACC) also lets you turn off Data Diet's \AUTO-loaded compression/decompression engine, allowing (for example) file copies to proceed without the delay caused by decompressing data as a file is read, and recompressing it as it is written.

The Data Diet Tools program, which is called from the Data Diet desk accessory during normal user operation, lets you dietize, normalize, and calibrate (find information about) individual files, directories, and entire drives. The calibrate function offers an incredibly verbose and detailed profile of your directories and drives, and lets you save this information in a text file, for reference. In installing Data Diet, the Tools program is likely the first utility most users will employ, using it to batch-dietize most of the files on their system. As noted above, Data Diet does not automatically compress uncompressed files, unless these files are read in and saved back to disk.

Also included in the Data Diet package is DC Squish, an executable-file compression program. DC Squish was previously only distributed with the DC Utilities disk, and was one of the main reasons why people bought the package. Like Data Diet, DC Squish compresses files, but unlike Data Diet (which compresses only data files), DC Squish compresses executable files (e.g., files with .PRG, .APP, .TOS, .TTP, and .ACC extenders).

So with DC Squish and Data Diet, you can get almost everything compressed.

The Speed or Size Option

There are three settings that you can assign to your files when you are running Data Diet. The first is the easiest. The "Off" setting will always keep a file normalized.

The second is called Type "A." This setting compromises filesize for speed. Type "A" won't compress files as much, but it won't take as long to compress and decompress them. According to the manual, Type "A" will result in a compression rate of at least 100K per second.

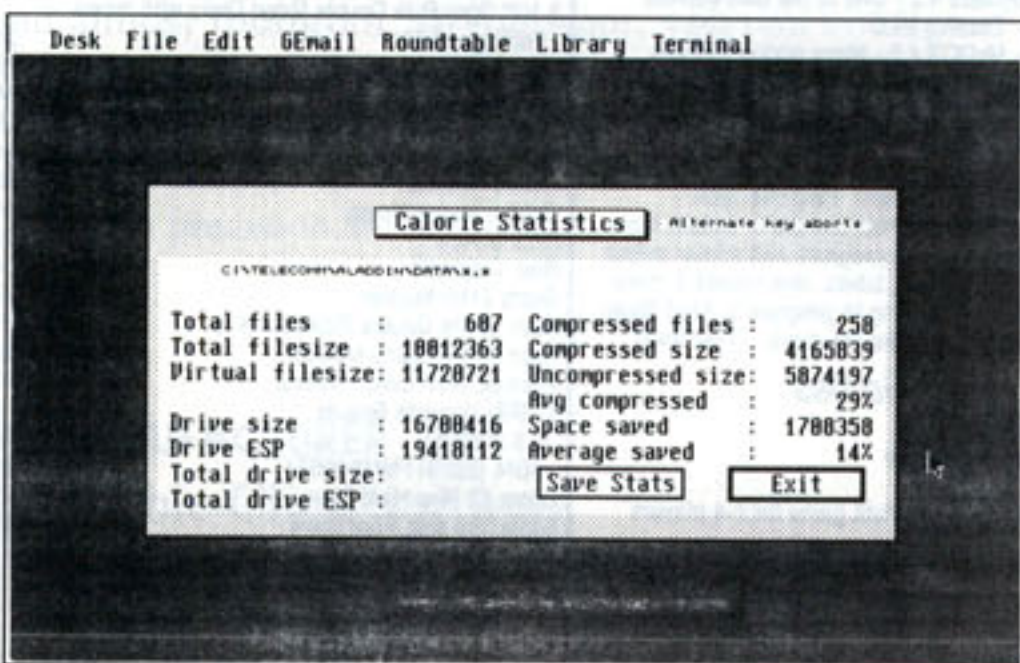


FIGURE 1. The calorie statistics dialog box shows you information about selected drives.

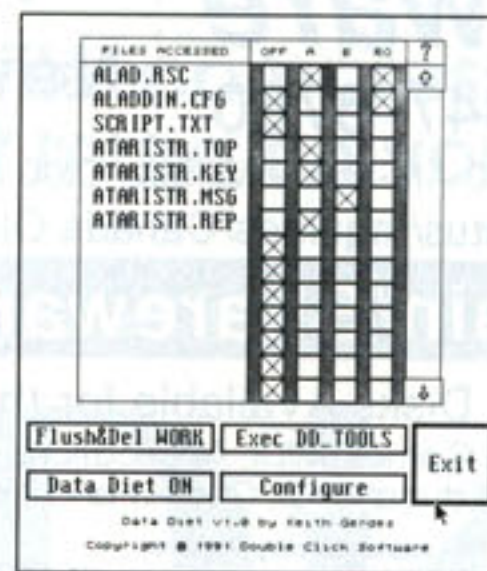


FIGURE 2. The Data Diet front end desk accessory lets you select the compression status of currently-accessed files.

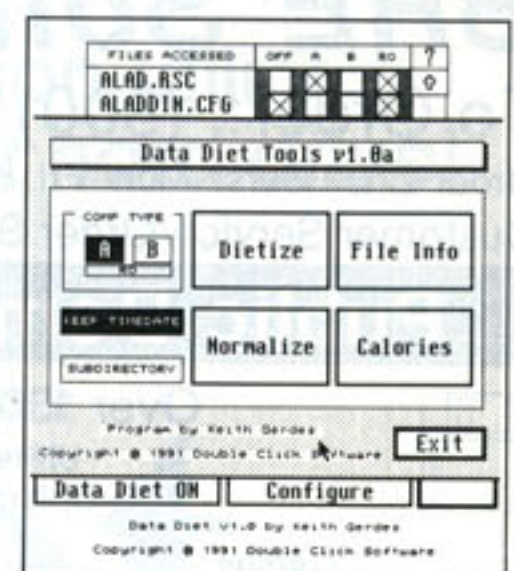


FIGURE 3. From the Data Diet Tools menu, you can dietize, normalize, and calibrate data files.

The third type of file-setting, Type "B," will create files that are two to 20 percent smaller than with Type "A," but at a slower speed. It is advised to use Type "A" for the default, and use Type "B" for larger files.

As advertised, Data Diet seems to compress most data files between 65% and 80%. As expected, compression of already-compressed .LZH, .ARC, .ZOO, .ZIP, and .GIF (precompressed) image files is negligible. The speed of Data Diet, though being billed as being faster than the competition on any computer platform, is still rather slow, even on a 16Mhz 68000 machine like the Mega STe. At times, this sluggishness is due to the file manipulations that Data Diet performs, not processor speed. Nonetheless, processor and hard drive speed are a large factor in how quickly Data Diet will dietize and normalize files. You most likely won't notice the delay on a 68030 machine, but you will notice it on one with an 8Mhz 68000.

The Manual

Though Data Diet performs well and is almost foolproof, it's natural to feel apprehensive about any utility that has such far-reaching effects. Given the implications of program failure, therefore, I would have appreciated the manual offering a more thorough and coherent explanation of how Data Diet manipulates files and moves them around.

Unfortunately, beyond a perfunctory Quick Installation section, a tutorial on batch dietizing, and descriptions of how each program works, there's not much to Data Diet's documentation. Though considerable detail is presented, the lack of overarching organization (not to mention the lack of a table of contents or index) makes it difficult to retrieve specific facts, when required.

This is unfortunate, particularly since — once you've been informed by experience how components of the package interact — Data Diet works very well, indeed. Easy to use, and fundamentally well-designed, I heartily recommend Data Diet to any ST owner fighting the battle of hard-drive bulge. ■

LYNX GAMES

Crystal Mines II



DEMONS FROM THE LONG-ABANDONED CRYSTAL Mines are terrorizing the neighborhood. Luckily, a local scientist has developed a robot capable of blasting through the dangerous mines and destroying the strange creatures that lurk there. Your job is to direct this robot in its quest, through 150 levels (plus 31 bonus levels) — each of which takes you to a different part of the labyrinth, and presents a new set of challenges.

The mines are depicted in a grid (a la Dig Dug) whose units comprise soft, hard, and explosive dirt, rock faces, boulders, buried artifacts, power-ups, and other surprises. Your laser blasts can clear a path through all but the hardest rocks, and TNT charges (of which you have a limited number) can blow most remaining obstacles to smithereens.

Demons roam at random through the mines, and touching them means instant destruction. Rockfalls, "sticky traps," and explosive objects (which can be set off, deliberately or accidentally, by your laser blasts), are added threats. Luckily, most demons can be destroyed by laser blasts, though "invulnerable" demons can only be wiped out with TNT or carefully-timed rockfalls.

The early levels can be negotiated by simple blasting, though later screens present obstacles that can only be overcome by considerable thought. Crystal Mines II combines much of the enjoyment of a high-speed arcade game with a strategic component that will satisfy more meditative players. Graphics are detailed, and sound and music add greatly to the fun of play.

SUMMARY:

Exciting, mentally-challenging mining maze.

MANUFACTURER:

Atari Corporation
1196 Borregas Ave.
Sunnyvale, CA 94089

PRICE:

\$39.99

Xybots



THE FEDERATION IS COLONIZING SPACE, BUT its plans may go awry. Xybot warriors have infiltrated a vital space station and unless you, working alone or with a friend, can destroy the wicked Xybots, all civilization will die.

As you roam the 3-D corridors of the station, Xybots of various types will threaten around every corner. Some are easier to destroy than others. Many can be taken out with a few well-aimed shots, but some can only be wiped out at certain angles or at vulnerable moments. More powerful zap shots are provided by pressing Option 1. But these potent zaps siphon energy from your limited supply, so use them judiciously. Your electronic map shows where the enemy is lurking, where you can replenish your energy, and where you can escape to the next level.

Pick up coins and bonus points along the way for use at the vending machines between levels. Buy extra firepower, boost your energy, or buy keys that open secret doors leading to hidden Xybots and high-powered Warp exits. For the truly ambitious, extra points are allotted for destroying all the Xybots on a given level. You'll know when you've succeeded when your player blows on his weapon *a la* Cool Hand Luke.

Comlynx for two-person play and throw your lot in with a comrade-at-arms. Total cooperation is required to take full advantage of the added security and firepower a partner can provide.

SUMMARY:

Expel aliens from a strategically-vital space station.

MANUFACTURER:

Atari Corporation
1196 Borregas Avenue
Sunnyvale, CA 94089

PRICE:

\$39.99



Portfolio

ATARI

T2 Portfolio

SMALL TECH SAVES THE WORLD

With the help of the Atari Portfolio —
the quintessential ‘small computer’ —

Terminator 2: Judgment Day makes
a complex statement about ‘small tech vs.
big tech’ and moral responsibility

We suffered a twinge of conscience when John Connor, protagonist of *Terminator 2*, used an Atari Portfolio to break into a cash machine. As former hackers, we knew that using one machine to subvert another can offer fairly heavy-duty emotional payoffs. But we also knew that it's wrong to intrude on private networks, and wrong to steal by means of such intrusion.

Later in the film, when Connor uses the same equipment to break into CyberDyne's vault, “liberating” the Terminator parts that would otherwise have engendered world destruction, we realized that James Cameron, the film's director, had set us up. Sure, hacking ATMs is wrong, and saving the world (with the same technology) is right, but the real questions raised by *Terminator 2* are far more complicated.

by **Brian Gockley & John Jainschigg**

Why Portfolio?

Why was the Atari Portfolio chosen to save the world? Beyond the fact that Atari employs some very sharp marketing people, there are lots of reasons. The Portfolio is convenient to program, meaning that *Terminator* techies could quickly generate software to produce the scrolling displays seen in the film. It's a robust prop, capable of working four to six weeks on a set of three AA batteries, so it would be no problem keeping the machine running through numerous "takes." And, of course, the Portfolio's size and appearance were right for the job: small enough to be carried in a backpack, it's still clearly a computer. By comparison, most of the Portfolio's competition (Sharp's Wizard series, Psion's Organizer, etc.) are disqualified on one or all of these counts.

Another reason we think Portfolio was chosen is that it's a commercial product. Had Cameron and Co. wished to portray Connor using some obscure piece of home-brew hardware (one of many imaginable alternatives), *Terminator*'s computer-graphics, video-effects, model-building, and other contractors (LucasArts' Industrial Light and Magic, Stan Winston, Fantasy II, and 4-Ward Productions, among them) had resources more than equal to the task of throwing such trivial props together. But as in so many other aspects of this extraordinary film, the director preferred to opt for realism and attention to detail. After all, as any true subversive will tell you, off-the-shelf items like the Portfolio are faster and cheaper to come by, are reliable, attract less attention, require less expertise to use, and — last but not least — are easier to lie about, if captured, than exotic, custom-wired "blue boxes."

Big Tech vs. Small

Another aspect of Cameron's choice was clearly literary: it's ironic to use a tiny, little commercial product, such as the Atari Portfolio, to subvert a big, powerful commercial institution, such as a bank or military contractor. And much of the subtext of *Terminator 2* revolves around this irony, the underlying theses that support it, and the ethical questions that it implies.

Part of the irony derives from the fact that so much commercial technology comes — either directly or indirectly — from military research or government contracts to private industry. These days, high tech propagates by a "trickle down" process: ideas originate and are prototyped in the morally-questionable domain of warfare, then undergo several cycles of refinement before ending up as consumer products, years or decades later. By the end of the process, a given technology has

As any true subversive will tell you, off-the-shelf items like the Portfolio are faster and cheaper to come by, more reliable, attract less attention, require less expertise to use, and — last but not least — are easier to lie about, if captured, than exotic, custom-wired "blue boxes."

changed both form and purpose, and its further evolution has become, of necessity, consumer-driven. Though the Portfolio's CPU, RAM chips, microswitches, LED display, piezoelectric speaker, and other components can trace their lineage back to weaponry, the product as a whole was expressly designed to satisfy consumer needs (including, if necessary, the need to save the world from atomic fire and the ruthless domination of machines).

That technology, in effect, "changes sides" as it passes from military to consumer hands is one of *Terminator*'s most important statements. Of almost equal importance is the counter-intuitive suggestion that as technology undergoes this process of "consumerization" (or "humanization," if you prefer), it is, in fact, improved — though this improvement is realized in some dimension that is not, strictly-speaking, quantifiable. In other words, a Portfolio is somehow better — more evolved — than the faster and more powerful computers that run an ATM network and an R&D security system. Just as a "stock-model" Terminator turns out, in the end, to be better than the more powerful T1000 prototype, itself an extension of the vastly more powerful SkyNet.

Positive Subversion

It's important to note, however, that technology is only partly "humanized" by the expedient dynamics attending its metamorphosis from military prototype into stock consumer product. The second part of the equation — as *Terminator 2* clearly demonstrates — is supplied by people, and involves deliberate moral choices. The best that market pressure can do is to render a given technology morally neutral. It's people's responsibility to take the process the rest of the way, choosing to use



©1991, CAROLCO

A morally-transformed John Connor uses his hacking skills (and his trusty Portfolio) to help save mankind.

technology for evil, or for good, completing its subversion to human aims.

The process of subversion is demonstrated by the ways Connor uses his Portfolio in the film: first to hack into a cash machine, then later to break into CyberDyne's security system. The first is clearly wrong; Connor's behavior is morally delinquent, and is dictated entirely by expedience. In the latter case, it is clearly right; revealing the fact that Connor — and, figurative-

ly, his Portfolio — have been morally transformed. On a grander scale, Connor subverts and transforms his Terminator in analogous fashion. Programmed in the future by Connor's adult self, the Terminator's initial purpose is both expedient and morally neutral: to protect the child Connor at any cost. But young Connor changes aspects of this programming: first forbidding his Terminator to take human life, then insisting that it help him free his mother, Sarah, from the institution where she is being held. In both cases, these imperatives lessen the Terminator's ability to pursue its original goal with full efficiency — in the first case, inhibiting its capacity to exert deadly force, and in the second, obliging it to expose Connor to the T1000. But the ultimate result is to change the Terminator profoundly, making it more than a match for its nemesis.

Saving the World

The real lesson of *Terminator 2*, of course, is that moral relativity is always wrong, even when choices are dictated by sure knowledge of future events. Though Sarah Connor knows that Dyson and CyberDyne will, if left to their own devices, eventually produce the technology that will doom mankind, she ultimately realizes that killing him — an expedient, morally-relative strategy — will not change the course of things to come.

This sobering discovery throws the value of knowledge itself into doubt, even as it forms the cornerstone of Cameron's message about technology and morals. Before learning to apply a moral agenda, people must learn about technology itself; and must, in the process, inevitably pass through a period of sophistication and empowerment that is morally uninformed.

It's important that all computer users — and potential users — understand this principle. Adopting and learning about new technology can never be risk-free, but it's the only way that people can hope, eventually, to reach the high ground. While any advance might conceivably be turned against us, it is equally probable that it become a link that is forged for our protection, and will ultimately help keep Terminators from our door. ■

LIQUID METAL

DENNIS MUREN,

who supervised LucasArts Industrial Light and Magic's T2 team of 35 computer-graphics artists, has been quoted as saying: "A lot of what we did, you can do at home on a Macintosh." But, he continues, "You can't do it in the time, or with the resolution and precision, that this show required." Perhaps not ... on a *Macintosh*. Even on a Big Mac-sized \$6.4 million budget. On an *Atari*, however ...

LEE SEILER

is an award-winning computer graphics artist and software entrepreneur; president of Lexicor Software. Lexicor's "Phase-4" product line (the Chronos-3D animation workstation, Rosetta-3D translator, Prism-Paint, and Prism-Render) comprise the most sophisticated microcomputer-based animation suite in the world. And naturally, these state-of-the-art software tools were designed to run on the ST/TT platform. In this interview, Lee discusses the F/X techniques of Terminator 2: Judgment Day, with an eye to approximating them at home, on something less than T2's \$6.4 million budget.

Atari Explorer: So, Lee — you've seen T2. Specifically, you've seen the scene that everybody's so wild about, where the T1000 comes walking out of the flaming wreck of an 18-wheeler, in an L.A. flood canal. How did they do it?

Lee Seiler: The way it was done was pretty tricky. They used a combination of several inputs, generated by several different types of equipment, and blended together with ingenuity. The flood canal and the wreck were at one level of the shot. The flames were mapped onto that — using Macs, in fact. Basically, they used Nikon 3500 slide scanners and a Mac fx running Adobe Photoshop, and took photos of the flames and used that equipment to fake the casting of the reflections on the T2. Then they went back and added heat distortion, secondary reflections, and other effects. To figure out how all the reflections worked, they did two things: first, they took a miniature chrome doll and set it in a model, to check POV, sight-lines, and distance effects. Then, they took Robert Patrick (who played the T1000), drew a grid on him, and walked him around the scene so that their computers would have a reference for substituting images into the final product.

AE: What about the movement of the chrome figure? It was clearly artificial, which was very effective, but at the same time, it was frighteningly realistic.

LS: The chrome figure itself, and all of the chromed effects, were computer-generated images done on a Silicon Graphics system, using Alias software.

AE: Could you actually do this kind of stuff on an ST?

LS: Sure. Or on a TT. Very simply, you would use CyberSculpt to create a figure. You would use Chronos to move the figure around in whatever environment you wanted, or just move it over a blank screen for later superimposition over a live background. Next, you would use our rendering program to do reflection and environmental mapping to complete the "chrome" effect. And then you'd use post-production tools, like Prism-Paint, to paint in things like heat shimmers, smoke, etc.

AE: We've worked with CyberSculpt, CAD-3D, and Chronos quite a bit, over the past few months. But we still don't see how you'd get that "chrome" effect. How do you get an image with such smooth curves?

LS: You don't need a lot of faces to get nice chrome objects. If you wanted to make a completely reflective ball, as few as 14 segments in the ball would be sufficient. When you're calculating the surface normals for any object, as long as they're even, you get a nice, even curve. If you're going to use complex reflections, you'll never see lines. Lexicor's renderer (not yet avail-
(CONTINUED ON PAGE 75)

Chronos does "Liquid Metal"

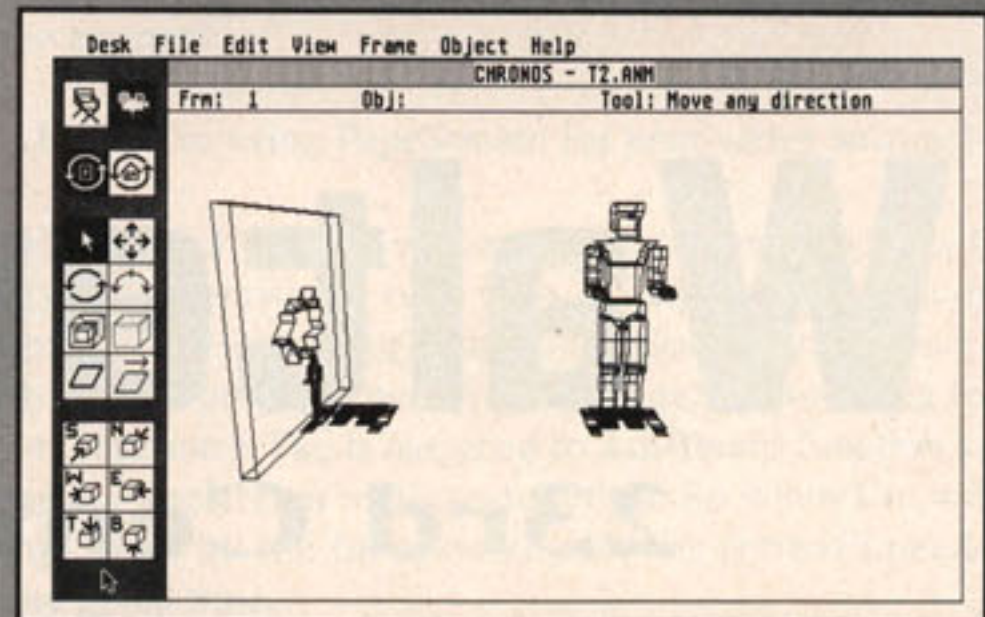


FIGURE 1. The "man" object, to the right, was produced in CAD-3D, along with three, successively deformed duplicate objects. The four resulting objects look very different, but contain the same number of points and faces — a requirement of Chronos' "morphing" system. Objects have been loaded into Chronos, and placed at the positions they will occupy during the morph cycle.

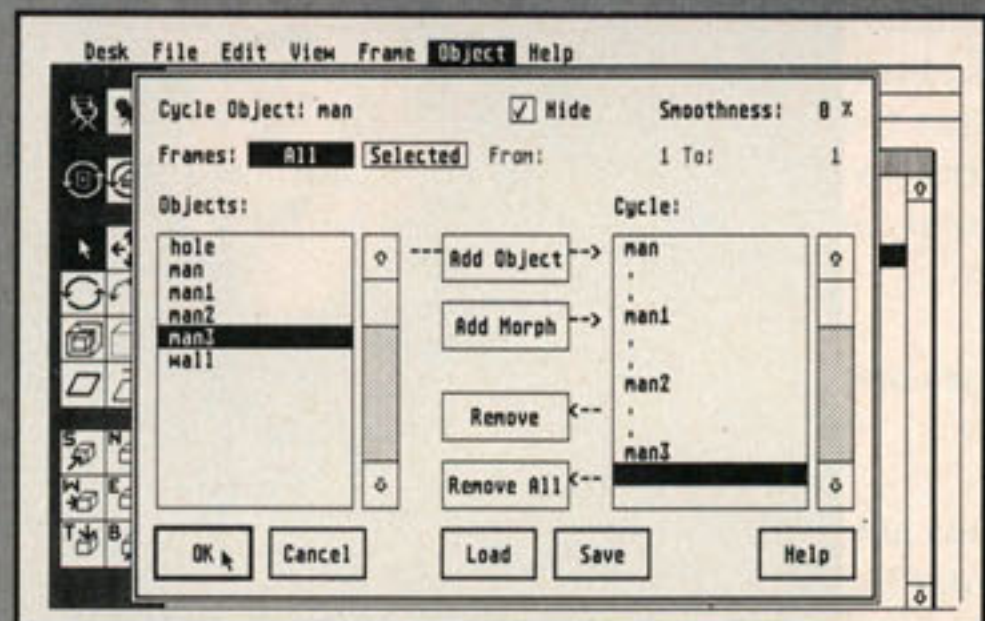


FIGURE 2. A morph cycle is created by adding object names to the cycle box, at right. "Morph frames," shown by dots, are then inserted between the object names. When Chronos renders the cycle, it will automatically generate intermediate "tween" frames between the objects, smoothing the transition from one object to the next.

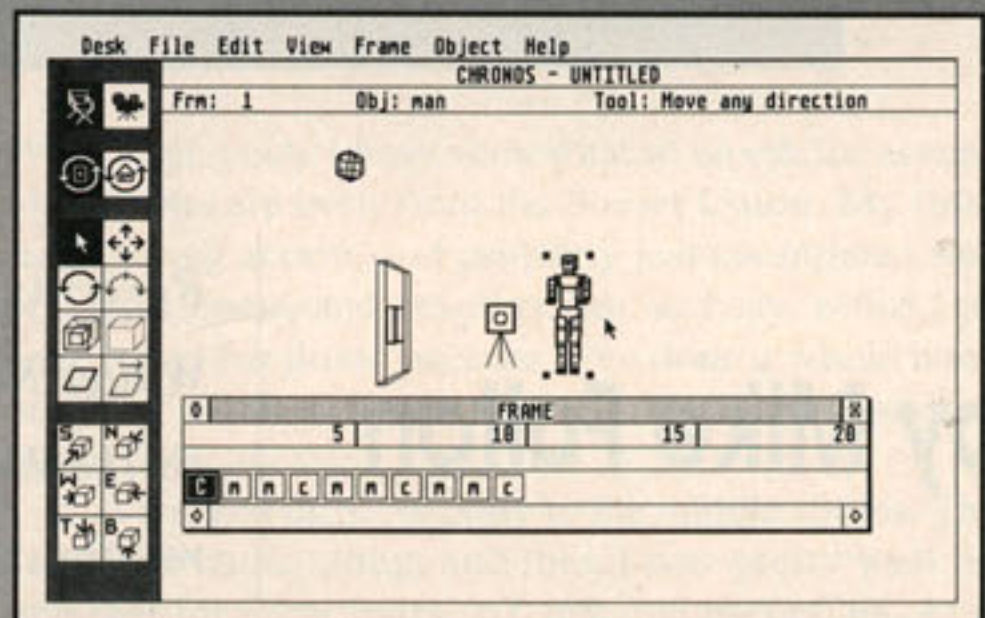


FIGURE 3. Frames are inserted, one per object or morph in the cycle, to capture the rendered animation. Chronos labels the frames as containing cycle-object ("c") or morph ("m") information.

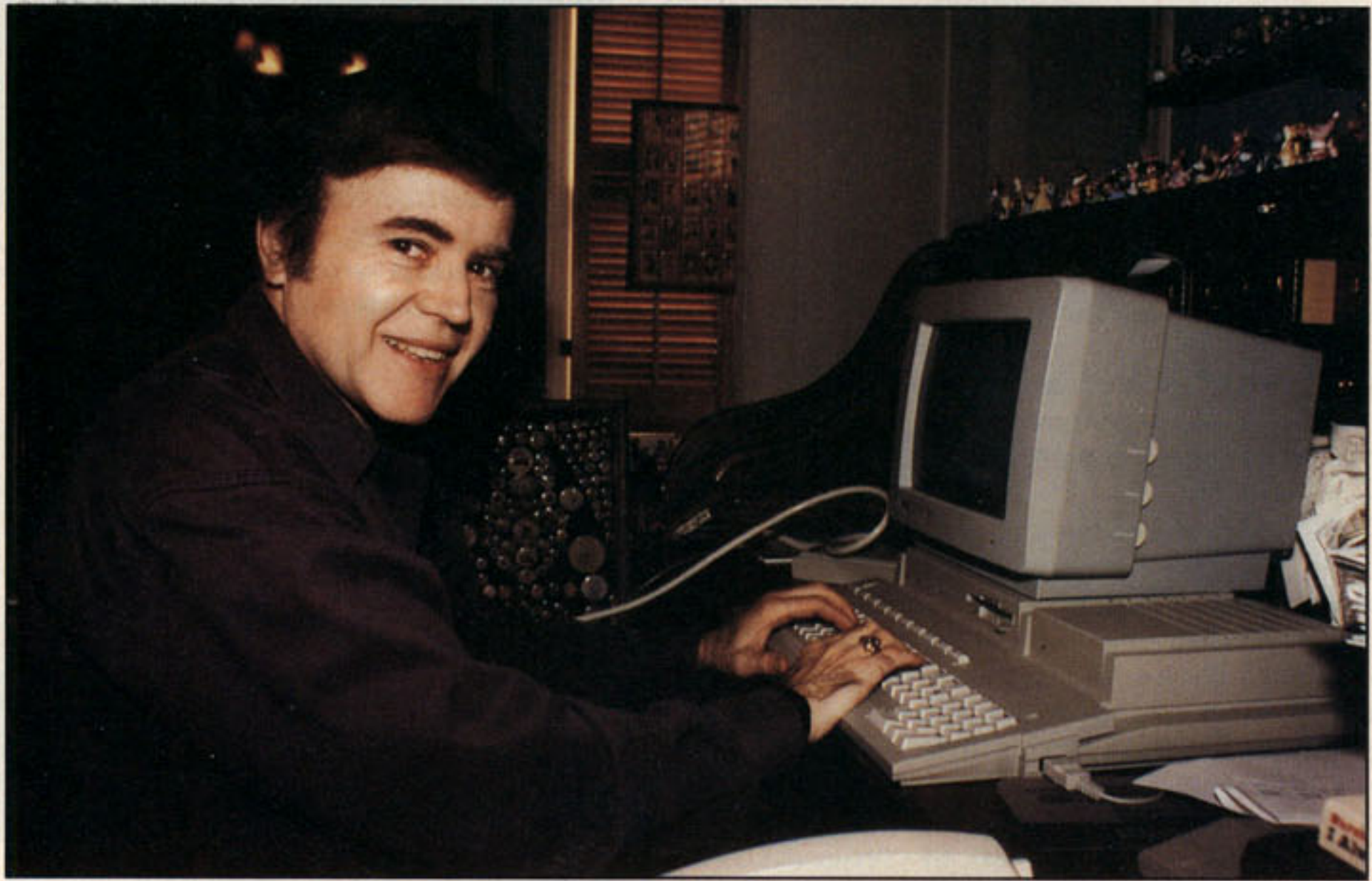
INTERVIEW

WITH



Walter Koenig

23rd Century Atari User



by Mike Fulton

Reviving the role of Chekov in this season's Star Trek VI, Walter Koenig's other pursuits stretch as far and wide (almost) as the Enterprise's travels. Talk shows, production, script-writing, and other projects are all currently in the works. And the computer he'll be using? Atari's Mike Fulton reports.

Atari Explorer: The Atari is your first computer, right? What does your system consist of?

Walter Koenig: Yes, this is my first machine. I have a Atari Mega STe with 4 MB RAM, the Atari SLM605 laser printer, and the SM124 monochrome monitor.

AE: How did you first hear about Atari computers?

WK: Through Mike Kelley, the fellow for who I am going to be doing a new talk show, as executive producer and host, on the new Science Fiction Fantasy cable TV network that he is putting together. We agreed that in this capacity, I would definitely need a computer, and he recommended the Atari from experience with it.

AE: I understand that you've already gotten software from several Atari developers.

WK: That's true, I've got PageStream 2.1 from Soft-Logik, and I'm using that for the screenplays that I am working on. I've also got several font packages from Computer Safari to use with PageStream.

AE: You've also got Hotwire on your system, from Codehead Software, I noticed.

WK: Right, it helps me get into and out of the programs quickly, which is a big help to me as a beginner.

AE: In your role as Chekov in *Star Trek*, you've been identified with the high technology of the 23rd Century. But when *Star Trek* first came on the air, personal computers didn't even exist yet.

WK: Did radio even exist yet? (Laughing) It's been so long!

AE: Did working in *Star Trek* affect your expectations for working with personal computers at all?

WK: No, my own personal mindset regarding any sort of technological apparatus is such that my immediate reaction is one of fear, overwhelming fear. Perhaps that's not totally founded in reality, but I've just learned to expect that it will be very difficult for me to do. As I get to this Atari, some of that trepidation is lessening, and I suspect that it won't be the problem I expected initially.

But my working on *Star Trek*, hitting all those buttons ... I hit the yellow button when I was feeling cowardly, the purple button when I was in a rage, and the green one when I was feeling envious. So it really had nothing to do with technology, and did not work as a forerunner for my introduction to real-life computers. There was no relationship between what I was doing as the navigator of the Enterprise, and what a real computer actually does.

AE: Besides, on *Star Trek*, you could just tell the computer what to do, instead of having to deal with the mouse and keyboard.

WK: Well, that's in the 24th century, with *Star Trek: The Next Generation*. On our show, we still had to hit the buttons!

AE: You're using PageStream for your script writing?

WK: Yes, it's set up so that all the different formats for my script writing, such as a dialog format, a scene description format, or a camera dissolve format, and so on, are all programmed in using PageStream's Tag feature, and each Tag is assigned to a different function key using PageStream's macro function. So when I'm writing, I just hit the function key for the format I need at any given time.

AE: So writing a script requires that you use a very specific format?

WK: Yes, for example, the dialog that the actors speak is always indented on both sides, in the center of the page. A stage direction or scene description would use all capital letters and not be indented, and so forth. By sticking to a specific format like this, it makes it easier during production to take a certain number of script pages and figure out how many minutes of screen time it will take.

AE: For our readers who would like to know more about you, please tell us a bit more about yourself.

WK: I started working in television back in the early sixties, as a much younger man, obviously. I did shows like *The Untouchables* and *Combat*. I did several episodes of the *Mr. Novak* show, playing many different characters, one of which was a Russian, a defecting Russian student.

AE: Is that where you figured out the accent to use for *Star Trek*?

WK: Well, yeah. I have somewhat of an ear for accents. My parents are both from the Soviet Union. My father had a strong accent, so I probably just assimilated some of it from home, and the other part, as I say, is that I just have a feel for doing accents. I've done a whole bunch on TV, French, German, English, and I've done some others in the theatre.

I worked fairly steadily in the middle sixties. Then *Star Trek* came along, and then I was pretty well tied into that for a few years, '67, '68, and part of '69. At the same time, I was doing a lot of stage work. When *Star Trek* went off the air, and the phone stopped ringing, and I had no prospects in film or TV. So I started writing.

I wrote a novel, which didn't sell, but I wrote it. Then I started writing screenplays, and one of them led to work in television, working as a writer on television episodes.

AE: What TV series did you write for?

WK: The first thing I did was an episode of a series called *The Class of '65*, an anthology series. It was my most satisfying experience, because it was only me and the producer. There weren't six story editors, four associate producers, three co-producers, and so forth, getting in and changing everything. Everything that went on the screen came right off the pages that I wrote, which was very gratifying.

From there, I wrote episodes of *Family*, *Land of the Lost*, *The Incredible Hulk*, and *The Powers of Matthew Star*. Those experiences weren't as satisfying as the initial one, because I was writing to a formula, and I had to somehow harness my own feelings, and my own ideas and inventions and make them compatible with the producer's ideas about the series. It became more and more disillusioning. Particularly to see my scripts rewritten and rewritten, and I finally stopped writing for television in the late seventies, and I started concentrating mostly on motion picture scripts.

I also finished another novel, which a few years later did get published, called *Buck Alice and the Actor Robot*. I started writing features, and had several optioned. NBC was going to make one into a movie of the week, but that fell through for various reasons. I did a pilot for a strip show, which would have been called *Face to Face*. It was shot, but didn't get sold.

AE: What you do mean by "strip show"?

WK: A strip show is one that comes on every day, five days a week. It had a psychologist as the host, and it would have had dealt with family problems, with reenactments and discussions. Each story would have been five days long. I did the pilot, but it didn't get sold. Life is a series of trains that we don't catch, you know?

Built into my contract was an agreement that I would direct two of the first thirteen stories (10 of 65 episodes). That certainly could have been a springboard for a whole new career. It would have been enormously beneficial for me towards opening up a new career, but the show didn't sell, so that didn't happen.

In the mid-seventies I started working again in television, with shows like *Medical Center*, *Ironside*, *The Man from Shiloh*, and in really good, guest-starring roles. At the same time I was doing theatre, not to supplement my income, because it didn't pay very much, but rather to give some expression to whatever artistic needs I had. I was doing plays like *The White House Murder Case*, *Steambath*, and again in very formidable, challenging roles.

I was also directing theatre at that time, I did *Hotel Paradiso*, a production of *Beckett* for Theatre 40, *Twelve Angry Men*, and so forth. So I was keeping my hand in the craft of acting.

AE: So this would have been about the time that the first *Star Trek* motion picture came out.

WK: Yes, also in the late seventies I was teaching acting. I taught at UCLA, the Sherman Oaks Experimental Film College, and I taught privately. I taught at the California School of Professional Psychology, teaching post-graduate psychology students. What I was doing was using principles of acting to help heighten self-awareness and self-perception, which would help them relate to their patients. It wasn't a regular part of the curriculum. I was asked to come in and create something and this is what I came up with.

And then we started doing *Star Trek: The Motion Picture* in 1978.

AE: They had originally planned on doing a whole new TV series, not a movie. Were you all signed up for that?

WK: Yes, the resurrection of *Star Trek* had a lot of false starts. In 1975, there was going to be a new screenplay for a new feature, which the studio turned down. Gene Roddenberry had a story which dealt with the finding of God.

AE: Similar to what ended up in *Star Trek V*?

WK: Not really, there was a certain relationship to the original *Star Trek* movie, but it was different. But because it did deal with God, the studio was somewhat sensitive about doing it. And it was finally shelved.

Then around 1977, they started talking about doing a new series. They took scripts from the original series which hadn't been shot, and they started also assigning stories to writers for new scripts.

They were thinking about Paramount having its own new television network, with the new *Star Trek* series being the masthead production. I knew the reason why they didn't go forward with it. It had to do with the studio couldn't be competitive with the network on advertising rates. The networks would come in and undercut the ad rates.

Then the studio came in and said we were going to do a low-budget, B-level feature. But when *Star Wars* came along right after that, and was so extraordinarily successful, Paramount decided that they should do something of a comparable nature, and since they already owned *Star Trek*, they decided to

expand it into a major feature. And that's how it began, and we did *Star Trek: The Motion Picture*.

Each time we did one, with the exception of *Star Trek IV*, we thought it was the last one. But *Star Trek IV* had been so successful, grossing over \$109 million domestically, we knew that we would have to do a *Star Trek V*. But after we did *Star Trek V*, we thought it was really the last one.

AE: I thought part of the problem was that *Star Trek V* had too many deliberate attempts at humor that fell flat.

WK: That's an interesting point. After *Star Trek IV*, the studio determined that there should be more humor. But the difference was in *Star Trek IV*, the humor came organically out of the story. It evolved. It was part of the plot, part of the characters. But in *Star Trek V*, the humor seemed more imposed.

AE: Like Spock doing a one-liner about Kirk needing a shower.

WK: Right, and I think ultimately that underscored its failure. We were manufacturing comedy when it wasn't appropriate.

AE: Well, onto *Star Trek VI: The Undiscovered Country*. It opens in theatres on December 6. I understand it was originally supposed to open on the 13th, but they moved it up. [Ed. note: This interview was recorded in late November, 1991.]

WK: Yes, it was moved up a week. From all reports, it's going to be very successful. The studio is very keen on the film. The buzz all over town is that it's going to be very good. I've been told there was a film which was scheduled to open on the same date, that has changed its release in order not to compete with us.

If that is the case, then it will be fine send-off, a final heralding, a final trumpeting of our saga, because this is definitely written as being the last film, the last story for this crew.

AE: As to that last point, it's also been said, however recently, that because the story and everything was coming together so well in this one, there was the feeling that it might not end up being the last one. That if it does

*My own
personal mindset
regarding any sort of
technological
apparatus is such
that my immediate
reaction is one of
fear, overwhelming
fear.*

well, they might consider doing something else.

WK: Well, if the picture grosses \$100 million, it would suggest that we are still viable, that the characters have not overstayed their welcome, and that there are still stories to be done with this group of people.

I think one of the main concerns has been that we are all growing older, and the media has been merciless in reporting that, with each succeeding film.

AE: Fortunately, I don't think you've been getting the worst of that.

WK: Well, they kind of blanket it, they say "this is an octagenarian cast. They need ramps for wheelchairs on the bridge."

AE: Has any discussion ever been made of doing a movie with just part of the original cast? Sulu finally has his own command in this movie.

WK: I think there's going to be a lot of speculation as a consequence of Sulu having his own command. I think a lot of fans are going to wonder if that means there going to do another film with Sulu.

I don't think there has been much consideration of doing another *Star Trek* movie with just part of the cast. Leonard Nimoy has been quoted as saying that he'll never do another *Star Trek* movie.

AE: (blank stare...)

WK: Yeah, well, right. But I try to take people at face value, most of the time. I think what they're talking about, is that since *Next Generation* has just one more season to run after this...

AE: On their original contracts.

WK: Yes, they may segue into feature films and use the *Next Generation* cast. Should that be the case, then ... and I'm just guessing here, with no basis for this in fact, then they might want to bridge that transition by somehow using some members from the old series.

AE: Like what they just did with having Spock in a two-part episode.

WK: Right, so they might want to do that. In which case, it probably wouldn't be Chekov, it would probably be Captain Kirk.

AE: Would you be interested in doing an episode of *Next Generation* if someone came up with a good story?

WK: I would be interested in working as an actor, and that includes working in the *Next Generation*. If the work is respectable, then yes, I'd be interested in doing it. But I'm not sure I'd be more interested in doing *Next Generation* than I would in doing *L.A. Law*, or something like that.

AE: Well, maybe we'll get an Atari user on the *L.A. Law* staff to read this and take that into consideration. Besides scripts, you've also done some other work, such as the DC comics and such.

WK: Yes, I did an issue of the *Star Trek* comic book. I was sort of challenged by the editor to do it, and I wrote one that I thought was reasonably successful. People seemed to like it.

I'm trying to sell a comic book superhero idea right now. DC Comics told me they would be interested under different circumstances, but that they didn't have an editor to handle it. They felt it needed special care, because I would retain authorship, it couldn't just go into their mainstream line. So I'm looking at a couple of other places right now.

And then I've been approached from another source to do a bi-monthly comic book of science-fiction and fantasy stories. My name would be in the title, and I would contribute one story to each issue.

We reprinted *Chekov's Enterprise* (a book about the making of *Star Trek: The Motion Picture*), and that seems to be selling quite well. And I'm also working on a screenplay. I'm on the first draft.

AE: Tell me about that. What's it about?

WK: It's a character piece about two attorneys, a white attorney and a Native American attorney. They are on the same side on a case, in which they are defending someone accused of murder. They are on the same side, but not necessarily for the same reasons. It examines the whole idea of a means to an end.

AE: You mean, if the end justifies the means?

WK: Yeah, you can have two people who ostensibly promote the same idea, but because they come at it from different places, the virtue is greater in one person than the other. Which is somewhat subtle, because the effect is still the same. The two men are defending a Native American, but without the same life experience, they don't deal with it the same way.

I'm mostly done with the first draft. I have to do some more work on it. I've got about four or five pages left on this rough first draft, then I'll be making some changes and corrections. And then I'll show it to some people, writers and producers, my agent, and then either submit it as is, or do some more work on it.

AE: Sounds good. Now with the Atari you'll be able to churn the pages out that much faster.

WK: That's right. That's exactly true. The time I spend with an electronic typewriter erasing and whitening out mistakes ... My typewriter doesn't even have a spell checker, so the time I spend looking up words in the dictionary ... A good twenty percent of my day is affected by these things, which can be totally circumvented by using the computer.

AE: Do you know the joke about how do you know when a Klingon has been using the computer?

WK: Right, from all the white-out on the monitor screen! ■

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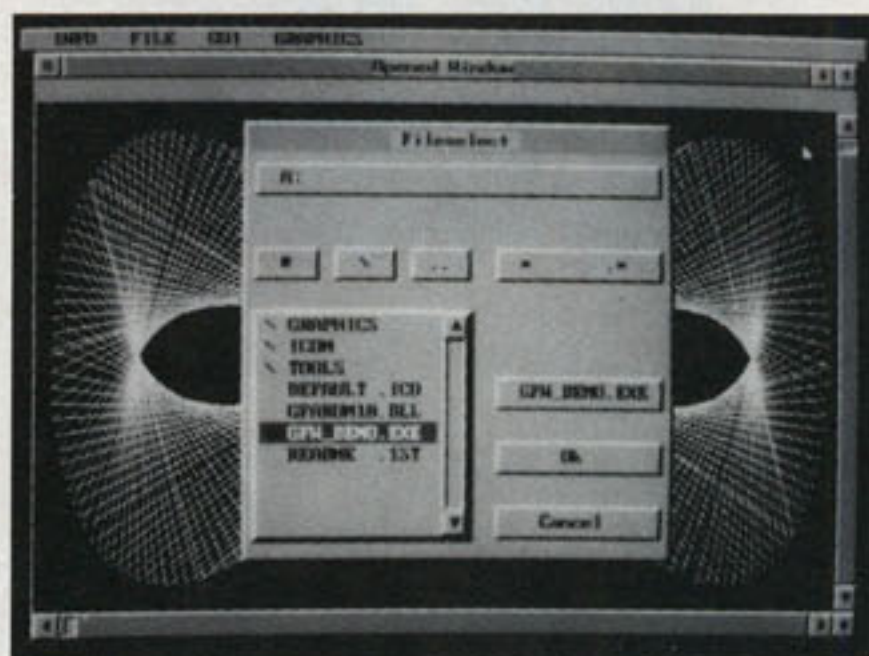
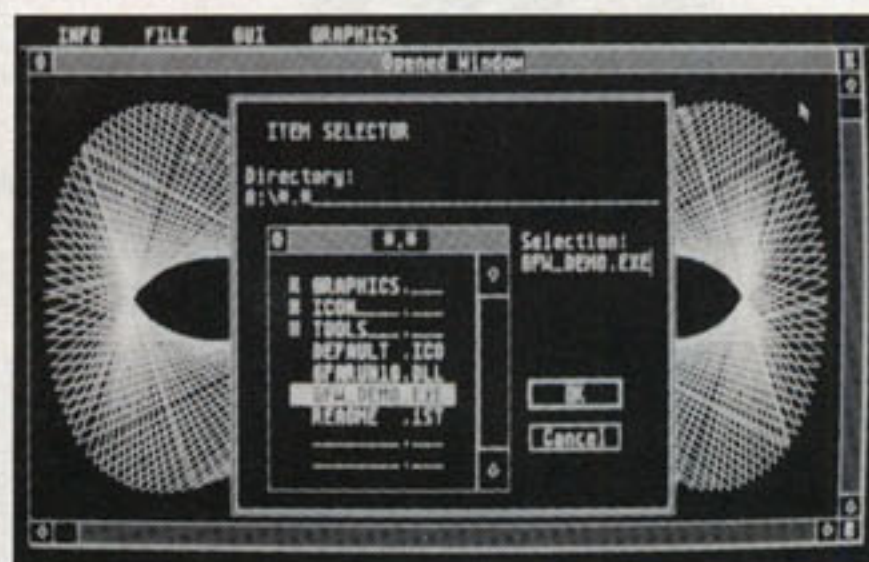
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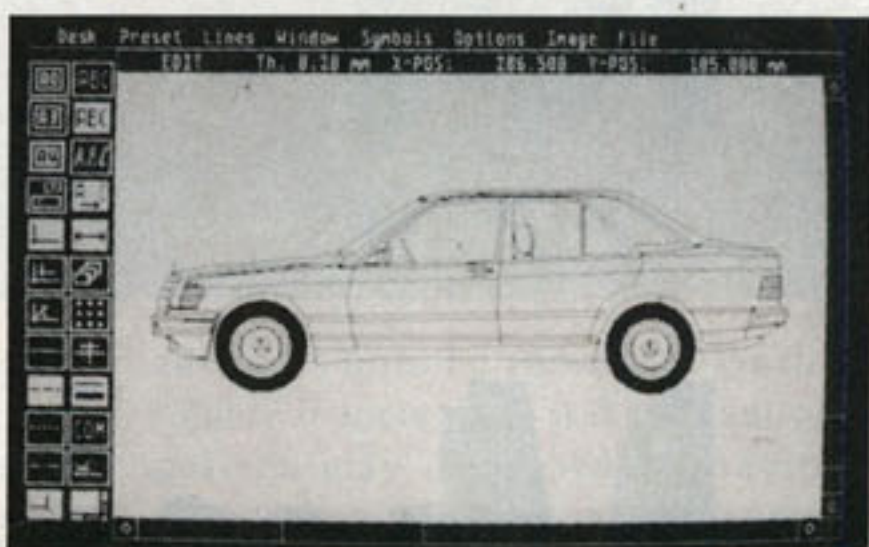
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An Ear for Music

Conversations with the Grusin Brothers

by Mihai Manoliu

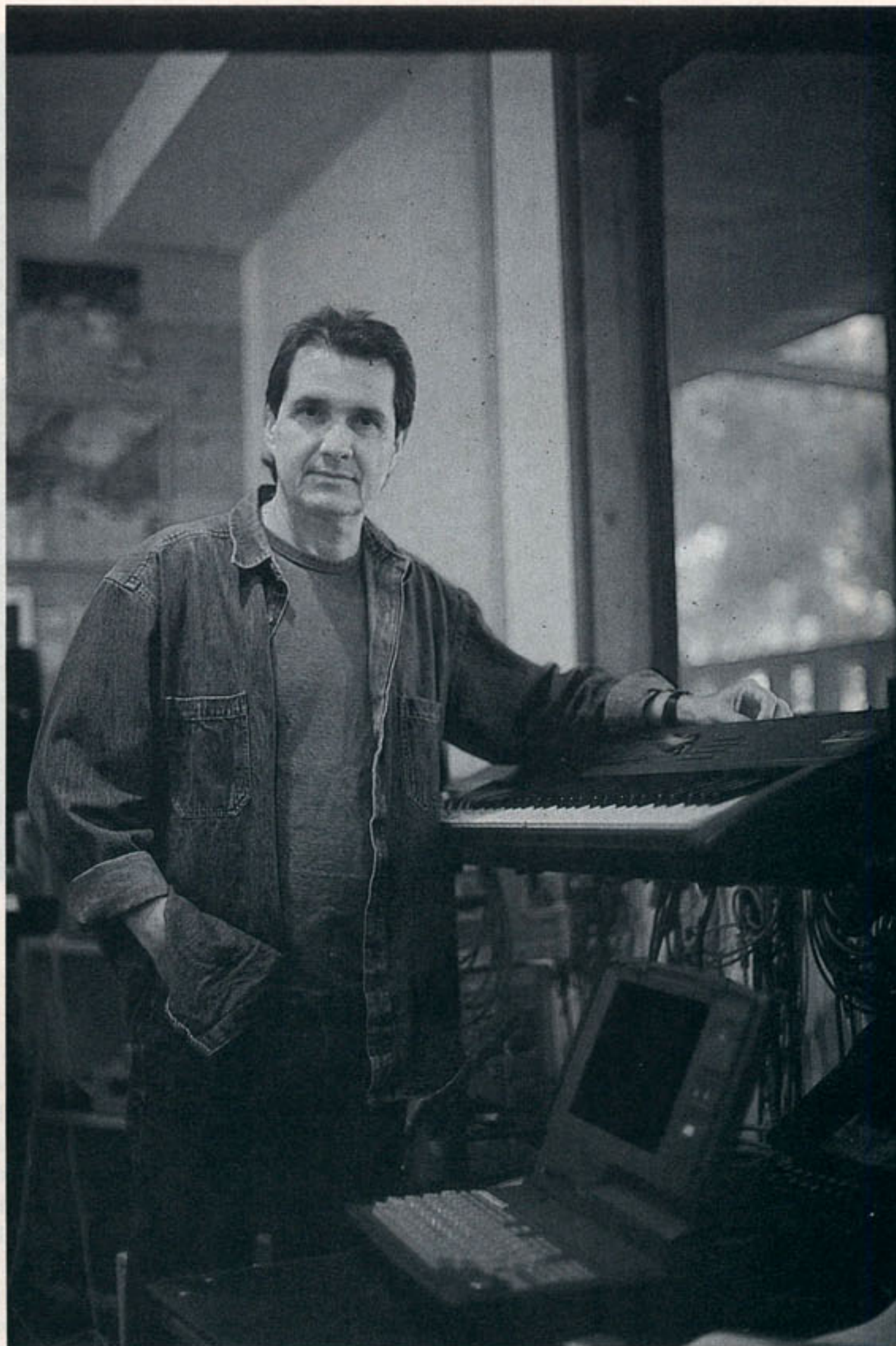
Don and Dave Grusin are perfect embodiments of the term "musician's musicians." Their music spans a diverse range of styles, rendered with artistic integrity, humor, and spirit. They are both composers of great talent, as well as engaging performers. It's not surprising that they are very supportive of other talented musicians — Dave Grusin helped start the highly-successful jazz label, GRP Records (whose roster includes such luminaries as Chick Corea, Gary Burton, and Tom Scott). Also not surprising, at least to most of us who use Ataris for music, they both use STacys for music composition and pre-production.

DON GRUSIN

Don Grusin is an outstanding keyboardist, composer, and producer. He has produced records for Ernie Watts and David Benoit, played on various projects with guitarist Lee Ritenour, and released solo titles on GRP Records. His latest release, *Zephyr*, incorporates the rhythms of Brazil and Africa with acoustic and electronic instruments as well as vocals. Carl Anderson (another GRP artist) and violinist Jerry Goodman make an appearance, as does the exciting Brazilian vocalist, Dori Caymmi (Don is closely involved with Brazilian music and culture).

I had a chance to chat with Don briefly during a break in his schedule. He described his basic studio setup as "a MIDI room; I got tired of trying to be a good engineer, so I got rid of all the analog tape gear; I go directly to DAT tape, and I do mostly pre-production and some broadcast quality stuff here. I use Smpte Track on my STacy as the composition headquarters, and Korg (the 01-W, which has lots of nice samples, and the SG1-D, for great piano sounds), Yamaha (DX7II), and Roland (D-550) sound sources." Does he use sound editing software? "Sometimes, but I don't have a lot of time for that sort of thing. I use Hybrid Arts' GenEdit when I do."

He is currently in the beginning stages of a new record for GRP, and is recording with Dori Caymmi and Ricardo Silveira (a guitar player from Brazil), as well as with the usual group of friends he has worked with over the years: Alex Acuna, Abraham Laboriel, Ernie Watts, and Eric Marienthal. Has he been performing? "I have been doing more of it the last couple of years. I went on a US tour this year with The GRP All-Stars: Lee Ritenour, Ernie Watts, Dave Valentin, and David Benoit. I've been to Japan and Indonesia, and plan on going



Photograph, Mihai Manoliu

to Europe in the Spring." And has he been taking the STacy on the road? "Yes, I've been using it as a sequencer, and it's become sort of my sidekick." I could see why; its portability and dependability make it an ideal performance tool. Don has also taken advantage of computer technology to collaborate long-distance with other Atari users; he has sent sequences and other data to musicians as far as Japan and Singapore.

What important technological

advances does he foresee in music? "There is increasing standardization, particularly in regard to playing sounds from different manufacturers, and I think that will help everybody — musicians and businesses. So these standardizations, as well as more memory and even optical data storage, are really promising areas for future developments."

Whatever innovations the future may bring, Don's focus will remain on musical growth. ■



DAVE GRUSIN

I was nervous while waiting for Dave Grusin to take my call — I would soon be talking to a composer whose music has been heard by practically every American who watches TV or goes to the movies. With seven Academy Award nominations for Best Soundtrack (including *The Milagro Beanfield War*, winner in 1988, and such memorable scores as *On Golden Pond*, *Tootsie*, and *The Fabulous Baker Boys*), hit TV series themes such as *St. Elsewhere* and *Good Times*, and many album credits to his name, it seemed unlikely Mr. Grusin would have any time to talk at all. I expected a half-distracted and rushed interview; instead, his warmth and openness dissolved my initial discomfort and led to a leisurely, informal discussion of technology and music composition.

Several of Dave Grusin's projects are currently in release, notably *For the Boys*, a film featuring the power vocals of Bette Midler, and *The Gershwin Collection*, a wonderful tribute to the master composer, on CD from GRP. The lively and lovingly-rendered Gershwin interpretations are certain to be a hit with jazz fans everywhere. The STacy figured peripherally in both projects, since it serves as the foundation for Grusin's home and road MIDI system.

So how does he typically use the computer? "I seldom use

the MIDI technology for actual performance, in terms of finally going to tape with it, but I use it extensively for demo purposes. I write with it because it's easy for me to watch the picture and use my Hybrid Arts SMPTE Track software to generate sketchy versions of what the different cues should sound like. Then I can replay the video and make any refinements I need. Since I normally rerecord everything anyway, I don't need to sync at home — but I find the software extremely helpful in organizing my ideas before scoring them for orchestra, and also for playing the material for a director. It's just easier for him to make judgments when he can hear something that gives him a sense of the melodies, the harmonies, and the feel of it. Based on his response, I can adjust and even rewrite cues before the orchestra is brought in." Indeed, many musicians would agree with Grusin's conclusion that computers have been a "marvelous technology for everybody's life."

You might guess that the studio at Grusin's Santa Fe home would be loaded with the latest gear. Surprisingly, he uses a minimal studio setup: the STacy driving a Korg O1/OW master controller, several DX-7's, and a Yamaha drum machine. He finds that for most writing purposes, the Korg is adequate. It is also compatible with the Korg T-3 units he keeps in LA and at his ranch in Montana, as well as with his brother's similar system.

He prefers to work in isolation while generating the basic ideas for a score; however, "there are normally a lot of editorial changes at the end of a film — it keeps changing, so proximity to the editing location can be very valuable."

Is collaboration an important part of the creative process for Dave Grusin? "Not as much in terms of writing, but definitely in terms of performing. Being a casting director for who is going to play this music is as important as writing it (Quincy Jones is a master of this). Part of the reason behind *The Gershwin Collection* was to do a project using some of my friends from the label," a chemistry

that obviously worked.

As our talk drifts back to technology, Grusin mentions that "last time Don and I were on the road together, we both had STacys. We had sequences we played with live, and it really worked nicely." Was there some musical experience made especially interesting by the use of MIDI technology? "Yes, it was a project Don and I did a few years back, called

Sticks and Stones. We did it all electronically; each of us worked at home, then we got together in the studio and expanded on it. The process of working that way was the most fun I've had." And the least fun? "I was using a hardware sequencer to score *Lucas* (using synthesizers exclusively), and my thought was: I think I'll take it out in the street, and if it's still there in the morning, I'll bring it in

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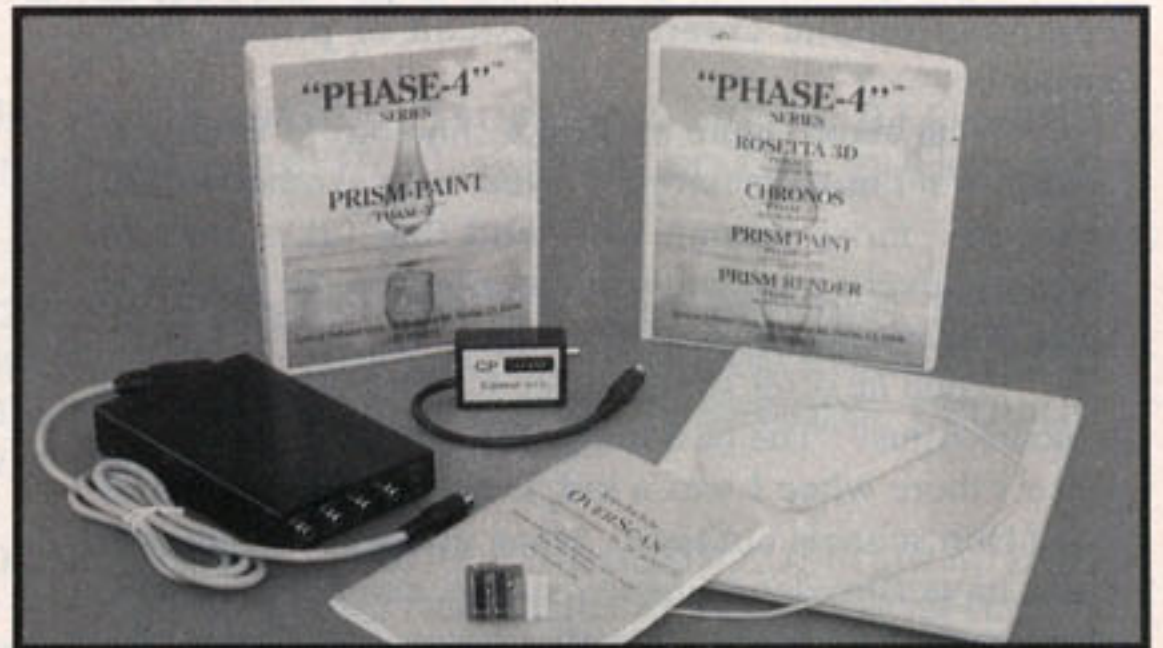
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and play it again." It's a fact of MIDI — many times you get caught up in hardware and software tangles that totally divert you from musical creativity. This is one reason Grusin doesn't need all of the latest gear. When he finds something that works well, he'll continue using it as long as possible; he prefers to focus his attention on composition and creativity instead of poring over manuals.

What about future musical technology? "Well, you always want more memory — you want synthesizers to react in a more human way, and that takes tons of memory; every time you want to modulate or modify it some way, you need more memory."

Could he offer some advice for musicians aspiring to score films? "The best thing that's available now that wasn't there when I was a kid, is that there are a lot of good film schools out there. Many colleges and universities have film departments, so you can hook up with projects through them." He also suggests that you take films on videotape and create original scores to replace the existing ones. This process is quite similar to the way you would have to work on new films, and provides excellent training in translating visual cues into music.

Are there artistic tensions inherent in film music? "It's sometimes easy to forget why you got involved in the business in the first place — your love of music. It

could seem like the life of a film composer is just solving problems, and you feel like an attorney or something, rather than an artist. The trick is to keep remembering that original love for music. Even in situations where you're asked to do something you don't really believe in, if you have a sense of musical ethics, you'll figure out the most artistic way to do it and still deliver what they want. Much of movie music is almost subliminal manipulation of the audience's emotions, so there are also a lot of nonmusical elements to think about."

What musical direction is he currently pursuing? "My interest now is in trying to do something less dependent on current ideas about commercial music; more like classical music — not to leave jazz out as an element, but doing things without necessarily being film music or a record — just writing some pure music in terms of ideas, and experimenting a bit. I need to move out of tonal things that I've been involved with most of my movie career. People like to hear "pretty" music, and if you're working for them it's your job to provide what they want. I don't have either a film or album planned, so that's what I'd like to do this winter." It is inspiring to see an artist of Dave Grusin's stature continuing to expand his musical vocabulary. His dedication to music shines throughout his work. ■

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EX

Attention, Portfolio Owners!

Join Atari and CompuServe on February 21st ... And Watch the Stars Come Out!

On February 21, 1992, starting at 3:00 PM (Eastern Standard Time), Atari and CompuServe Information Service will host a 24-hour Port-a-Thon on CompuServe's Portfolio Forum!

All your favorite Portfolio folks will be there! Superstars like Don Thomas, Atari's Director of Portfolio Marketing; BJ Gleason, author of PBASIC; and Ron Luks, SysOp of CompuServe's Atari Forums, will be stopping by to answer questions, provide support, or just to chat about everybody's favorite palmtop!

Get the scoop on new Portfolio products, software releases, utilities, and documentation everything you need to make Portfolio computing easier and more productive. Valuable prizes will be awarded! But you can't win if you're not there!

So join us on the 21st, for 24 hours of Portfolio FUN!

To get to the Atari Portfolio Forum, type GO APORTFOLIO at any CompuServe '!' prompt. If you're not a member of CompuServe, you can get a **FREE** introductory membership with a \$15.00 initial credit by dialing (800) 848-8199 (ask for Operator 198), Monday through Friday, 8:00 AM to midnight, EST, and Saturday and Sunday from noon to 10:00 PM EST.

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The others are a new
species you can breed
on your Atari computer.**

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Avant Vector is a cutting-edge graphics tool that's fast, easy to use and surprisingly versatile.

The large butterfly wing on the right is a vector image created by Avant Vector. Using "automatic tracing," a bit image graphic (the smaller butterfly) was converted to a vector graphic, resulting in the smooth output you see here.

Vector graphics have big advantages over bit image graphics - they make much smaller files, and they can be scaled to any size without losing resolution or looking blocky. And Avant Vector's tracing routines are highly sophisticated; in a recent review of 7 Mac, PC, and ST auto-tracing programs, Avant Vector was rated best of the bunch!

Avant Vector supports .PI3, .PC3, .IMG, .BLD, .PIC or .PAC formats. If you want to vector Mac, PC or Amiga graphics, you can do so with .TIF, .IMG or .JFF. Avant Vector

Plotter imports and exports .EPS files too, and can load and save HP plotter files.

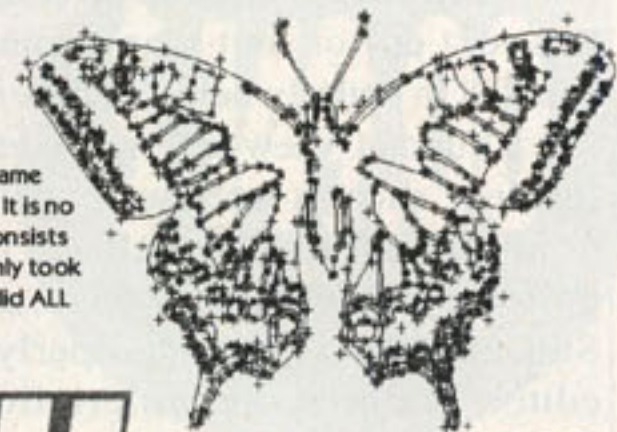
No matter which DTP package you use, Avant Vector is a wonderful companion. It creates .CVG files for Outline, Calamus or Repro Studio. And .GEM files for Fleet St Publisher, Timeworks, Publishing Partner, PageStream, EasyDraw and Repro Studio. With .EPS on the Plotter version, you can print to a PostScript printer, as well as the usual drawing and cutting options.

Since Avant Vector is a full featured vector graphics package, you can touch up any picture you've auto-traced, or draw pictures from scratch - with an intuitive interface you'll learn in a matter of minutes!

Call or write CodeHead Software for more information about Avant Vector (and its amazing cousin, Repro Studio). Special introductory pricing is available until December 31, 1991. Act now and save!

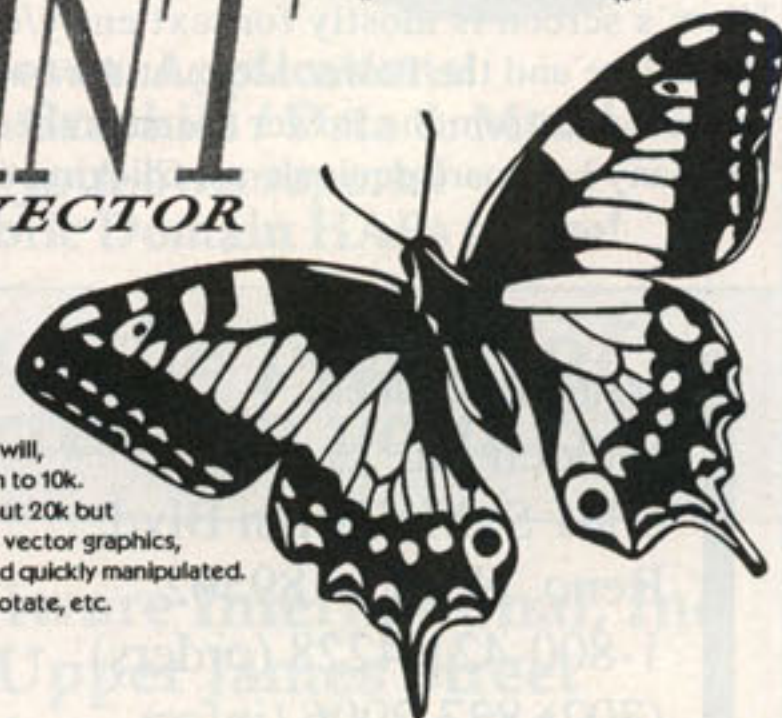


To the left is a pixel-based .IMG picture. In other words, the picture is made up of dots. It's a 58k file. The image can't be enlarged much more than this without the ragged edges showing.



To the right is a snapshot of the same image after it has been vectorized. It is no longer made up of dots. It now consists of lines and bézier curves. This only took a few minutes and Avant Vector did ALL the work for you.

AVANT
VECTOR



This is the .CVG vector version: it can now be enlarged or reduced at will, and the file size is down to 10k. The .GEM version is about 20k but otherwise identical. As vector graphics, the images are easily and quickly manipulated. You can stretch, skew, rotate, etc.

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Wish all text editors weren't slow and hard-to-handle?
ASCII, and you shall be given! Here's ...

Sudden View

by Mel Motogawa

Sudden View is a unique ASCII text editor, that offers a revolutionary new way of working with words. Sudden View is based on a concept called Live Editing, that breaks new ground in text editing ease. Conventional methods for editing text are a two-step operation. While putting your thoughts down and organizing them, you must also conform to your text editor's interface: how it wants you to move a block of text, scroll through your file, etc. This can greatly hamper the creative process. But Live Editing strives for the goal of minimizing thought-throttling interaction with the program and makes text entry/editing as intuitive as possible. As a result, you can do some amazing things with this text editor, but many common conventions are handled in entirely new and different ways.

Sudden View offers most typical word-processor features, such as word wrap; delete by word, sentence, or block; autosave; search and replace; undo; text import/export; four file buffers, etc. However, because Sudden View is, more properly, a low-overhead text editor, features such as printing are absent. Sudden View's screen is mostly for text entry/editing with a status line and the Power Menu at the bottom. Options are selected from the Power Menu, either by mouse or the many keyboard equivalents. Clicking on some menu

items takes you to a sub-menu from which more options are available.

A vertical scroll bar on the right side of the screen allows you to use Instant Access. Instead of dragging the window position indicator, as in GEM, you simply click anywhere on the bar to be transferred instantly to the related part of the document. As in other areas of Sudden View, this transition is blazingly fast.

Dynamic Scrolling is another incredibly quick way of getting exactly where you want in a file. You simply click the left mouse button and drag up/down, left/right. The screen will begin to scroll as if the mouse pointer was your hand and you were moving the page about in a virtual fashion. It's unique, and lightning-quick!

Dynamic Arrangement involves the copy, cut, paste and move operations often needed in text editing. Unlike other editors, these operations can be carried out using only mouse clicks and mouse movement. Sudden View's powerful "move" function, for example, lets you "pick up" a block of text and move it in realtime through the file, via Dynamic Scrolling. As the block moves, text "flows" around it until you arrive where you want to be. This looks very radical when you first see it, but one quickly realizes how convenient and iconic the action of moving text has become.

Another power feature is Sudden View's ability to block out lines, characters, sentences or what is called a Field Block. Field blocks are immensely helpful, for example, when editing data that is in columnar format. Say you have three columns of text and you want to move the third column to where the first column is. In a regular text editor, this would involve laborious cut-and-paste, plus tab operations. But using Field Blocks, you can block out only the column you're interested in, and move it to the desired location.

Last Change is a handy function. It remembers the last four places you edited in your document. Selecting

MANUFACTURER:

Sudden Inc.
5081 S. McCarran Blvd.
Reno, Nevada 89502
1-800-421-4228 (orders)
(702) 827-2996 (info.)

PRICE: \$69.95

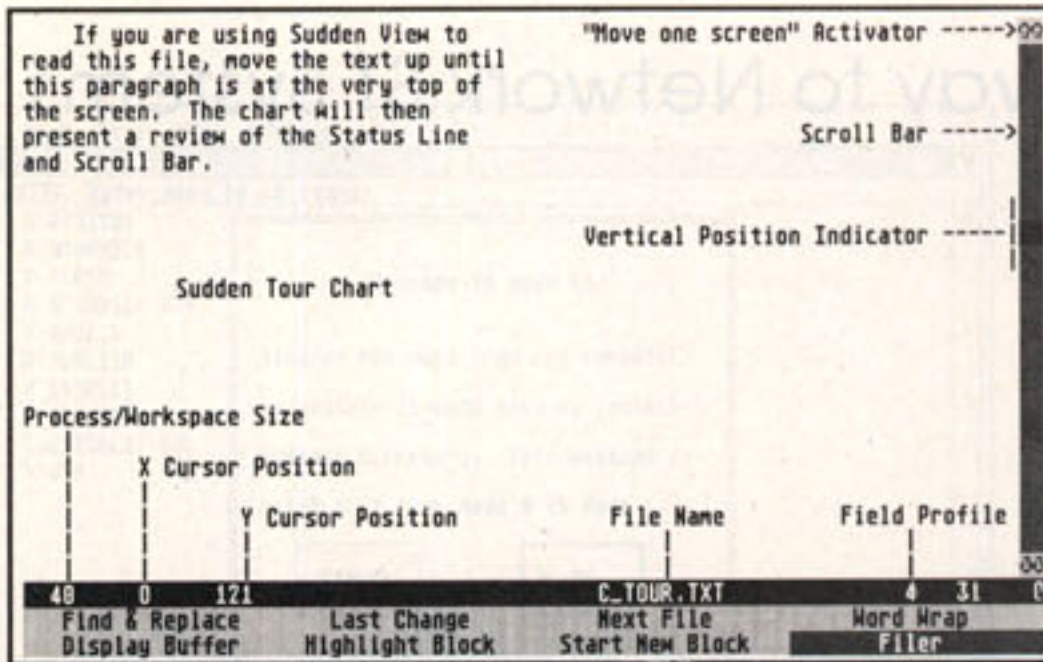


FIGURE 1. A portion of Sudden View's tutorial. The various parts of the screen are described. The status line and Power Menu are at the bottom of the screen. Power menu items can be selected using keyboard or mouse.

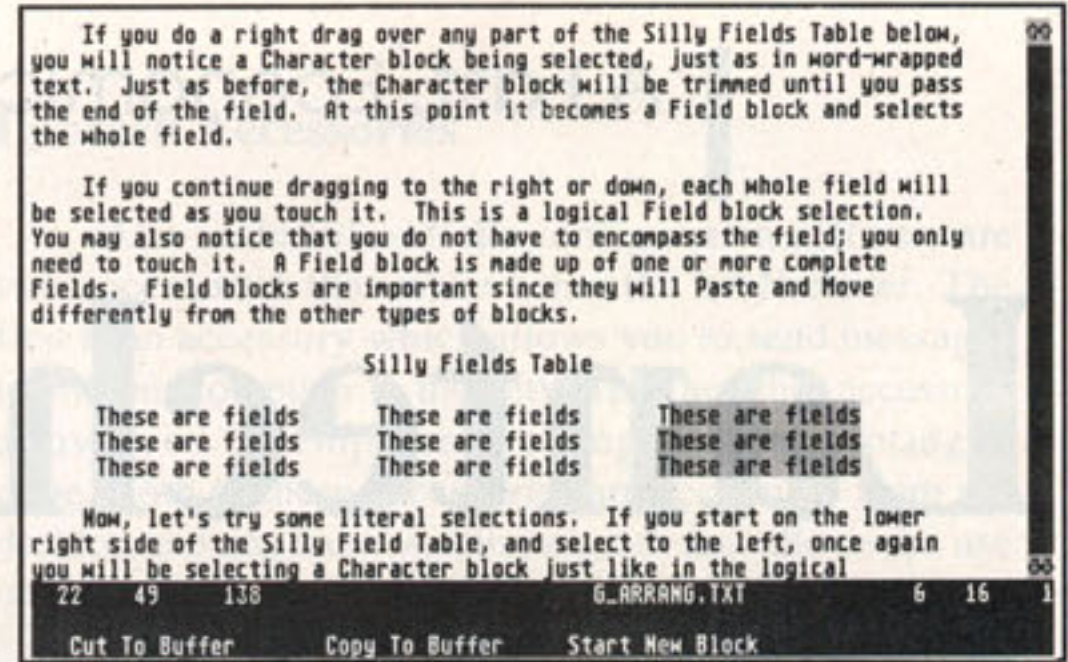


FIGURE 2. An example of a Field Block. The highlighted area can be moved, cut or copied. Transferring the column's data to another part of the document can be done quickly and easily.

the option four times brings you back to where you started. And each of the four Sudden View buffers has its own Last Change pointers. The Paste Buffer is also extremely powerful in that it remembers the last 20 blocks cut, copied, or deleted.

This is a brief summary of some of Sudden View's features. The program is an intriguing advancement in text-editing technology. Besides the obvious usage of editing text, Sudden View's tutorial suggests you press it into service as an address book, software development tool, schedule maker, and thought processor — just some of the other suggested uses. From the copious documentation (226K worth) that came with the

program and the obvious thought put into the software itself, clearly the author is serious about Sudden View and the Live Editing concept. Anything new will take some effort to get used to, but you may find in the long run that Sudden View is more intuitive and productive than the text editor you're currently using. The demo, available on GENie in the ST Roundtable File Library or from Sudden Inc. (\$9.95 from developer. Qualifies for \$20 discount when buying the registered version.), is fully-functional and gets you acquainted with the program, while the registered version offers ten additional features. I recommend a serious look at Sudden View for anyone who works with words. ■

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Example #3: Real Estate DBase



As a simple example of a Relational Database not just limited to text, HyperLINK can be set up to "link" any given field in

a database with an associated graphic file. In the Realty HAP for instance, there is a link from the database to a picture of the house indicated. This is just a sample of how Multi-Media can be used.

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A Fast, Economical way to Network ST Systems

Lantech LT-101 Network

by Joe Miranda



MANUFACTURER:
Lantech Systems
12 Shedd Road
Billerica, MA 01862

PRICE: Startup kit (2 LAN adaptors, software, manual) \$379.95. \$179.95 per node, thereafter.

When a business goes looking for a computer system, one of the first requirements is often the ability to network. Networking allows multiple computers to share files, access the same peripherals (such as printers, hard drives, backup systems, and modems), and take advantage of electronic-mail and other "network aware" applications.

Atari's TT and Mega STe systems come equipped with a LocalTalk-compatible intermediate-speed network port, and permit interfacing (via the VME bus) of Ethernet and other network cards. But the ST series has no such option. Though "network" products have appeared that employ the ST's MIDI and other bidirectional ports, all such solutions are limited by data-transfer speed.

Enter Lantech

Luckily, Lantech Systems of Billerica, Massachusetts, has developed a cost-effective, efficient, and easy to use networking system for all ST series computers. Lantech's LT101 network interface (see photo), measures a mere 4-3/4" x 2-1/4", and can be installed in the cartridge port of any ST, Mega, or STe computer with TOS versions 1.0, 1.2, 1.4 or 1.6/1.62. Connections to other computers in the network are by co-axial cable. Installing the LAN software is made easy by programs Lantech provides. Despite the program's lack of GEM "bells and whistles", it is easy to understand and use. Using the software, the network can be configured to access a hard drive connected to any other computer in the network.

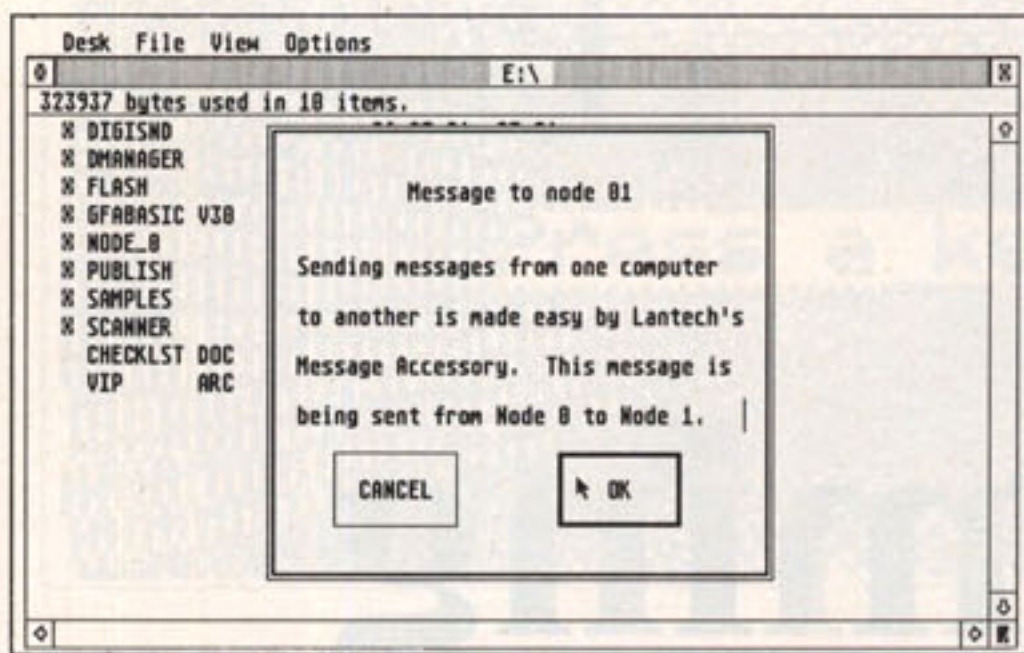


FIGURE 1. Lantech's messaging accessory.

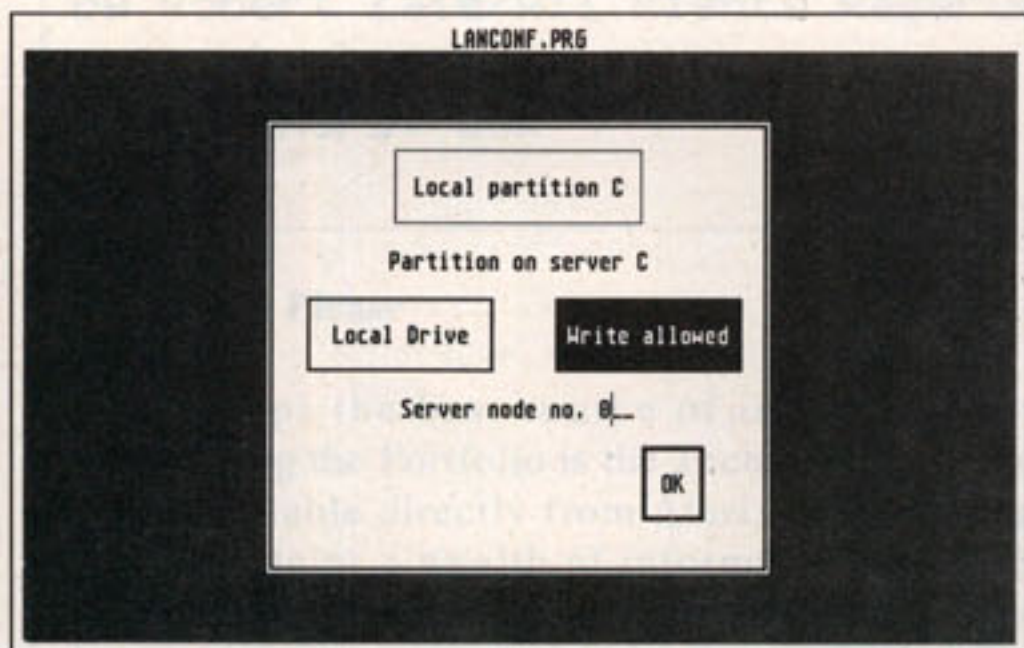


FIGURE 2. Establishing network permissions.

Running LANCONFIG.PRG presents you with a series of menus that allow you to select hard drive partitions from other computers in the network for use by each computer. The person configuring the network may elect to allow workstations full read/write access to partitions, or read-only access, on an individual basis. After assigning partitions, you can define which "Node" you wish each computer to print to. This is an ideal option when not every computer on the network has its own printer attached. Once this information has been entered, the configuration program creates a program (LANTECH.PRG) that can be run either from the desktop or from your AUTO folder. Once this program is running on every node, the networking process is mostly transparent. LANTECH.PRG takes up approximately 10K for a five-computer network with eight hard drive partitions (two drives with four partitions each). In addition to remote hard drives, each computer in the network may have its own hard drive attached in the normal way. The only thing to keep in mind is that any partition on a drive that is attached to the computer must come before partitions from the network.

Transfer of data over the network compares favorably with that of similar systems for IBM compatible computers. That DOS systems typically cost much more makes Lantech an exceptional value.

Lantech Accessories

Also included with the configuration software are two accessories that make using the LAN easier. The first is an accessory which allows you to send messages to another computer in the network. The other accessory allows you to temporarily change where printing is done. Both of these accessories are accessible from the desktop and any from within program that allows the use of Desk Accessories.

Problemettes

Although the Lantech LAN is a very solid system, there is one major problem which must be acknowledged. TOS, which was not originally designed for networking, does not provide features for resource-locking and file-sharing. Additionally, because TOS does not consider that the disks it is connected to may be updated by other systems, it does not always automatically re-read File Allocation Tables before commencing write operations. Disk caching programs, because they store not only the FAT, but actual disk sectors, in RAM, pending intermittent updates, further complicate this problem.

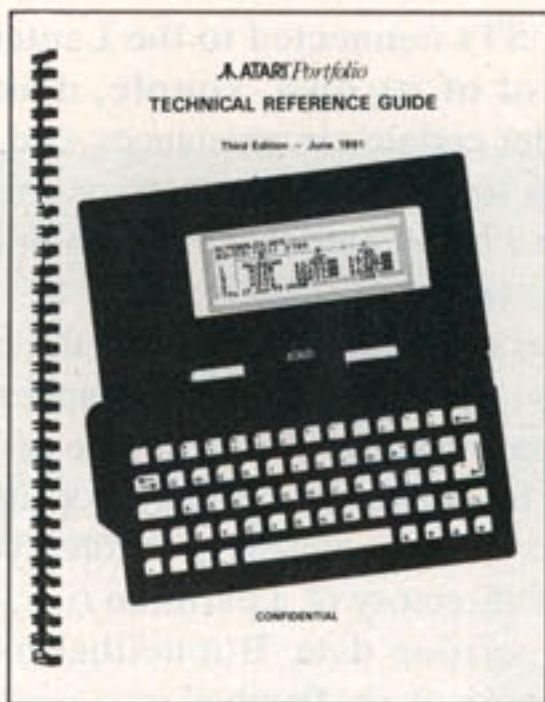
As a result, STs connected to the Lantech LAN (under the control of its own, simple, disk-server software) can, under certain circumstances, end up writing simultaneously to the same partition, or writing to a partition as dictated by an outdated FAT. In both cases, data may be corrupted.

Lantech offers several ways around the problem. By preventing individual computers from accessing, or writing to, given partitions, a certain degree of absolute protection can be built into the network configuration. Another way of protecting yourself is to force your software to re-read the directory of a partition (i.e., by reading a file) before writing data. But neither method is entirely secure or particularly flexible.

The problem is best resolved by installing software such as A&D's Universal Network, which provides the missing "network aware" operating system features. Universal Network is fully compatible with early versions of Lantech's product, and an upgrade to support the next generation of Lantech's hardware (LT201) is promised soon. In terms of sheer throughput, Lantech's simpler disk-server software is faster than the general-purpose Universal system, however; so potential buyers should assess the risks and rewards of running either product, before making a commitment.

We have not noticed any incompatibilities between Lantech's products and commercial software (though the network's message-sending accessory does not function from within non-GEM applications). Overall, the Lantech LAN is a fast, economical way to network ST systems — one that is remarkably easy to install and use. ■

Programming Portfolio

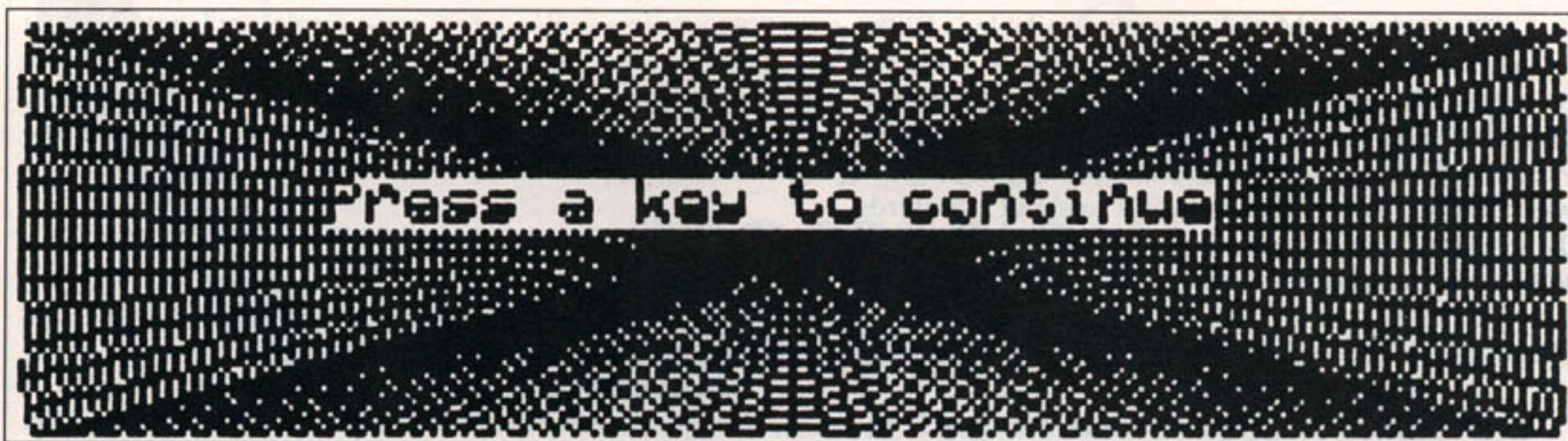


Welcome to programming portfolio! the increasing popularity of Atari's palmtop PC-compatible, and the recent release of languages and compilers for the machine, has created a need for information on how Portfolio works and how it differs from a standard PC. This column will examine a variety of Portfolio programming topics, offering a well-rounded view of non-proprietary aspects of the machine's hardware, system software, file formats, and other details. We'll also discuss programming techniques to help you write your own Portfolio applications!

ABOUT THE AUTHOR

BJ Gleason is an instructor of Computer Science at The American University in Washington D.C. and has been programming for over a decade. Gleason is author of over two dozen utilities and games, including PBASIC 4.9, the "freeware" BASIC interpreter designed specifically for the Portfolio. His Compuserve ID is 75300,2517.





```
Portfolio PowerBASIC Compiler  
Rev #1.00a ** Copyright (c) 1991  
by Robert Zale/All Rights Reserved
```

```
Compiling -->> LINES.COM  
Free memory: 66k
```

```
c:\>
```

Portfolio PowerBasic compiles one of the demo programs included in the package (left).

Above, the compiled program goes through its paces, showing off Portfolio's graphic capabilities.

Information Please

Perhaps the best source of information on Programming the Portfolio is the Technical Reference Guide, available directly from Atari. This 80+ page manual contains a wealth of information on all the secrets you need to program the machine. It also comes with a disk of source code and the Portfolio Emulation Software, which lets you run Portfolio programs on a standard PC. (\$60, plus tax) from Gail Bacani, Atari Corporation, 1196 Borregas Avenue, Sunnyvale, CA 94089). Additional facts may be gleaned from documentation supplied with PowerBASIC, PBASIC, and other Portfolio development tools. These are discussed, below.

Tiny Trade-Offs

The Portfolio's small size necessitates certain trade-offs in the machine's design. These trade-offs lead to a number of slight differences between Portfolio and standard PCs. In this first column, we will take a look at some of the Portfolio's special features, and show you how to work around the occasional challenges they present when porting applications from the PC environment. We'll also offer a survey of programming languages that can be used to create Portfolio applications from scratch.

The Screen

Screen size is one of the most obvious differences between the Portfolio and a standard PC. The Portfolio's screen is 8 lines by 40 characters, and this can sometimes cause programs expecting a larger screen. There are two possible ways around this problem. The simpler is to change the Portfolio's screen mode, using

the Setup menu. (The Portfolio has three screen modes: Normal, Static and Tracked. Normal is the 8-line x 40-character mode. In Static and Tracked, the 8 x 40 screen serves as a window to a virtual 25 x 80 screen that is PC-standard size. In Static mode, you can use ALT and the arrow keys to scroll around on the screen. In Tracked mode, the window automatically follows the cursor, which may work better for certain applications.) The second (and preferred) method is to rewrite the program to make use of the Portfolio's default display.

The second difference between the Portfolio's text screen and that of a PC involves LCD refresh. On a standard PC, writing directly to text screen memory causes information to appear at once. On the Portfolio, however, text will not be copied from screen RAM to LCD until a refresh operation is performed. Again, the Setup menu offers a simple solution that may work for certain applications: change the Portfolio's Refresh mode. Options include a refresh triggered by the system timer, keyboard activity, or both. For programs that write directly to the screen, you should select both (making refresh as frequent as possible). However, it is highly recommended that you change the program to operate in the No Refresh (normal) mode, since this is the Portfolio's default state.

Memory

The standard Portfolio comes with 128K of memory, at least 15K of which is reserved for DIP/DOS and virtual drive C:. Care must therefore be taken to keep programs as small as possible. A common problem is that some programs automatically assume there is at least 256K of memory available, and they just use it, instead of requesting it from the operating system. This will typically cause the system to crash.

The largest RAMcard currently available is 128K. In order to save space on the RAMcard, it is highly recommended that you use the PKLITE or LZEXE utilities (both available as shareware in CompuServe's Portfolio Forum (GO APORTFOLIO)). These utilities will compress executable programs to about two-thirds their normal size. Programs compressed this way will self-extract automatically upon execution.

Graphics

The Portfolio's graphics screen memory is arranged as a simple bitmap, 30 bytes (240 bits) across by 64 lines down, occupying 1,920 bytes of RAM. Each pixel is represented by a single bit, which can be either 1 (on), or 0 (off), and the LCD is updated by refresh in graphics mode, the same as in text mode. This differs from the arrangement on a standard PC, both in dimensions, and in the fact that no "graphics text" facility is supported. Thus, while you can draw on the Portfolio's graphic screen using ROM BIOS functions, you cannot mix text and graphics without special programming. PowerBASIC and PBASIC evade this minor limitation by creating and printing their own character sets.

Timer

On a standard PC, a timer tick occurs 18.2 times a second, updating the realtime clock. Mostly to reduce battery drain, this rate has been reduced on the Portfolio to 1 tick per second in Fast mode, and 1 tick every 128 seconds in Normal mode.

Some programs count timer ticks during initialization in order to determine the speed of the computer. If the code waits for 18 timer ticks, this process will take 18 seconds on a Portfolio in Fast mode, and over 36 minutes in Normal mode. For this reason, adjusting system speed to Fast can sometimes solve the problem of a program that seems to lock up the machine. More generally, Portfolio programs should avoid this method for determining clock rate.

Parallel and Serial Ports

The Portfolio's detachable parallel and serial ports reside at different addresses than on a PC, and use a slightly different interrupt structure. This leads to problems with communications programs that write directly to hardware.

Portfolio Pluses!

Portfolio also has a large number of built-in options, not normally supported on the standard PC. Portfolio has functions for drawing boxes on the screen, handling menus, dialing the telephone, and employing a wide variety of "hooks" into the built-in applications. The technical manual describes these options in detail,

but there are also a few non-proprietary languages that let you access these special functions. Using these Portfolio-only features can reduce the size of your code, and make your program look and feel more like the built-in applications.

Programming Tools

Now that you are aware of some of the things that make Portfolio unique, let's take a look at some of the programming languages for the machine. Two classes of language are available: systems that will run on the Portfolio directly, and those that run on a PC, allowing the creation of programs that can be transferred to the Portfolio and executed. The big advantage of having a programming language on the Portfolio is that fact that you can then easily program on the go. I have often found myself in the strangest circumstances, and the ability to be able to create and modify programs on the fly has been invaluable. Naturally, the best systems work both ways, giving you maximum flexibility in application development. (\$99.95, Atari Corp., 1196 Borregas Ave., Sunnyvale, CA 94087)

Basics

There are two versions of BASIC available for the Portfolio. The first is Atari's PowerBASIC compiler. This is a reasonably straightforward compiler (for a review of PowerBASIC, see Atari Explorer, September 1991, page 70), with some interesting built-in functions. PowerBASIC allows for text and graphics on the same screen, but does not allow you to access the more interesting Portfolio-only features.

The other is PBASIC version 4.9, my own "freeware" BASIC interpreter for the Portfolio, available in the APORTFOLIO forum on CompuServe (for a review of an earlier version of PBASIC, see Atari Explorer, Jan/Feb '91, page 70). PBASIC is an almost-complete implementation, lacking only Random Access Files. And PBASIC does allow easy access to Portfolio-only features.

Forth

Essex Marketing Services ((203) 651-8284) have developed a FORTH-83 compiler for the Portfolio. It has a kernel of just 8K, leaving a lot of room for programs and data. Versions of the compiler are available for PC, and the HP95LX as well, allowing for easy development across platforms.

A86

Eric J. Isaacson's A86 is not only one of the fastest 8086 assemblers, but it is one of the few assemblers that will run on the Portfolio. Version 3.12 has been tested on the Portfolio, and found to work perfect-

Arabesque™

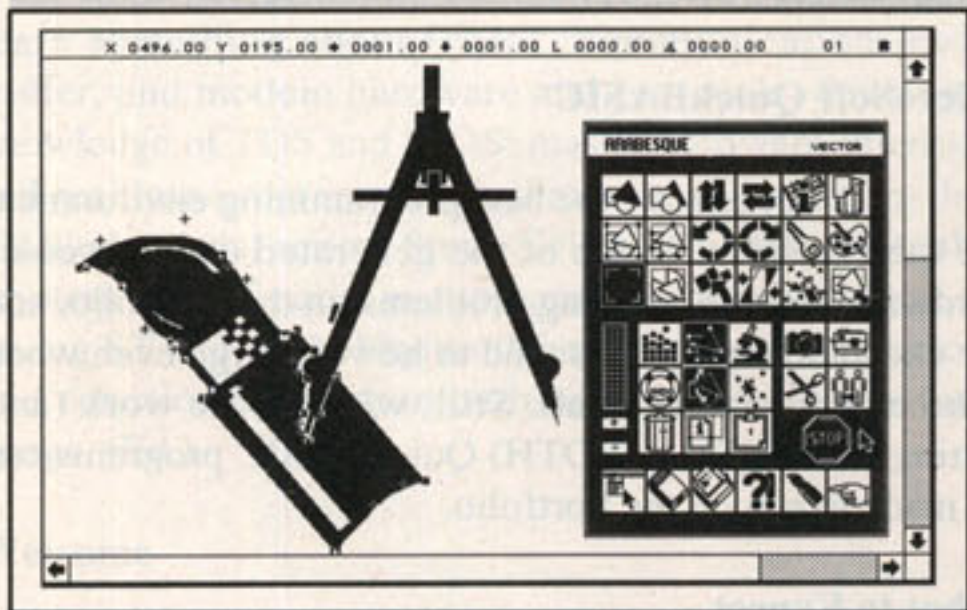
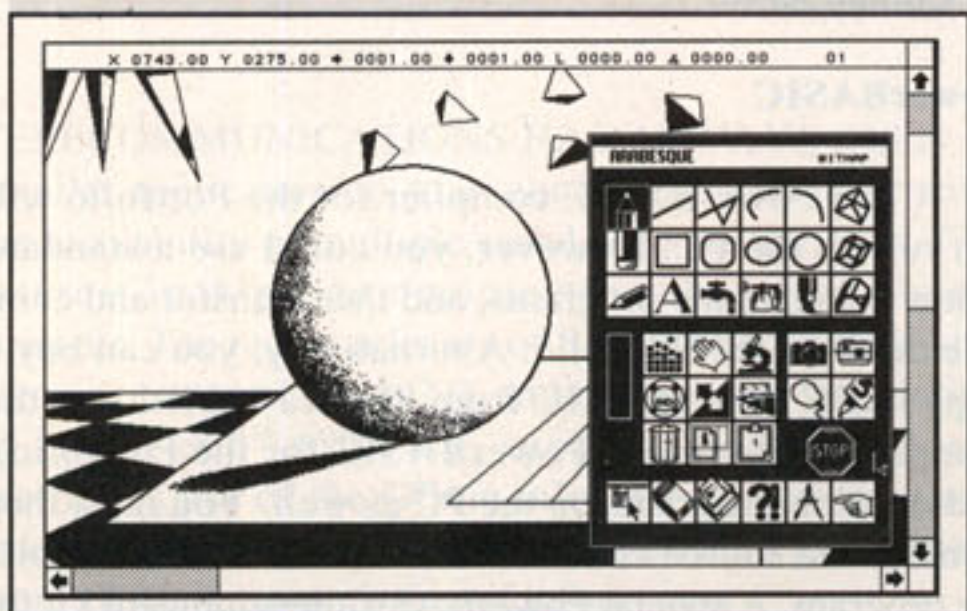
PROFESSIONAL

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Arabesque Professional is a complete Bitmap and Vector based illustration program. It allows you to create, import, edit, and save graphics in the two standard computer formats, Bitmap and Vector.

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- Draw points, lines, Bézier polygons, B-splines, circles, ellipses, arcs, 2D/3D, and rectangles (with or without rounded corners) in Bitmap or Vector mode.
- Choose from various line end styles, thicknesses, drawing modes, etc.
- 108 different fill patterns, edit your own or use an image block.
- Block operations (rectangle or arbitrary shape) including: cut, paste, mirror, rotate, bend, increase contrast, contour, smooth, enlarge, save and load.
- Outputs to 9- and 24-pin dot matrix, "Bubblejet", as well as Atari and HP laser printers.
- All functions operate rapidly in magnification mode.
- A complete UNDO feature.
- Load and save various graphic types including IMG, IFF, Degas, NeoChrome, Doodle, Calamus CVG, GEM/3 and Arabesque's own compressed formats.
- Configurable "spray can" feature.
- Complete selection of drawing modes, including: replace, XOR, AND, transparent, reverse, and more.
- Easily convert Vector graphics to Bitmap graphics, with optional use of gray scales.
- Fully illustrated manual.



Arabesque is also a program with an incredible amount of attention to detail. Its speed will amaze you, while its ease of use will astound you!

Arabesque is compatible with all Atari computers. It supports large display screens, like the Moniterm. Requires at least 1 megabyte of RAM and a monochrome monitor.

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Portfolio has functions for drawing boxes on the screen, handling menus, dialing the telephone, and employing a wide variety of "hooks" into the built-in applications.

ly, though some earlier versions of this shareware assembler will cause the Portfolio to crash. (Available on CompuServe in the APORTFOLIO Forum).

Turbo Pascal 3

Because of the Portfolio's timer design (as described before), Turbo Pascal 3.01A from Borland International will not run easily on the Portfolio. However, in CompuServe's APORTFOLIO forum, there is a document called PURBO.TXT that describes how to modify the development system to run in this environment. After making a simple modification to the compiler with DEBUG, you merely set the Portfolio's display to Tracked and Refresh trigger to "both" (i.e., keyboard- and timer-triggered refresh), and you are ready to run. Compiled programs will also run on the PC, but the timing might be off, depending on the PC's clock speed.

Off the Port

Offboard program development offers the advantages of using a faster machine, a more sophisticated compiler, and more complete debugging facilities than are available on the Portfolio itself. The problem is that you may not always be able to test a program that uses any of the Portfolio-only functions. Running a program that accesses a Portfolio-only function on a PC without Atari's emulation software will typically lock up your machine.

Borland Turbo C

This compiler is widely used by many developers writing code for the Portfolio. To insure compatibility, be sure to set the DIRECTVIDEO parameter to 0. There are a number of libraries under development to provide Portfolio-only support for the language.

Turbo Pascal 5.5 and 6

Turbo Pascal programs will run on the Portfolio, provided you don't use the CRT unit, because it tries to calculate the clock speed. There is a replacement avail-

able for the CRT unit, called The Portfolio Unit, available in the APORTFOLIO forum on CompuServe. This emulates a fair number of the functions in the CRT unit, and adds access to a number of Portfolio-only functions, such as Boxes, Sounds, and Menus. This unit will be examined in an upcoming issue of this column.

PBASIC Editor

The PBASIC interpreter will run on both the Portfolio and the PC. But since the PC does not have the Portfolio-only functions, some statements will generate errors. The PBASIC EDITOR, Version 2.0, takes care of that problem by providing Portfolio Emulation built into the editor. This allows for easy development of BASIC programs on and off the Portfolio. The editor is available on CompuServe.

PowerBASIC

The PowerBASIC compiler for the Portfolio will not run on the PC. However, you could use a standard editor to create the programs, and then transfer and compile them on the Portfolio. Alternatively, you can buy a copy of PC PowerBASIC from Spectra Publishing (the company that created PowerBASIC for the Portfolio), and develop programs on the PC as well. You must then transfer the source code to the Portfolio and recompile the program. A special PowerBASIC development kit for the PC is expected soon, which will allow PowerBASIC users to access Portfolio-only functions. (Spectra Publishing, 1030 E. Duane St., Ste. D, Sunnyvale, CA 94086, (408) 730-9291)

MicroSoft QuickBASIC

... is not exactly the best programming environment for the Portfolio. Much of the generated code accesses hardware directly, causing problems on the Portfolio, and the executable programs tend to be very large even when source code size is small. Still, with a little work (and setting REFRESH to BOTH) QuickBASIC programs can be made to run on the Portfolio.

What to Expect

Now that we've laid out the groundwork for programming on the Portfolio, we will start to write some applications. In upcoming issues, we will look in-depth at different programming languages, and show you how to write applications in it. We will look at the special features of each language, and where possible, show you how to access those special Portfolio-only features.

Editor's Note: The next installment of BJ Gleason's column will appear in Atari Explorer's March/April 1992 issue. ■

Serial Programming

TELECOMMUNICATIONS HAS ALWAYS BEEN A popular application on Atari computers. And now, with the availability of multiple serial ports on the Atari TT, interest in Atari communications has never been stronger. The recent releases of Stealth and STalker, the announcement of Flash 2.0, and the growing popularity of "front end" software, such as Aladdin (which facilitates use of the GENie information service), are evidence of an upsurge of market interest in ever faster, more efficient transmission of information.

Learning to write communications software can be lots of fun. This is especially true, since serial-port applications involve a little of everything. To program truly high-performance comm software, you need to learn something about UART, communications controller, and modem hardware and protocols; develop a knowledge of TOS and BIOS; master hardware-interrupt and realtime-programming techniques, and more. In this detailed tutorial series, Steve Yelvington delves into the mysteries of ST serial port programming, with an eye to giving ST and TT hobbyists the ability to write practical and functional communications software in any language. (Ed.)

Welcome

Before the ST, serial ports were the playground of only a few truly dedicated assembly-language hackers. For most of us, writing software for modem communications was simply out of the question. But the ST changed all that. With TOS, communicating is simple. No assembly required.

Sure, you'll need to learn a few tricks before you jump in and start writing your own terminal program or bulletin board system. But they're not hard tricks to learn, and — armed with a few key facts and just about any programming language — you can craft your own communications program in an evening or so.

Basic Connections

Regardless of whether we're talking about the ST's standard, 25-pin modem port, or a Mega STe or TT "AT-style" 9-pin port, any RS-232 serial connector contains only two pins that actually carry data. Of these (usually pins 2 and 3), one is used to transmit, and one to

FIGURE 1. RS-232 Spec for 25-pin Connector

Pin	Source	Usage
1	-	chassis ground
2	T	Transmitted Data
3	M	Received Data
4	T	Request To Send
5	M	Clear To Send
6	M	Data Set Ready
7		signal ground
8	M	Data Carrier Detect
9	-	Reserved (PTT use)
10	-	Reserved (PTT use)
11	T	select transmit frequency (PTT use)
12	M	backward channel DCD
13	M	backward channel CTS
14	T	backward channel Transmit
15	M	transmitted data clock
16	M	backward channel Received Data
17	M	received data clock
18	T	initiate local analog loopback
19	T	backward channel RTS
20	T	Data Terminal Ready
21	M	signal quality
22	M	Ring Indicator
23	T	data rate selector
24	T	external transmitted data clock
25	M	test indicator

T = Terminal M = Modem

receive. The remainder of the pins serve other purposes under the RS-232 specification: voltage, grounding, hardware "handshaking," clock pulses, etc. (See Figure 1).

Most serial applications use relatively few of RS-232's features to manage communication between devices. In fact, it is rare to find all features supported in any given hardware implementation — most "industry-standard RS-232 ports," support only a practical subset of the full protocol specification.

The simplest practical two-way RS-232 connection, in fact, employs only three wires: transmit, receive, and ground. No real hardware handshaking is required for communication (if necessary, various signals can be simulated at either end, by jumping pins to voltage or ground on their own connectors). If transmit and receive pins are criss-crossed, such a cable can be used to connect two computers in what is known as a "null modem" configuration (see Figure 2). Additional signals and their pinouts are used for modem control, and will be discussed later in this series.

Across an RS-232 connection, a bit of data travels as a deflection in voltage that lasts for a certain interval of time. The validity of a bit is determined both by its own duration and by the duration of the period of "silence" before and after its transmission. As long as minimum durations are maintained, bits can be transmitted and received without the need for a fixed clock signal, used to synchronize devices at either end. Communication of this type is thus referred to as "asynchronous." "Synchronous" communication is also supported under the RS-232 protocol, and by all Atari hardware.

In asynchronous RS-232 communication, bits are not sent individually, but in series (hence "serial") whose makeup depends on a protocol that must be agreed upon before communication can take place. Commonly, a packet consists

FIGURE 2. A simple, three-wire "null-modem" RS-232 connection, appropriate for mating two ST/TT computers by their main serial ports.

25-pin DB	...	to ...	25-pin DB	... or to ...	9-pin (AT Style)	
Pin			Pin		Pin	
TX	2	.....	RX	3	TX	2
RX	3	.....	TX	2	RX	3
GD	7	.....	GD	7	GD	5

FIGURE 3. Control registers for ST/STe/TT modem port (provided by 68901 MFP/ST).

Base Address: \$FFFF8000

Offset:

\$FA06 Interrupt Enable Register A
 \$FA0A Interrupt Pending Register A
 \$FA0E Interrupt Service Register A
 \$FA12 Interrupt Mask Register A
 \$FA26 Sync Character Register
 \$FA28 Control Register
 \$FA2A Receive Status Register
 \$FA2C Transmit Status Register
 \$FA2E Data Register (write to transmit, read to receive)

of a "start" bit, eight data bits (making up a byte), a "parity" bit (used in error-checking), and a "stop" bit, but variations in the number of data and stop bits, and the status of the parity bit are possible. All but the data bits are automatically generated by the RS-232 hardware, under the control of an algorithm implied by the current protocol. Baud rate is also clocked and managed by the hardware.

Inside the Machine

The view from inside the machine is slightly different. To the ST's (or TT's) microprocessor, the modem port appears as a quartet of 8-bit-wide "registers," each of which occupies a fixed address. Control of the serial hardware, data transmission and reception, and error-checking are performed, at the lowest level, by writing to, and reading from, these memory locations, which map to the ST/TT's main 68901 MFP (Multi-Function Peripheral Chip). Additional serial ports on Mega STe and TT are

provided by a second MFP 68901 chip, and by the new Zilog SCC (Serial Communications Controller), which also supports the LAN connector. These additional ports are controlled by a similar register DMA scheme, that will be discussed later in the series. For now, Figure 3 shows the layout of registers for control of the main modem port, and orchestration of its interrupt scheme.

Interrupts

Simple serial communications software can be written that "talks" directly to the port addresses, "polling" receiver and transmitter status (by reading from the registers and checking the appropriate bits) to determine when data is available, or when a byte can be transmitted. But the enormous difference between microprocessor speed and maximum baud rate means that such a "polling" application will spend most of its time just sitting around, waiting for status bits to change. Because the

microprocessor has hundreds of other jobs to do in the meanwhile, a method must be found to service the serial port hardware on demand.

To enable "on demand" processing, the serial port hardware supports four types of "interrupt." The "receiver data ready" interrupt occurs when data has arrived at the serial port and is available for reading. The "transmit buffer empty" interrupt occurs when the transmitter is ready to receive a byte of data for transmission. Transmit and receive error interrupts are also available. All interrupts may be individually enabled (via the "interrupt enable" registers), so that an interrupt-driven application can service as many, or as few of them, as is required. Additionally, interrupts can be "masked" (via the mask registers) so that they cannot demand service (see below), but cause bits to be set in the "interrupt pending" registers, recording the

fact that error and other conditions have occurred.

Interrupt bit assignments are as follows for IERA, IPRA, ISRA, and IEMA. Bit 1 relates to the "transmit error" interrupt. Bit 2 to the "transmit buffer empty" interrupt, called when the transmitter is ready for new data. Bit 3 is called on receive errors (parity, etc.). And Bit 4 is called when a received character is waiting to be read. A given interrupt is enabled by writing a '1' to the corresponding bit of the Interrupt Enable Register. A pending interrupt is cleared by writing a '0' to the corresponding bit of the Interrupt Pending Register. A '0' in the corresponding bit of the Interrupt in-Service Register tells the system that an interrupt has been serviced. And writing '0' or '1' to the corresponding bit of the Interrupt Mask Register tells the system whether or not an interrupt should be treated as masked.

Interrupt Servicing

When an interrupt is enabled, and the particular condition occurs that sets it off, the serial port hardware sends a signal to the Atari's microprocessor. This signal forces the microprocessor to suspend operations, save its current state, and branch to code pointed at by a "vector address" associated with the interrupt in question. Vectors for modem-port interrupts are stored in ST main memory, beginning at address \$100 (hex), as shown in Figure 4. Each location stores a four-byte (longword) address, pointing to an interrupt handler.

Interrupt-handling code "services" the associated interrupt by reading data, writing data, or doing error-handling. It then terminates interrupt-processing by clearing (setting to 0) the appropriate bit in the serial hardware's "interrupt

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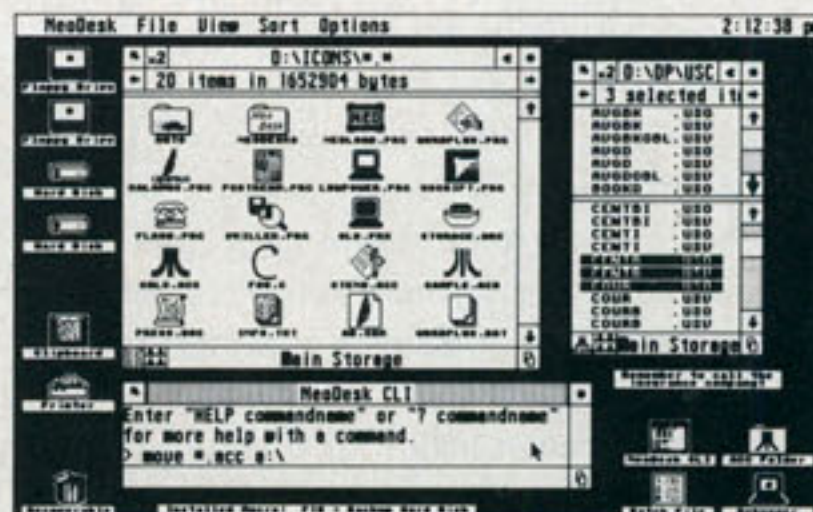
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service" register, allowing subsequent interrupts to occur. Normal microprocessor operations are then resumed.

Interrupt-service routines can be written in assembler or compiled languages; and we'll be discussing techniques for writing them, later in this series. For now, the ST's operating system, TOS, provides limited facilities for interrupt-driven transmission and reception of serial data and status-checking.

TOS Facilities

To assist in managing the serial port, TOS maintains a pair of FIFO ("First-In/First-Out") buffers — one for input, and one for output. The buffers are emptied (in the case of transmission), and filled (in the case of reception), by low-level interrupt-service routines that talk directly to the serial port hardware.

Though default buffers are allocated on system startup, a program can relocate and resize them at will, simply by changing pointers and values in a buffer-management structure called an "iorec." As Figure 5 shows, TOS' buffer-management system is fairly sophisticated. Separate "head" (data in) and "tail" (data out) indices, plus "high-water" and "low-water" indicators are maintained in the structure, as two-byte integers. The head and tail indices relate to flow control. In the case of data reception, if more characters are received (and buffered) than indicated by the high-water value, the ST will send an "XOFF" character (CTRL-S) to halt transmission (if its flow-control feature is enabled). When a sufficient number of characters has been removed from the buffer (i.e., by an application), an "XON" character will be sent, allowing transmission to resume. In the case of transmission, TOS will use high-water and low-water marks to condition the "output status" flags returned by BIOS- and GEMDOS-level serial status inquiry functions.

FIGURE 4. Vector addresses for modem port interrupts.

\$124	Transmit Error
\$128	Transmit Buffer Empty
\$12C	Receive Error
\$130	Receive buffer full

FIGURE 5. iorec Structure

```
struct iorec{
    long ibuf;           /* Pointer to buffer */
    int ibufsiz;        /* Buffer size */
    int ibufhd;         /* Head index */
    int ibuftl;         /* Tail index */
    int ibuflow;        /* Low-water mark */
    int ibufhi;         /* High-water mark */
};
```

FIGURE 6. GEMDOS-level serial I/O functions, and preprocessor macro definitions.

Function	Description
Cauxin	Read a character without echo
Cauxout	Write a character
Cauxis	Return TRUE if a character is available
Cauxos	Return TRUE if output is possible, i.e., the output buffer has room for more data


```
#define Cauxin()          (short) gemdos(0x3)
#define Cauxout(a)        (void) gemdos(0x4,(short)(a))
#define Cauxis()          (short) gemdos(0x12)
#define Cauxos()          (short) gemdos(0x13)
```

FIGURE 7. A C function that writes a nul-terminated string to the serial port, via GEMDOS.

```
#include <osbind.h>

/* Write a nul-terminated string to the aux port */

void Cauxws(s)
register char *s;           /* Argument is pointer to start of string */
{
    register char c;       /* "Register" variable declarations can
                           speed program execution */

    while (c=*s++)         /* A typically-terse C expression: variable
                           c is equated to the character pointed at
                           by s, then s is incremented to point at
                           the next character. The "while" loop will
                           terminate when the value of c is 0
                           (false), which will occur when s points
                           at the nul character ('\0') that
                           terminates the string. */

        Cauxout(c);       /* Write the character */
}
```

Iorecs

Access to the ST's built-in interrupt-driven serial I/O facilities is offered at several "levels" of the operating system, including BIOS and GEMDOS. TOS provides ways set RS-232 parameters (baud rate,

word size, stop bits, parity, flow control, etc.), to locate iorec structures (and thus to relocate and resize buffers), to test input and output status, and to read and write to and from the buffers themselves (TOS handling all the details of buffer-stuffing, pointer and counter updating, plus the actual

hardware-level transmission and reception of data).

For certain applications, this scheme is too limited — primarily because TOS' own general-purpose facilities are not designed to do additional specialized processing of data within interrupt-service cycles. A "background" upload-download program that employs the Xmodem protocol, for example, would likely wish to perform handshaking, error-checking, and "packetization," as interrupt-driven functions. For such applications, there are various ways to replace the basic TOS routines with "home made" handlers. Another problem is that TOS does not provide facilities for handling error interrupts. These must also be provided by the programmer, if required.

Elementary I/O

Most of the time, however, all you have to do is treat the serial port as if it were the console.

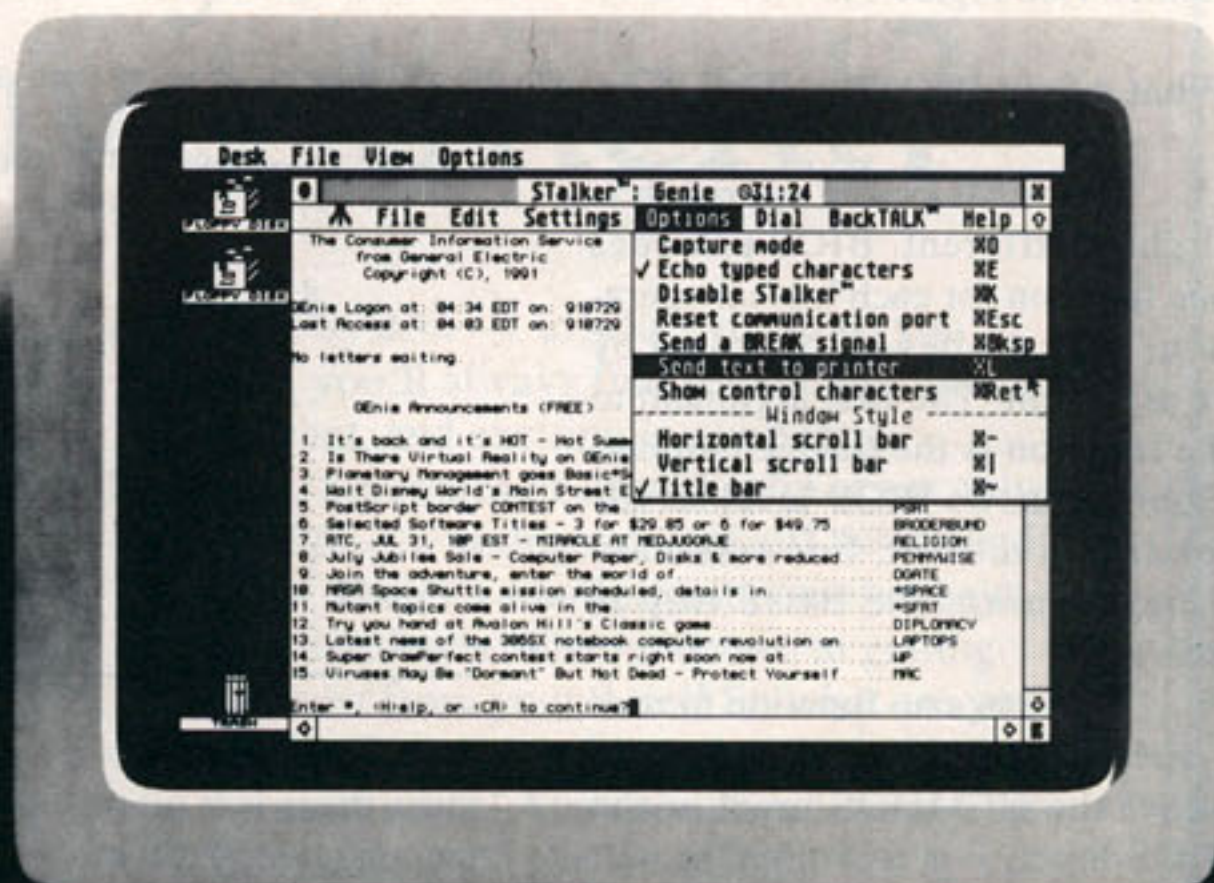
We're going to look at some examples of how to do this. They're written in C, but if you're programming in another language, don't despair. C is used here only to string together TOS functions. The basic strategies don't change when you shift to another system of notation.

TOS is organized into several "layers," including BIOS and GEMDOS. Both provide functions for single-character modem-port I/O that work exactly like their console equivalents (see Figure 6). In C, the functions are generally defined as preprocessor definitions that encode calls to the system gemdos() function. Other languages may require that you write GEMDOS calls explicitly. If you're coding in assembler, you should be able to translate by keeping in mind that you push arguments (as required) onto the stack from right to left and then call trap #1 for GEMDOS.

To send the character "A" to the ST's screen using GEMDOS,

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you would do this: Cconout('A'). To send the same character to the modem port, simply use the equivalent aux function: Cauxout('A').

GEMDOS has a function Cconws that writes a string of characters to the console with one function call. There's no serial port equivalent for Cconws, but you should be able to write one easily enough (see Figure 7).

What About BIOS?

From BIOS, the approach is slightly different. BIOS provides one function for each logical operation, with the device indicated by an argument. The first argument to the function is the device number. Figure 8 shows BIOS-level serial-related functions. For assembly programming, the BIOS trap is #13.

There is a no function to read a string from the modem port at either the GEMDOS level or the BIOS level. For reasons that will become clear shortly, you should write your own.

A Terminal Example

All of the GEMDOS and BIOS input functions return 32-bit LONG values. In the case of the serial port, only the low 8 bits are interesting: they contain the character read. Separating these bits from the 32-bit LONG value that con-

FIGURE 9. A very dumb terminal program.

```
#include <osbind.h>

#define BANNER "\033EIncredibly dumb full-duplex terminal version 0.1\r\n"

main()
{
  int c;

  Cconws(BANNER); /* Display banner string */

  for(;;){ /* Endless loop */
    if (Cauxis()){ /* Data waiting at the AUX port */
      c = (int) (Cauxin() & 0xFF); /* Get it and clean it */
      Cconout(c); /* And write it to the console */
    }
    if (Cconis()){ /* Data waiting at the console */
      c = (int) (Cnecin() & 0xFF); /* Get it and clean it. Character
                                   echoed automatically to screen. */
      if (c) /* If it's not a NUL from a function key */
        Cauxout(c); /* Write it to the AUX port */
    }
  }
}
```

tains them is a matter of ANDing the long with 0xFF hex.

Given the above information, we can actually write a (very) dumb terminal program (see Figure 9). The technique used is to "poll" (test) the keyboard and serial port for input, by turns.

In the case of the console, the low 8 bits will contain the ASCII code corresponding to the key — if there is one. If the keystroke is a nonstandard key, such as a function key, HELP or UNDO, the low eight

bits will be an ASCII nul value. In all cases, the upper 24 bits contain a unique keyscan code and information regarding the state of the shift keys.

You'll notice that the above example contains no code for setting baud rate, or other parameters. For the time being, you'll have to do this from the Desktop's Control Panel. Also note that although the program is not explicitly written to terminate, because GEMDOS console I/O processes control-characters, hitting Ctrl-C will cause the program to terminate.

Of course, that means you can't send control-C out the modem port. That's one of many reasons it's called an "incredibly dumb" terminal. You'll probably want to rewrite the program using BIOS functions and test for use of the UNDO or F10 keys.

Next issue, we'll begin by discussing enhancements to the above program that will support timeout processing, and begin our discussion of modem control and protocol configuration.

Editor's Note: Part 2 of Steve Yelvington's column will appear in Atari Explorer's March/April, 1992 issue. ■

FIGURE 8. BIOS modem-port-related functions and preprocessor macro definitions.

Serial	Description
Bconin(1)	Read a character
Bconout(1,c)	Write a character c
Bconstat(1)	Return TRUE if a character is available
Bcostat(1)	Return TRUE if output is possible
#define Bconstat(dev)	bios(1,(short)(dev))
#define Bconin(dev)	bios(2,(short)(dev))
#define Bconout(dev,ch)	bios(3,(short)(dev),(short)(ch))
#define Bcostat(dev)	bios(8,(short)(dev))

(Note: "dev" is 1, for the serial port.)

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Individual implementations have extended the language in various ways. Atari PILOT, for example, released in cartridge form in 1980 for the Atari 8-bit series, featured "turtle graphics," a machine-language subroutine interface, and other enhancements. Now eSTeem, Inc., of Hoover, AL, has developed a series of state-of-the-art PILOT executives for the Atari ST line. ESTeem PILOT SE, the flagship of the series, is an extended version of Standard PILOT with enhanced file-handling, program "load and go," and I/O commands, and featuring a secure, password-based multiuser interface. ESTeem PILOT is equivalent to PILOT SE in all respects, save that it is designed as a single-user system. The final component of the series, eSTeem COPILOT, is a shareware runtime interpreter for eSTeem PILOT programs. COPILOT is included with eSTeem PILOT,

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BAUD RATE: 1200 2400 4800 9600

FLOW CTRL: NONE XON/XOFF RTS/CTS

LENGTH: 7 8

DELAY:

PARITY: NONE ODD EVEN

WAIT: YES NO

START BITS: 0 1

END-OF-MESSAGE: CR CR/LF CODE

STOP BITS: 0 1 2

MESSAGE BUFFERS: NINE (30) ONE (255)

CDROM/VIDEODISC/AUX BUFFER SIZE:

OK
CANCEL

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and may be copied and distributed with PILOT modules on a non-commercial basis, free of charge.

Installation

Installing eSTeem PILOT is easy enough, provided you follow the instructions in the manual. The software is not copy-protected, but requires that you enter a license number and verification code, then delete a set of "demo" configuration files, before full access is granted to program features. The manual also details a method for creating a "demo" version of PILOT that may be freely distributed.

ESTeem PILOT is an interpreter executive, containing no facilities for program-editing. Instead, it is designed to load and execute PILOT modules composed on an external text editor and saved as ASCII files. While advanced programmers may take this in stride, neophytes might be disappointed to discover that because eSTeem programs are developed offline, convenience features such as immediate-mode execution and automatic syntax-checking are not available. On the

other hand, I was pleased to discover that, because eS-Teem PILOT is GEM-based, any of the new breed of superfast desk-accessory ASCII editors (SuddenView, reviewed in this issue, is my current favorite) works just fine for generating PILOT code.

Pilot Syntax

The most wonderful thing about PILOT is that you can describe the entire language in a paragraph. PILOT statements may contain a label (PILOT does not employ line numbers); a command; an optional conditioner (command modifier or subcommand); a conditional expression (which, if not true at runtime, will prevent the command from executing); a colon separator; and an object upon which the command is performed. PILOT statements may include all of these components, or just a few of them (See Figure 1).

Commands are simple and mnemonic, and may be issued in complete form, or shortened to single-letter equivalents (e.g., 'TYPE:' = 'T:'). In this example, the T(YPE): command (here used with its 'H' conditioner, which forces the cursor to 'hang' on the message line after the prompt is printed) is used to print messages on the screen, and the A(CCEPT): command to retrieve user input and store it in string variables. The M(ATCH): command, one of PILOT's most appealing features, tests the result against a range of possible responses. If no match is found, the J(UMP): command, with its 'N' conditioner (for "No"), causes execution to branch to appropriate code.

Esteem Extensions

The eSTeem dialect offers a wide range of extended commands for file-handling, general RS-232 serial and printer I/O, and graphics. In the latter case, the system is capable of loading up to two Degas .PI2 or .PI3 files and up to eight GEM Metafiles (such as are produced by EasyDraw) at one time, and supports both quick image-to-image paging and simultaneous display of multiple images. The eSTeem screen is capable of text-only or graphics-only operation, and can also assume a "split-screen mode," in which four lines of text are displayed at the base of a graphic image. Additional graphic commands include the ability to set up to five label "markers" on screen, for selection with the mouse, and to draw complex graphics with hidden "hotspots" for mouse selection. Additional features include program-assignable keys, and a unique Help feature that facilitates the provision of context-sensitive help, even in simple programs.

ESTeem PILOT offers a complete subsystem for laser videodisc control via RS-232. Compatible with any laser videodisc player that supports a serial interface (e.g., Pioneer LD-V4200, LD-V6000, etc.), the subsystem consists of an elegant suite of VIDEO: commands

FIGURE 1. Section of a typical PILOT program.

```
TYPEH:Hi! What's your name? %% Type message, hang cursor
A:$name %% Accept answer
TH:
Well, $name, what do you think of the article, so far?
A:$thinks
M:great,terrific,super,wonderful,outstanding,aces %% Match terms
JN:PROBLEM %% If no match, jump to label
T:
Well, $name, you've obviously got superb taste!
J:EXIT %% Unconditional jump to label
*PROBLEM %% Problem routine starts here
T:
A less-than-superlative response, eh $name? Who called you a critic?
*EXIT
END: %% End program
```

that allow serial port configuration, message-buffering and retrieval, delay processing, and command transmission. We saw the system demonstrated at WAACE and at the recent Chicago AtariFest, and were much impressed. Hooks have also been built into eSTeem PILOT for control of Atari CDAR-series CD-ROM drives.

Docs and Extras

Because the COPILOT runtime program necessarily duplicates most of the executive features of eSTeem PILOT, a protection scheme is employed whereby COPILOT can only run PILOT modules for which special "runtime codes," generated by eSTeem PILOT, are made available. It is thus impossible to use COPILOT as one does eSTeem PILOT — i.e., as an executive for original program development. We think this is fair (and actually, pretty neat).

Documentation for the package is comprehensive, including full installation instructions, a brief tutorial on PILOT, a complete command lexicon, an index, and a quick reference guide, all in a handsome, three-ring binder. The text is backed up effectively by demonstration modules included on disk, though users completely unfamiliar with PILOT will surely wish to purchase a complete tutorial introduction to the language. If there is a single flaw to the documentation, it is that substantial portions of it apply not to eSTeem PILOT, but to the more advanced "professional" version, eSTeem SE. This can be mildly confusing, though a README file is included, explaining which sections of the documentation apply to the single-user product, and which do not.

We like eSTeem PILOT — it's a solid, well-designed, and professional package that should be of great use to educators, corporate trainers, and others who require a fast, flexible system for developing interactive applications. ■

by Mark Jansen

Small and lightweight, Atari's new ST Book notebook computer is loaded with sophisticated features and optimized for portable productivity. In this exclusive interview, Explorer's Mark Jansen talks with Tracy Hall, Senior Design Engineer at Atari, who was responsible for developing the core technology on which the Book, and Atari's next-generation pen-based system, the STylus, are built.

Writing the ST BOOK

Atari Explorer: ST Book is built around a small, low-power ST-compatible computer. How did that project begin?

Tracy Hall: It began when I was brought in as a consumer product developer. I was to help Atari find another approach into the United States. That's what ST Book and STylus will allow us to do — make more inroads into U.S. markets.

I flailed around, and eventually proposed a device that would let you hand-write into your machine. Originally, it was just a handwriting input method, a pen control method, not an ST per se. The idea was to build something inexpensive to allow you to do hand control, hand entry of information; you'd use it as a personal controller, organizer kind of thing.

Then, research showed we could use the STe chipset to build a machine with low power consumption. Most of the chips were CMOS; only a couple of things weren't, like the floppy-disk controller. I decided to build this machine from the ST, so it evolved into a larger, more powerful basic machine.

AE: How was that basic machine developed?

TH: We began with a rough design, and crossed out everything that wasn't absolutely necessary. It was like making a statue of an elephant — take a block of cement and chip away everything that doesn't look like an elephant.

The first six months saw no hardware built at all. We defined what we wanted, thought out what we needed, what we could sacrifice, and how we could save power. It was very, very carefully thought out. Over the next few months, we did the final logic design and early prototypes.

I did things to save five milliamps here and three percent there; for example, we used a new RAM-refresh scheme to save power. Only one pair of RAM chips is fully turned on at any one time, whereas the STe turns on all of RAM at once and refreshes it.

We used pseudostatic RAM, because it saved about ten percent over dynamic RAM and used the least power for its density. Given the battery life we wanted, that was significant.

We eliminated video output, since it burned as much power as the rest of



ADAM

STBOOK

FILE EDIT ACTION DRAW

FROM SPECIFICATIONS

only from the desktop, but also while you are running
programs. For example, if you want to change the font of
while you are working in a word processor, you can use
panel desk accessories to change keyboard format time in
the word processor. Most programs that use the menu will
you to access desk accessories. Desk accessories like
the far left menu item including the Desk menu.

Installing a desk accessory is easy whenever you
connect. The operating system checks the Main directory
for files that need to be run during start
the system and in initializing those files of files
and associated file information. Any file ending in .

Digital Clock
05:28:40 PM

the system put together; I doubled the battery life that way. With a Liquid Crystal Display (LCD), all you need is the LCD controller; very few people carry color monitors in their pockets anyway.

We also decided we didn't need a backlight; we use a very high contrast LCD.

AE: Why no backlight?

TH: ST Book will be used in lit conditions. All you need to see the screen is a small gooseneck light, which musicians, for example, have anyway. We're also talking to third-party companies about doing an ST Book light.

The backlight in STacy uses something like five or six Watts of power. ST Book, when running, uses about one and a quarter Watts, total. If we used a STacy backlight, we'd have about a forty-five minute battery life. We felt it wasn't worth it.

AE: What does ST Book weigh?

TH: Two kilos. 4.4 pounds. That's with the forty-megabyte hard drive and a NiCad pack. It's one of the lightest notebooks around; in fact, you can put two ST Books, two AC adapters, two NiCad packs, two alkaline packs, and two power cords in a STacy case, and it still weighs less than a STacy.

AE: STacy and ST Book are both portable STs, but the machines are very different, and have different development lineage. Why?

TH: The philosophies were different between STacy and ST Book, which accounts for the difference in the machines. STacy was an ST put into a portable case. Everything stayed; it's the same circuitry as an ST. When you include all possible features, you end up with a larger machine.

ST Book is a different approach — a lightweight, fully functional, portable machine with a minimum five-hour battery life. Anything that didn't contribute to that was left out.

AE: What were some things done to the core machine to produce ST Book?

TH: We built a new IDE interface for an internal hard drive, and left the floppy drive external, because of the



Tracy Hall, shown here with an early prototype of the ST Book — the so called "Wooden Book."

power used by its controller. In most portable applications, given a choice between a forty megabyte hard drive and bags of floppies, the hard drive is an obvious win.

We also developed the Vector Pad. The idea was to fit a mouse substitute into the machine, so you didn't have something on a cord when there's not a lot of space to run a mouse around. It made a good substitute in a small machine; it's very

small, easy to use, and durable.

AE: The Vector Pad is a small disk you "lean" in the direction you want to move the mouse; the harder you lean, the faster it moves. How does it work?

TH: The Vector Pad is a force-sensing device. There are four sensors: top, bottom, left, and right. When you push in any direction, the force is distributed between the two closest sensors. The balance of that force depends on how close you are to either sensor; in other words, the ratio of the two gives us the angle at which you're pushing. The total amount of force, both sensors added together, tells us how hard you're pushing. We control the mouse direction using the angle information, and the mouse speed using the force information.

The only motion you feel is your finger and the rubber pad underneath it compressing a bit; it takes about five minutes to get used to it. One reason why it takes that time is one Vector Pad and another aren't exactly the same. If you start using somebody else's machine, its Vector Pad may feel different.

AE: To software, it looks just like a mouse?

TH: Exactly. It goes through the new ST Book keyboard controller, and as far as software is concerned, this is a mouse.

AE: Is ST Book completely compatible with the STe?

TH: There are some control bits that were unused in the STe, which we've used to control the new features of ST Book. A couple of programs are sloppy, and alter those bits; for example, one program puts the internal hard drive into Reset Mode. That's a bad behavior and it's because somebody set a bit that they shouldn't have, but because it didn't hurt anything in the past, they didn't

notice.

Cartridges do work, and the expansion port contains all the signals necessary to create a cartridge port. To make a cartridge adapter requires a PC board and two connectors, period. A third party could easily build adapters, or special cartridges.

AE: Is there a BLITTER chip?

TH: Yes; it uses the combination MCU/GLU/BLITTER chip from the STe. You can see a difference in graphics performance with the BLITTER on.

AE: How much memory does ST Book have?

TH: There will be both one megabyte and four megabyte machines available; they are not easily upgradeable. The special power-saving memory refresh uses video access to refresh the RAM. In ST Book, one access to the screen accesses all the chips. That scheme is intimately tied to the size of memory, so you actually have to change control circuitry to change memory size.

AE: What other capabilities does the expansion port have?

TH: It has every signal on the 68000 microprocessor, plus memory control, interrupt control, clocks, all the signals necessary for a cartridge port, and various other useful signals. The specifications have been released to outside developers. It's easy to use, and the expansion port even has the ability to turn the machine on, in case a peripheral needs to do so.

One reason why I put all the 68000 pins out there was so I could hang a logic analyzer onto the system through the expansion port, without opening the case. We've done that extensively, which made it very easy to debug the software.

AE: Are there any new peripherals planned for it?

TH: There is a MIDI expander in design right now. It will provide more MIDI ports, plus SMPTE tracks, to make the ST Book even more useful for musicians.

AE: Other than the expansion connector, what ports does ST Book have?

TH: It has a standard parallel port and standard nine-pin serial port.

The MIDI connectors are smaller than normal, be-



cause of the size of the machine. However, you will be able to buy an adapter so you can use your regular MIDI cables, and a third party will probably come up with MIDI cables that plug right into the ST Book.

The floppy/ACSI port, which I call "Pseudo-ACSI," is another new connector. It contains the same signals as an ST Hard Disk port, with enough signals added to control the external floppy disk controller. We'll probably include a cable that will allow you to connect ST devices like hard disks or laser printers directly.

Next to the keyboard, there's a small ten-pin connector; we could build a numeric keypad that would plug in here. There is even a special protocol for talking out the keypad connection to currently-undefined devices.

There is space for an RJ11-type connector and internal modem under the Vector Pad. Just connect your phone line, and go. The modem can also turn the machine on to receive a call. We're working on a 2400 baud data, 9600 baud FAX modem.

Incidentally, because of the very small and light connectors used, we've provided mounting points so you can anchor a peripheral onto the machine. That way, it doesn't put a strain on the connector itself.

AE: Which version of TOS comes in the ST Book?

TH: TOS 2.06, one of the latest and greatest. We've added a couple of features: for example, if you hold down the Control key during the boot procedure, it loads the hard disk driver as normal, but it does not run desk accessories or the \AUTO folder, or load the NEWDESK.INF file. This is in case you have a bad desk accessory, \AUTO folder program, or NEWDESK.INF, and you can't get your system up. It allows you to bypass the corrupt files and get your machine running.

TOS and the ST Book ROMdisk, which contains the file transfer software and such, are contained in one 256K x 16 ROM chip one half inch on a side. It's very easy to change — pop out the ROM, pop in a new one, and you're done.

AE: Other than TOS, what is in the ROM?

TH: The power control software that allows you to do a Save and Resume, the file transfer software, and something called "Book Format."

We provide Book Format, in case the data on your hard disk becomes corrupted. It formats and partitions the internal hard drive, and installs a bootable driver. Just run the file transfer program to put files back onto your machine.

The hard disk comes with a calendar and calculator, which run as accessories. You also get a floppy containing the Control Panel and CPXs, and the accessories, should you need it.

AE: ST Book comes with a calendar/appointment program. How does it work?

TH: The real-time clock chips in STs and STes have had an "Alarm" output, which previously hasn't been connected anywhere. In the ST Book, it's actually connected to the power-on circuitry.

You can set an alarm for sometime in the future that will turn on the system. The system will go right back to whatever application you were in, and then things like desk accessories and such can run. Programs can use that capability; for example, software could wake up the system, use a modem to call a bulletin board, download a couple of files, and go back to sleep. We've provided a new system call to allow them to do things like that.

The calendar program keeps track of appointments and regularly scheduled events, and has a phone dialer and such. When one of its alarms go off, it turns on the machine, beeps, and displays an Alert Box with the text you entered for that particular appointment.

AE: Will all ST Books have hard disks?

TH: Yes, they will have at least forty megabyte hard disks. There could be some available with sixty megabyte and larger drives.

AE: Could a dealer install a larger capacity hard drive?

TH: Yes, but it would take some work. We don't recommend you buy other IDE drives, because there are some characteristics about the ones we're using, various features that we've had put into the firmware, which aren't on standard IDE drives. Other IDE drives will work, but you won't get as careful power control.

AE: The entire ST Book is smaller than an ST keyboard, so a new keyboard was obviously needed. How did you fit a workable ST keyboard into that space?

TH: This keyboard has eighty-four keys, rather than the ninety-four of a full size keyboard. The keys are slightly closer together than on a full-size keyboard, and have a shorter keystroke, but the difference is small enough that it's really quite easy to use.

The keypad keys are embedded into some of the normal keys; there's a "Fuji" key, which allows you to access the "keypad" modes in the normal keyboard. There's also a "Pad Lock" key to lock the keys into that mode. It gives you a numeric keypad within the regular keyboard.

We also added a couple of features to the keyboard controller. It now has a "sleep" capability, where the controller can go to sleep between keystrokes or commands, saving a little more power. That requires hardware handshaking between the keyboard and the

rest of the machine, which is built into the ST Book. One side effect is that on the ST Book, you don't lose keystrokes if software can't keep up; they'll just be saved up in the keyboard controller until it can send them out.

AE: Without a floppy drive, how do you transfer files into the ST Book?

TH: You can use the built-in file transfer software and the parallel port; it takes about two minutes to transfer a megabyte of data.

We include a special file-transfer cable, which is a parallel printer cable with a couple of pins swapped, and a copy of the file transfer software on floppy disk, so you can run it on another ST. The software shows you both machines' disks. You select files to copy, and copy to or from the other machine; you can do backups in either direction, all over the parallel port. It will also work over the serial port, so if you don't happen to have the parallel file transfer cable with you, you can use a serial cable. We have available a Portfolio version of the program as well, which will allow you to transfer data with a Portfolio.

AE: What about those who really want a floppy drive?

TH: We will make an external, battery operated, high-density floppy. It should provide over two hours of active use on four alkaline cells — much longer if it's off much of the time. The drive won't steal power from the ST Book's batteries, but if the ST Book is plugged into its AC adapter, the floppy drive will get power from that. Otherwise, the drive has its own AC adapter.

AE: Is the drive different from other ST external floppy drives?

TH: Yes. To save power and space in the ST Book itself, the floppy drive controller chip is in the floppy drive. It's a new chip, which allows us to use a high-density, 1.44 megabyte drive, the only drive planned for the ST Book.

AE: ST Book allows you to shut it down quickly, even within an application, and come back right where you were, a feature called "Save and Resume." How is that done?

TH: What actually happens is the machine reads the values of all its hardware registers: processor registers, hard drive, memory control, video access mode, video base registers, everything it can find, and stores them in a previously-allocated section of memory. In ST Book, all the memory is always battery-backed; it's not a special bank.

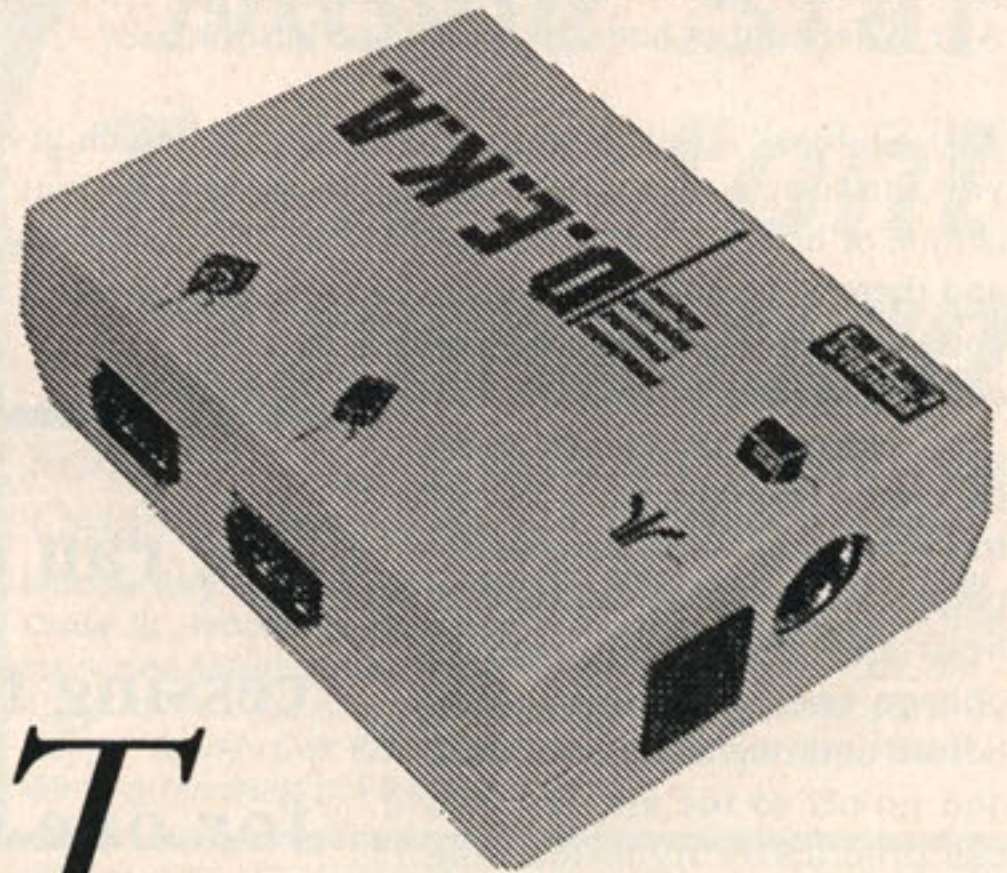
When the machine is turned on again, the BIOS

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executes a routine to restore the machine to the state it was in before it was shut down. It restores the registers, then the BIOS returns the machine to your code, as if nothing had happened. It all takes about a half a second — even if you need to spin up the hard drive to save a file, that only takes about three seconds.

It works in almost all applications, unless they're doing weird networking over the MIDI port or something like that. The vast majority of programs like spreadsheets or word processors have no problems at all.

AE: What kind of batteries does the ST Book use?

TH: ST Book is designed to run on NiCads, which give you the long battery life. Alkalines only give you a couple of hours of battery life, but if you're at an airport and there's no place to plug in, you can buy yourself a couple of packs of batteries and continue working.

It's unlikely you're going to need a recharge in a day of travel anyway. With two battery packs, which charge in about an hour and a half, it's easy to charge one pack the evening before and one in the morning, and go off to the airport; you can practically fly around the world on two packs.

AE: Are the battery packs recharged when they're in the machine?

TH: They're recharged in the machine whether the it's running or not. It's an independent portion of the AC adapter.

AE: An hour and a half charging gives you five hours of use?

TH: That's absolute minimum. We ran tests here, accessing the hard drive for one minute every five minutes, displaying a fairly complex dither pattern on the screen, and using no power saving techniques at all, and we got over five hours of battery life. During normal use, I would expect ten hours.

Save and Resume saves a great deal of power. And when you shut the machine down, it uses so little power battery-backing the memory, the bat-

teries will last up to three months.

AE: What power-saving techniques are available?

TH: There are three things you can do. "Video Saver," stops updating the LCD display from main RAM; the LCD controller has its own copy of screen memory, and it updates the LCD from that. Whenever a system call is made to update the screen, screen updates are turned on, and turned off afterwards, automatically.

The side effects of this are minor. Because screen updates aren't being done from RAM, we have to turn on some self-refresh circuitry to keep the RAMs refreshed, which slows down memory accesses every once in a while. Programs run 0.5% slower in this mode, and for the cost of that 0.5%, you save twenty to twenty five percent of the system power — a very good

tradeoff. If you have some weird program that writes to screen memory directly, one that doesn't use system calls, there's no way to detect that, and the changes it makes to the screen won't show. But those programs work fine with Video Saver off.

After a certain amount of time, "Blank Screen" turns off the voltage to the LCD driver, saving another ten to twenty percent of the system power. Its only side effect is blanking your screen. Whenever there's a key-stroke, or if you choose, activity on the serial port, it turns the screen back on.

If there's no physical I/O, meaning any kind of floppy, hard drive, serial, parallel, MIDI, or keyboard activity for a certain amount of time, "Shut-down" shuts off the system via Save and Resume. When you press the Power button, you're right back where you were. Both Blank Screen and Shut-down are programmable for up to twenty minutes delay.

AE: No matter how thrifty you are with battery power, they'll run out eventually. Can you monitor their condition?

TH: There's a lot of power detection and management built into the machine. There are actually three levels of low power

We ran tests here, accessing the hard drive for one minute every five minutes, displaying a fairly complex dither pattern on the screen, and using no power saving techniques at all, and we got over five hours of battery life. During normal use, I would expect ten hours.

—Tracy Hall

signals: Source Low, Source Dead, and Power Not Good. The Power light is green under normal conditions, orange when the battery is low, and red when "Source Dead" occurs. There's also a bit that can be read by software, indicating that the batteries are low.

When the light turns orange, it usually means you have about a half an hour left in the batteries; it's a darned good idea to save your files and find an AC source or a fresh battery pack, particularly since all you have to do is hit the power button to turn the machine off, swap in a new battery pack, and turn the machine on again.

Both the Source Low and the Source Dead signals allow code to run. Power Not Good means the five volt supply to the machine is drooping, and shuts down immediately. You will probably never actually see the red light; by the time it's red, the machine's shut off.

AE: In the worst case scenario, what could happen if you let the batteries run dry, and ignore all the signals?

TH: You might have to reset the machine, but you most likely won't lose anything. The ST Book takes care of itself pretty well. If you don't try to "push the envelope," it will survive.

AE: When Source Dead has occurred, is the data in memory preserved?

TH: RAM is maintained, as a matter of fact. It has a separate linear power supply, which works off the NiCads until they get down below about six volts, which for eight NiCad cells is really low. Then there's a pair of rechargeable lithium cells to take over, which allow you to switch battery packs; they keep RAM alive for forty or fifty hours, so you can switch batteries r-e-a-l s-l-o-w-l-y.

AE: What about the hard drive?

TH: These hard drives are quite good at taking care of themselves — they automatically park their heads, so they won't be damaged.

AE: What kind of battery packs does ST Book use?

TH: They're about cigarette case size, and the NiCad packs weigh about a half pound to a pound, and give very good power density.

There's also an alkaline pack; you just drop your batteries into the pack, and slide it into the machine. ST Book only charges NiCads, so if you plug in the AC Adapter/Recharger while you have alkalines in, the machine will stop using power from them and won't try to recharge them. It's perfectly safe. ■

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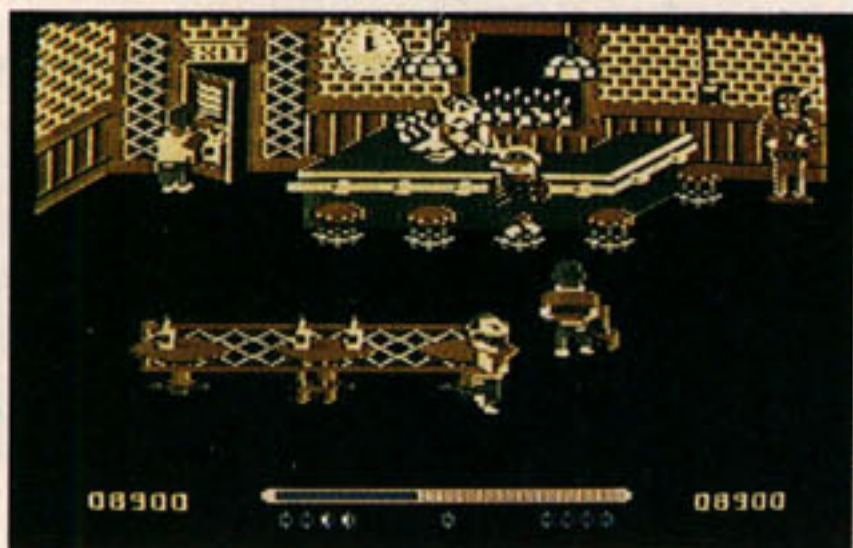
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An 8-bit Adventure that's Hip-to-the-Minute!

Pondering About Max's

by Elwood J.C. Kureth



PONDERING ABOUT MAX'S (P.A.M.) SURELY ranks among the most enigmatic software titles of all time, right up there with such cryptic names as Gorf, Zork, Q-Bert, and even the classic Pac-Man. At least with titles such as Centipede, Missile Command, and Asteroids, you had an inkling as to what elements were involved in the game. Without further investigation, these straightforward (But hardly creative) names either quickly aroused or killed your interest, depending on your tastes.

But P.A.M.? Think about it. Pondering About Max's ... what? Intelligence? Violent temper? Who is doing the pondering? And just who — or what — is Max? Questions, questions.

As it turns out, 'Max's' refers to the Max Man competition — "a simulated barroom brawl, complete with flying bottles, smashed chairs and stuntman fighters," held each year at Jackson's Beach. The pondering is performed by Clarence Bean, who once visited the competition and came away with a less-than-favorable (to put it mildly) impression of the event. Clarence punctuates his distaste by throwing four-bit insults at the contestants, calling them "thick-skulled," "anencephalic mutants," and dismissing the Max Man itself as a Neanderthal spectacle.

Of course, having listened to Clarence's diatribe, you're then expected to pay for the privilege of entering

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Kids n' Kidprgs!

by Beverly Mann
& Edmund D. Mann

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Kidprgs is the collective name of four programs, distributed by D.A. Brumleve Software, designed to help children three to ten years of age learn reading, writing, and creative skills. Included are Kidpainter, a "color-in" paint program; Super Kidgrid, a program that generates tiled, "tangram-like" designs; Kidpublisher Professional, a kid-oriented desktop-publishing program; and Telegram, an intriguing communications "game" that involves delivering singing telegrams. The authors of Kidprgs — D.A. Brumleve, M.A., T.R. Brumleve, Ph.D., and M.L. Marks, M.Ed. — are all professional educators.

To gather data on how kids react to Kidprgs, we loaned an Atari 1040 STe computer, with color monitor, to Whiz Kids, a Long Island-based educational computing center run by Mrs. Nancy Koch. During a three-week period, more than 100 children were observed using the Kidprgs (we're happy to report that our 1040 STe easily survived the many hands-on sessions).

During the evaluation period, notes were kept on how children reacted to each program, both when using the software under teacher or parent supervision, and during free-play periods.

Kidpainter

... is a "paint" program that employs a simple, iconic user-interface. Unlike free-form "grownup" paint programs, Kidpainter is designed for the coloring-book crowd. You create an outline picture using various drawing "tools," add text if desired, then apply quick color "fills" with your "paintbrush." Additional modes let you create "rubber stamp" images for quick reproduction, and "cut up" paintings into "picture puzzles" for on-screen reassembly. Paintings (and preliminary drawings) may be loaded and saved to disk, and printed out for hand-coloring. The program is solid, easy to use, and technically-clever; and, like all the Kidprgs, comes with a "children's manual" that will get young users up and running in a hurry. (\$35.00)

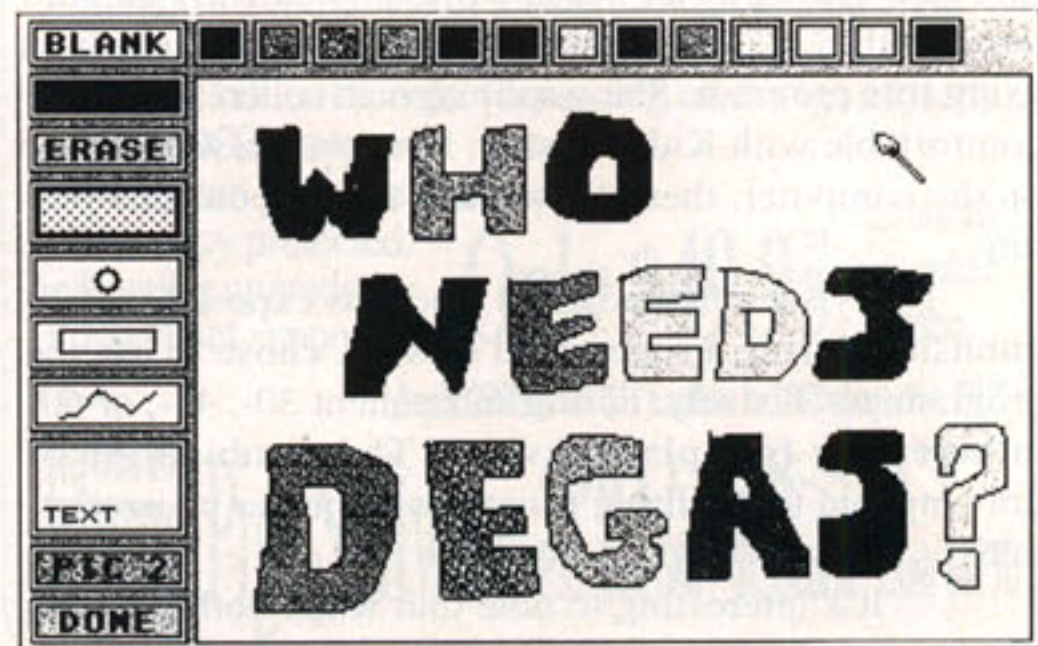
A.F. (age 5) enjoyed painting her name but did not get further involved with the program. Kidpainter held her interest for about 5 minutes.

E.K. (age 4-1/2) easily created a picture and dictated a short story which the teacher typed for her. The child was very enthusiastic about this activity, and happily kept working with the program until her mother picked her up.

C.W. (age 4) used Kidpainter to begin a letter

book. She drew a picture of an apple for 'A,' and typed upper and lower case words with assistance in spelling and keyboard location. The teacher used the program to convert her banana (for 'B') into a puzzle which this very enthusiastic child enjoyed solving.

Kidpainter was used at three birthday parties that were attended by children aged 4-7. The program held each child's attention an average of 20 minutes, generating far more interest than competing programs on other systems. Clearly a winner!

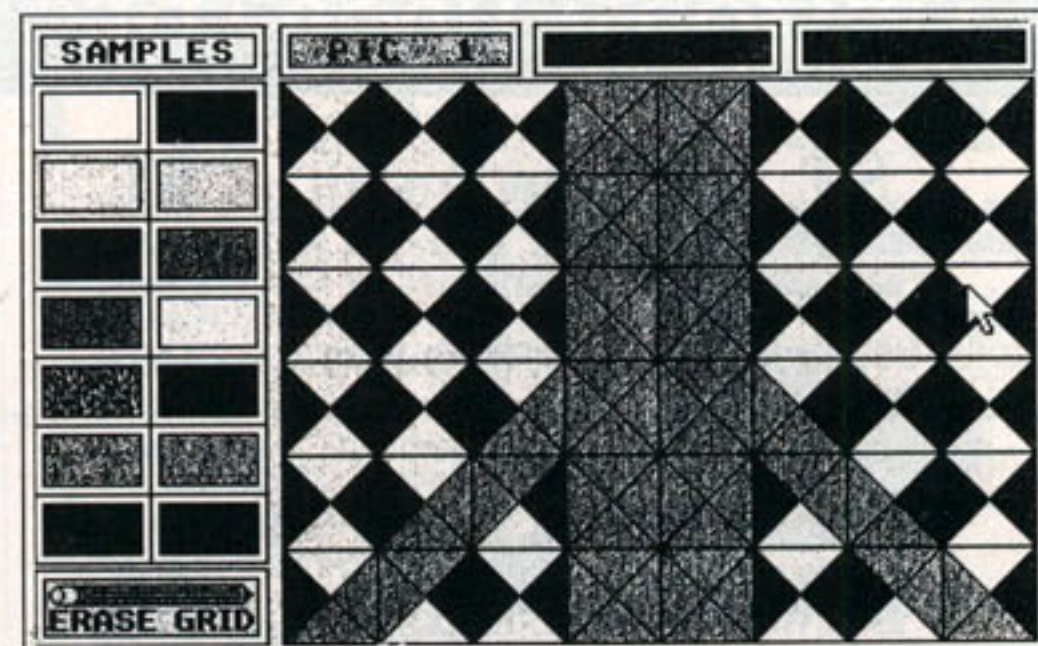


Super Kidgrid

... presents children with a grid, subdivided by diagonal lines into triangles that can be filled with color to create on-screen designs and pictures. Designs can be loaded and saved, and the program can turn any design into a "paint-by-number" printout that kids can color with "real world" media. Because the grid imposes its own regularity, even very young children can make impressive designs with Kidgrid. Older children may enjoy the "tangram" challenge of using restricted forms to create recognizable images (numerous samples are provided with the software to help get you started). And any grownup who's into Log Cabin quilting will immediately latch onto Kidgrid as a perfect design tool. (\$25.00)

Several children who used Kidpainter were also observed while they used Super Kidgrid. The first child, C.W. (age 4) easily grasped the mechanics of the program. She selected only three colors and created a simple random pattern that the teacher printed in paint-by-number form. The child took the drawing home to complete.

E.K. (age 4-1/2) created a random design with many colors but was somewhat intimidated when the teacher printed her creation in more austere "paint by numbers" form. Her mother was pleased that she could bring home an activity they could work on together.



In general, Kidgrid received a lukewarm reception from very young children, holding their interest for only about ten minutes before other activities drew them away (actually, this is pretty good performance when you're dealing with 4-year-olds — Ed.) We suspect that the effort of coordination required to fill Kidgrid's triangles may be marginally too great for wee folks. Older children enjoyed the program considerably more, and rose more frequently to the challenge of using Kidgrid's tiling system to create recognizable images. Parents tend to appreciate the program, both for its aesthetics, and because its paint-by-number output can become a shared, "real world" activity.

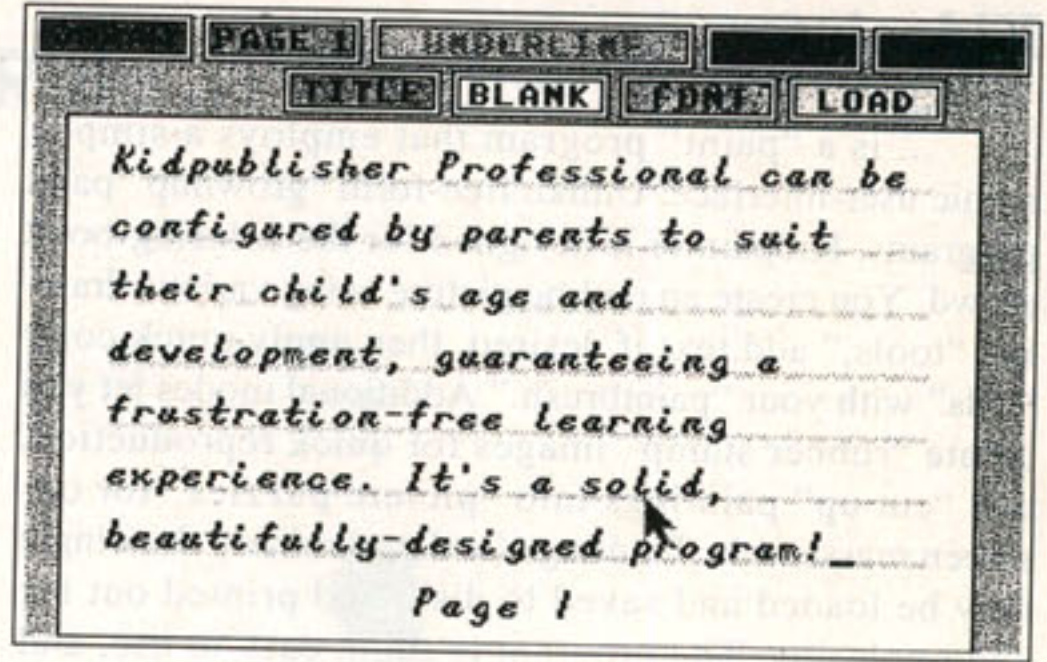
Kidpublisher Professional

... incorporates an extensive, "Kidpainter"-style drawing program, a text editor, and a wide selection of built-in fonts, forming an easy to use, yet surprisingly powerful desktop-publishing package! Older kids (and even younger kids!) adore it; quickly learning the simplified user-interface and employing Kidpublisher to make their own picture books, greeting cards, and other printed matter. (\$35.00)

T.G., a 6-year old girl, enjoyed creating a picture and writing a story. She wrote phonetically and did very well. S.C., a 7-year old girl, thoroughly enjoyed using this program. She was imaginative, creative, and comfortable with Kidpublisher. First she drew a picture on the computer, then she wrote a story about that picture.

Every school-aged child who was exposed to Kidpublisher during a supervised session, chose to use the program, exclusively, during subsequent 30-, 45-, or 60-minute long free-play sessions. The combination of drawing and text-editing functions seems to be irresistible!

It's interesting to note that when both drawing and text features are available, kids gravitate first to the medium in which they are most comfortable, then use



what they've produced as a springboard to conquer the program's alternative mode of operation.

Telegram

... is an "activity" program, incorporating math, music, reading, and humorous elements. Children "deliver telegrams" by driving an on-screen vehicle to specific "addresses" in a rectangular city-grid (an interesting way to teach the concept of spreadsheet-cell ad-

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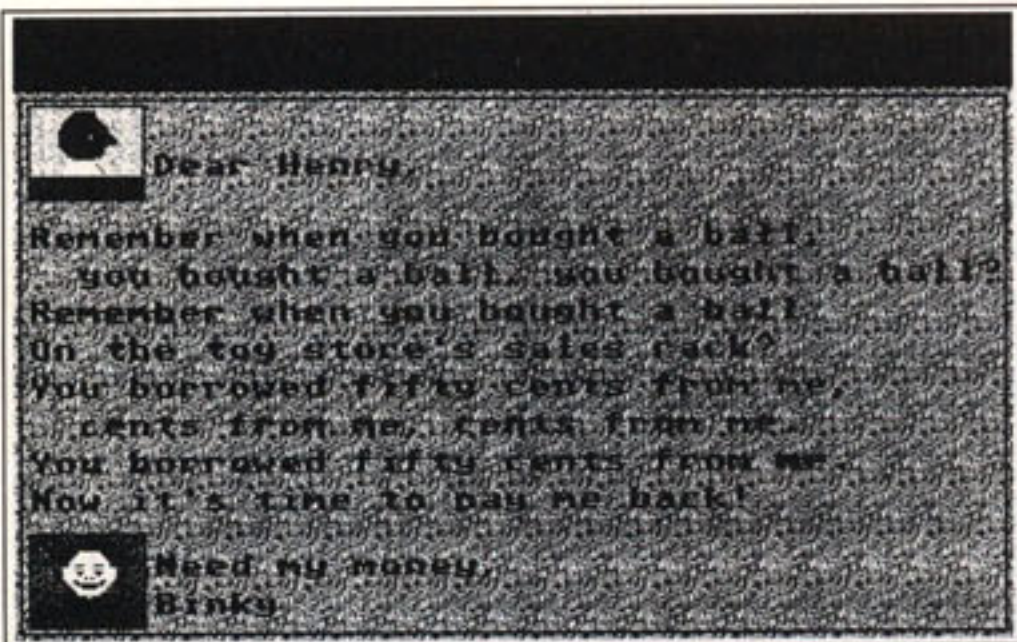
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dressings). After ringing the doorbell, the computer plays a familiar tune, and the telegram's words appear on the screen, animated in "follow the bouncing ball" format, for sing-along. The telegrams, drawn from a large set supplied with the program, are very funny. (\$25.00)

Unfortunately, though the program intrigues adults, the joke seems to be lost on most children. The children we observed tended to exercise the program's features, delivering one or two telegrams, then lost interest quickly, thereafter. Boys, moreover, seemed to be embarrassed to sing aloud. We suspect that Telegram might be more successful when used for solitary play, or in carefully-refereed group or party situations.

System Requirements

Each Kidprg requires an Atari ST, Mega, or TT system with a single- or double-sided disk drive, color monitor, and dot matrix, bubble jet, inkjet, or laser printer that can accept an Atari screen dump.

The programs are not copy-protected, and a startup utility allows even computer-timid parents to configure each program appropriately for their child, generate necessary backups, etc.

Beverly Mann teaches English at the State University of New York at Farmingdale, and is an adjunct English instructor at Suffolk County Community College and New York Institute of Technology. Her husband, Edmund Mann, is an entrepreneur, adult-education teacher, and long-time Atari Explorer author.

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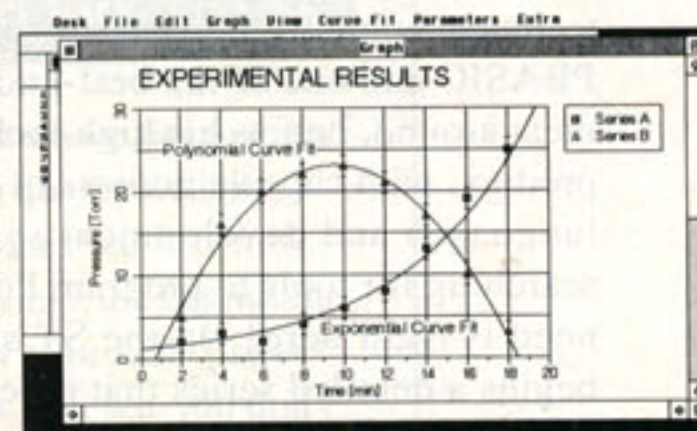
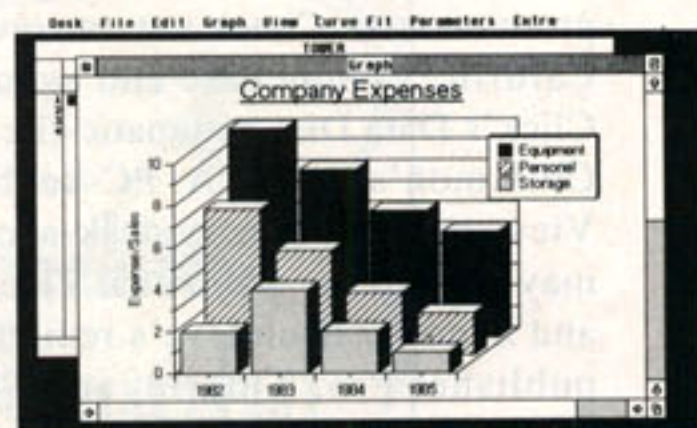
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EDITOR'S NOTE

CONTINUED FROM PAGE 4

ship navigators!

What if you don't like sci-fi movies? Music buffs will love Mihai Manoliu's article on brothers Don and Dave Grusin, two of the most influential Atari musicians around. Dave is best known as a film composer (his most recent score is featured in Bette Midler's holiday hit, *For the Boys*), while Don's most recent album, *Zephyr*, on GRP, involved collaboration with Jerry Goodman and Dori Caymmi! And both brothers use Atari STacy computers to help realize their musical visions.

Was 1991 "The Year of Atari in the Movies?"

ST Book Review!

Atari's new ST Book notebook computer, slated for first-quarter '92 release, engendered rave reviews at trade shows in the latter part of '91. The Book's small size, innovative VectorPad pointing device, and 10-hour battery life bid fair to revolutionize ST portable computing. This issue, Tracy Hall, designer of the ST Book's core hardware, offers a fascinating look into Atari's hardware design and development process, and takes you hands-on with one of the most exciting new products around! So that's it, right? '91 was "The Year of ST Book!"

Then again, '91 was a great year for third-party products, too. Check out our reviews of Gribnif's new Cardfile 3 phonebase and agenda-manager; Double-Click's Data Diet automatic-file-compression package; Omnimon's D.E.K.A. PC-keyboard adapter; Sudden View, a revolutionary desk-accessory text editor that may change the way Atari ST users work with words; and Dorothy Brumleve's remarkable Kidpainter, Kidpublisher Pro, Kidgrid, and Telegram programs — products that make the ST sing, at school and home.

This issue also marks the beginning of two new technical columns. BJ Gleason, author of award-winning PBASIC and one of the best-known Portfolio programmers around, begins his high-tech tour of Atari's pocket prodigy, with capsule reviews of Portfolio programming languages and development systems. If you've been searching for tools to program Portfolio, all the info you need is right here! On the ST side, Steve Yelvington begins a detailed series that reveals the secrets of serial communications — one of the most challenging areas of application programming.

So What Year Was It?

1991 was such a good year in the Atari world that no one label seems to satisfy. And '92 promises to be even better. Still, when talking about things Atari, there

remains one theme that ties everything together. Atari is committed to providing you — our customers — with the best in high-tech products at a reasonable price. Sure, we take pride in the fact that, during the past twelve months, Atari's name has been seen by a wider audience than ever before, whether it's because we saved the world in *Terminator 2* or blew Apple's doors off at the Seybold DTP show.

But the thing we take most pride in is that you — our loyal customers, readers, and friends — are still with us, and still going strong. So let's call 1991 "The Year of the Atari User," and shoot for more of the same in '92! ■

Call for Authors!

Atari Explorer is searching for enthusiastic Atari users who are also experienced technical writers! We are currently seeking freelance writers with experience in ST/TT, Portfolio, and 8-bit applications; hardware and peripherals; MIDI and music; entertainment software; programming; and other topics. For writer's guidelines, please send a self-addressed, stamped envelope to:

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LETTERS

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Dr. Charles Gelard
Quimper, France

Monterey Bay Whaling Co. offers a full line of Portfolio products, from Atari and other manufacturers, and consults in Portfolio programming and software design. Write to them at 2681 N. Rodeo Gulch Rd., Soquel, CA 95073.

Goldleaf Mixup

Dear Editor,

The articles and advertisement concerning Goldleaf Publishing, Inc., in the September, 1991 issue of Atari Explorer have finally stirred me to action. I have been trying for more than three months to have the money (\$159.95) returned that I paid Goldleaf last June for their Sherlook software. Robert Engberson, at that time Sales Manager for Goldleaf, stated in a letter to me, dated August 16, 1991, that a refund could not be made until August 27th because most of their office staff was the Dusseldorf show. Although I have made two written requests since then for the return of my money, no further communication of any kind has been directed to me from Goldleaf.

John L. Smith
Canyon Country, CA

We took this problem to John Fox, of Goldleaf, who replied as follows: "We're very sorry for the frustration Mr. Smith has experienced, and are processing a refund for him, right away. Indeed, we extend this brief to cover all our products: if customers are not satisfied with Goldleaf products, we will gladly refund their investment in a timely fashion."

P:R:Connection

Dear Editor,

The letter in the Summer, 1991 Atari Explorer from Mr. Larry Bucher, in Laos, concerning the Portfolio/8-bit connection was of considerable interest to me since I have a similar problem. Just recently, I purchased an ICD P:R:Connection and a Supra Corp. SupraModem 2400. I plan to set up for telecommunications using these with an Atari 130XE Computer and Indus GT drives.

When I boot the ICD P:R:Connection disk, the screen displays "Setting up Atari 130XE RAMdisk. Please wait." for several seconds. It then displays an 850 Express BBS advertisement for several seconds. The screen then goes blank and the cursor and the word "READY" appear in the upper left-hand corner. There is no response to the RUN command. I have tried the LOAD, the ENTER, and the BINARY LOAD statements without success. Further than that, I am at a loss as to what to try next, as I am more or less a novice with computers.

Ronald E. Bell
Tooele, UT


On bootup, ICD's P:R:Connection software installs software "drivers" that provide a connection between the Atari 8-bit's operating system and the P:R:Connection hardware's physical printer and RS-232 serial ports. Having installed these drivers, the boot process continues to termination, dropping you into BASIC on a 130XE, which should explain your READY prompt.

Additional "terminal software" is needed to access the drivers, talk to your modem, and provide full-service telecommunications facilities. Many such programs are available for the Atari 8-bit at moderate cost. Try American Technavision at (800) 551-9995 for suggestions. ■

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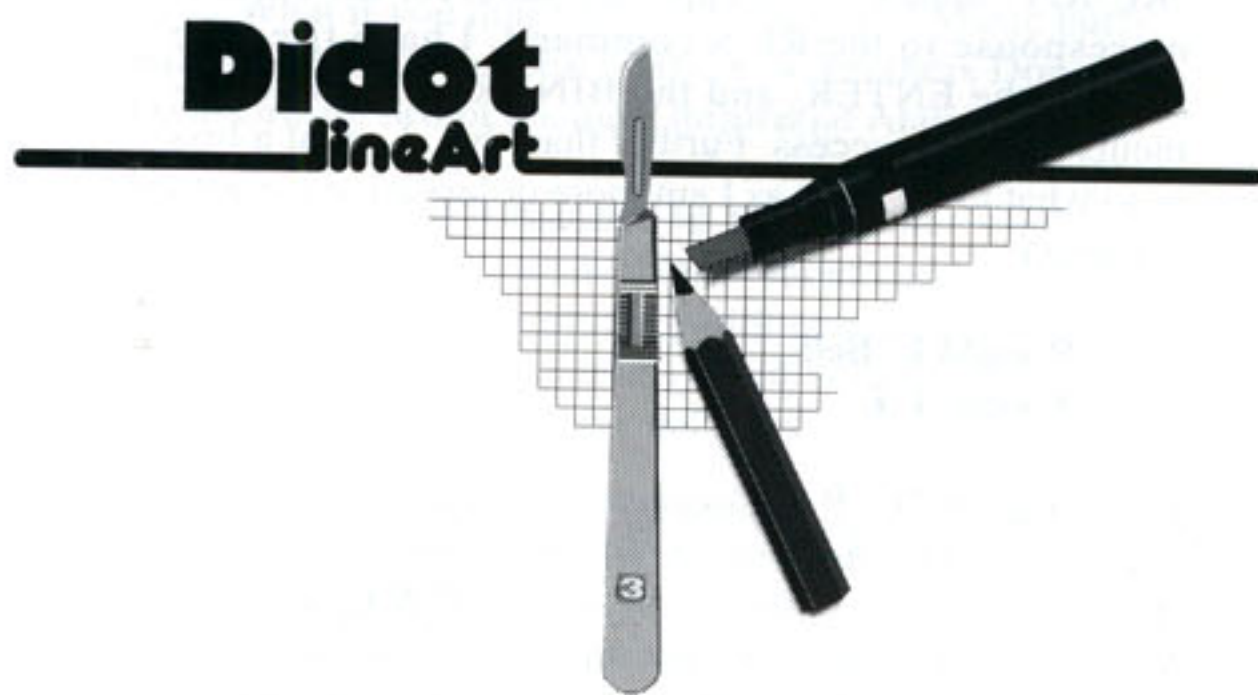
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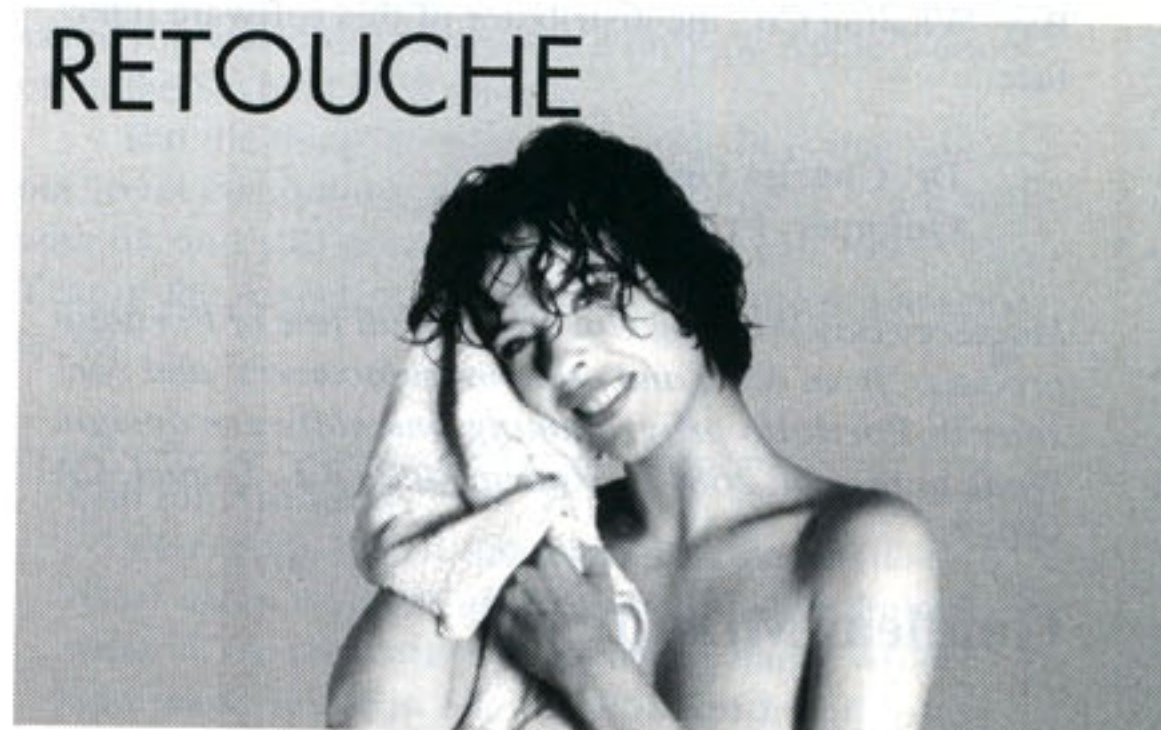
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(CONTINUED FROM PAGE 23)
able) uses "curved triangles" for the periphery of objects, so that curved outlines are possible. That's the only area that presents any difficulty.

AE: So a lot of how a form appears actually depends on your knowing, beforehand, how Chronos and the renderer will actually handle objects. Does that mean that the process of designing an effect begins with the design of the objects that will go into it?

LS: Absolutely. Though the renderer is powerful, you've got to remember that everything doesn't happen in the computer. The real trick is learning to use whatever modeler you have, so that your model responds properly to the rendering tools. You don't want to have edges or corners in the wrong places. You don't want holes.

Still, there are things that software can do to make things easier. One of the things we'll be offering with our materials editor is called "volume mapping," where instead of taking a picture of wood and wrapping it around, say a chess piece, you'll take the chess piece, modeled in CyberSculpt, and, in effect, "cut it out" of a piece of wood. All primitive "surface mapping" considerations go away when you have software like this at your disposal. Eventually, you'll be able to make substances that can be sculpted, directly.

As far as the chrome effects go, per se, the process is fairly simple. You assign certain attributes to the object, then by using either environmental or texture mapping, provide that chrome surface effect. But I should define my terms. Texture mapping is when you wrap a texture, like "fur" or "slate," onto a surface. "Chrome," or what we see as chrome, is not a texture. It's an attribute: the condition of being highly reflective in a certain range of grey, having a certain hardness and a certain spectral coefficient. If you shine a light on a piece of chrome you get a perfect round spot. If you shine a light on a piece of aluminum you get a more diffused spot.

Environmental mapping is when you take the environment (i.e., what's around the object), and calculate the angles of reflection, mapping that directly onto a surface. That's what they did, in T2, to put reflections of the flames (and ground, and sky, etc.) onto the surface of the T1000, as it walked out of the wreck.

AE: So it actually is possible to do, say, video-resolution effects, on a TT, that mimic the effects used in T2?

LS: Sure. But you can't do everything in one program. It's much better to do things in bits and pieces. Ultimately, the limitations are not with the software or with the computing platform. The limitations, such as they are, are with you — the artist. It takes a long time, and considerable practice, to learn to use software this powerful to deliberately create the effects you want. For example,

to learn to use CyberSculpt well enough to build a T1000 would take three or four months of daily use.

Me, I've practiced a lot, and I really can sit down in front of a TT and do this stuff. When we were at ComDex, last November, we had a routine set up where Paul Dana would talk about the programs, and be like the background voice, and I'd sit and run the computer. People would come over from the Mac booth and they couldn't believe what I could do! Of course, I didn't tell them that — okay, sure, the software is great, but it wasn't the software doing the work. It was me.

AE: So it takes practice?

LS: Yes. And learning how to combine the right tools. What an object looks like depends on everything else you've done. The easiest part of the process is in rendering and modeling and motion control. Rendering, especially, is relatively easy. There are tons of ray tracers that work on the Atari already, and are easily converted to more resolution and more colors. The trick is understanding what the ray tracer does with the image — that's how you make your stuff look real.

There are also ways, frankly, to cheat. To use features of the software that let you create effects very economically and quickly. Let's take an example. Suppose you want to move a chrome ball through space. What are you going to do? Model the universe? Stars and all?

There's no need. Just use CyberSculpt to texture-map several flat objects with holes in them. Then stack those objects up in the Chronos world, at a certain distance from one another, so that the holes overlap. Finally, use Chronos to "fly" the ball through the holes in those flat objects. If you do this just right, it will appear to the eye as if you're in a 3D universe. But you'll be using mostly 2D objects, which makes rendering a whole lot faster. You can actually do this now using CyberTexture and CAD-3D. Anybody who wants to write Dave Ramsden for the program can get it.

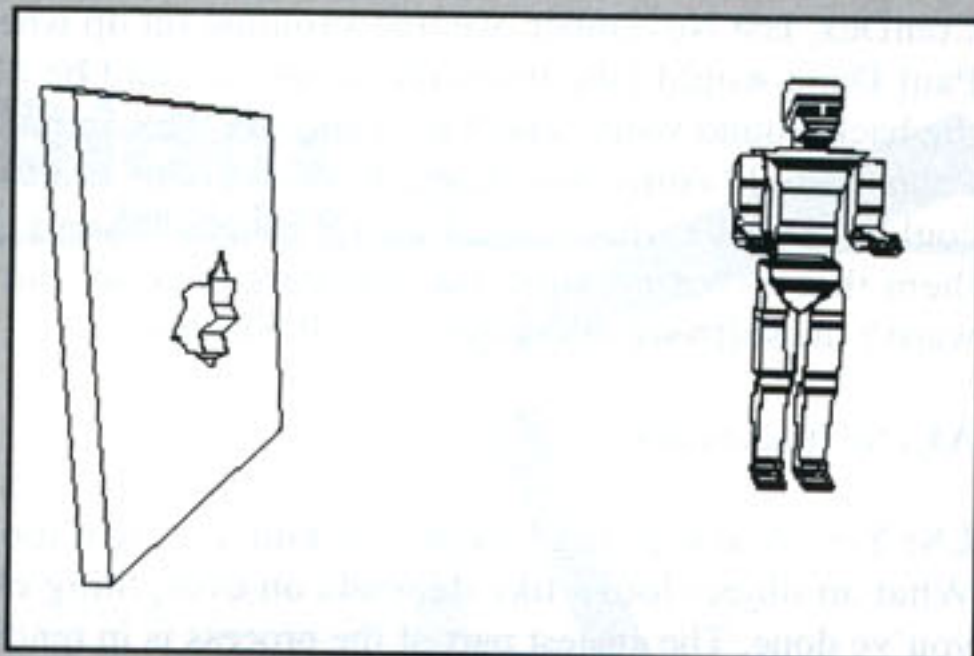
AE: Back to Terminator 2: How did they generate those incredible "liquid metal" effects? Like when the T1000 hid himself in the hospital's checkerboard floor, or poured through the canopy of the helicopter, or when he disguised himself as Linda Hamilton?

LS: By a technique called "morphing," in which the computer supplies intermediate frames between one object state and another object state. ILM used morphing techniques throughout T2, not only to change objects from one form to another, but to change surface attributes — like when the T1000 changed from its featureless chrome form to Robert Patrick's human form.

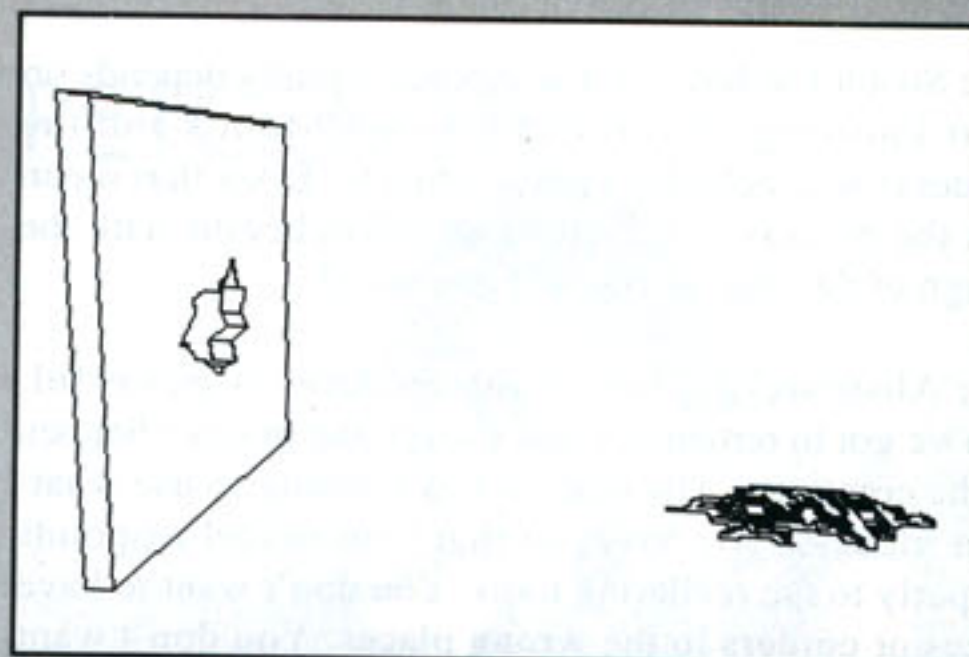
In fact, though, morphing only handled part of the process. In the above example, ILM used morphing to render intermediate frames and alter surface texture, making the T1000 less and less reflective and adding

Announcing Didot and Retouche!

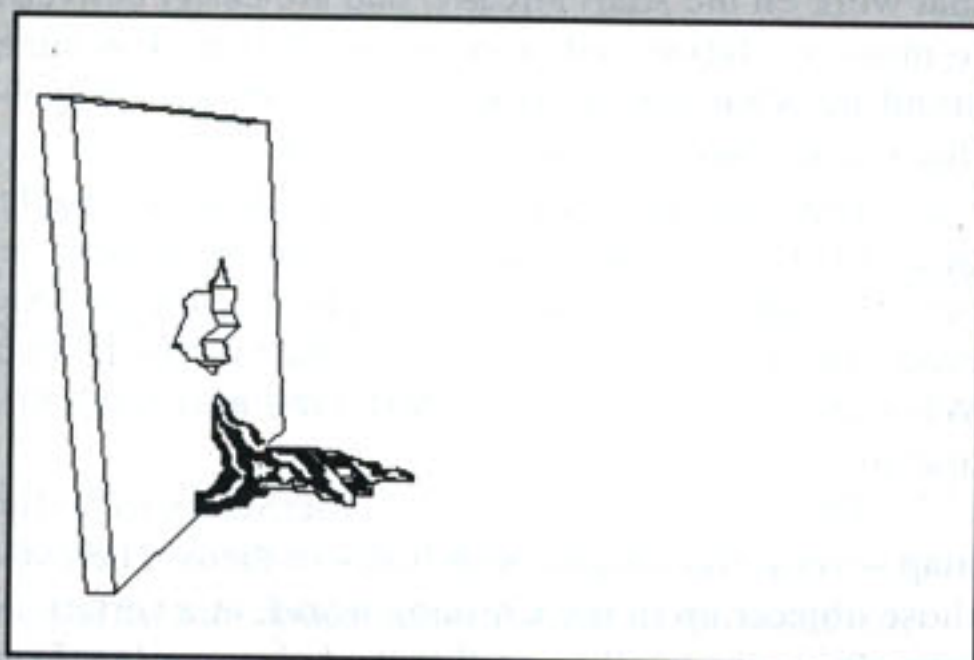
Four frames from the rendered animation. Prior to rendering, the basic wire-frame objects were replaced by more refined, textured equivalents (adapted from the original objects, using CyberSculpt), allowing Chronos to render more realistically. Frames were then further touched up with Prism-Paint.



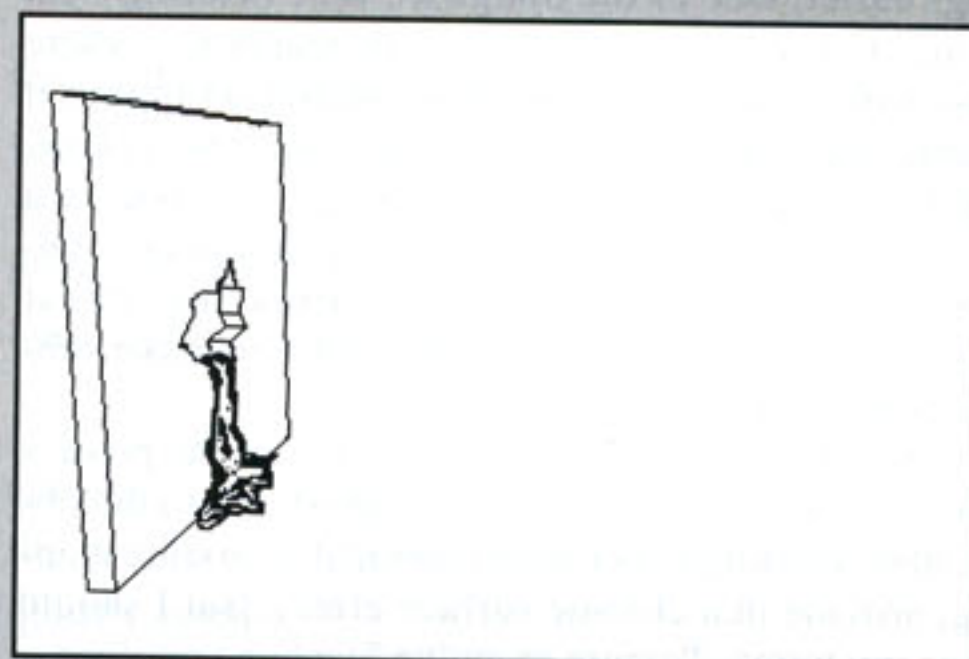
The chrome man stands there. Suddenly, a shimmer comes over his body ...



... and he collapses into an amorphous blob of liquid metal that slithers across the floor ...



Reaching the wall, he extends a loathsome pseudopod upwards ...



And then, like mercury, slides up and through! Top that, LucasArts!

SOFTWARE

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CHRONOS-3D (keyframe animator)	\$245.00
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surface detail. But when they reached the end of the sequence, they used a film effect called a "cross dissolve" between one morph and the next, suddenly adding more detail, then concluded by doing a "cross dissolve" and wipe from this last "almost-live" guy to the real live guy. By combining techniques, they were able to fuse the computer-generated material seamlessly with the live material.

They did some other lovely stuff this way. For example, on a couple of occasions, to show emotional distress in the T1000, they showed a rippling chrome effect going over the real character.

AE: Can you do similar morphing with Chronos?

LS: Very easily. In fact, you can do almost identical morphing with Chronos. Here's a simple project:

we have a piece of "glass" with a hole in it, a chrome guy on one side, and we want to make him go through the hole to the other side. It's easy to visualize the key frames in the sequence: in the first, the chrome guy has melted into a kind of puddle. In the second, he's flowed up the wall and is halfway through the hole. In the third, he's a puddle on the other side, and in the last keyframe, he's pulled himself together, again.

There are several ways to go about generating the sequence, but the one that gives you the most control of intermediate appearance begins with you "cloning" your chrome guy four times, making four perfect copies. Let's say that your original chrome guy will be the beginning keyframe object, and clone #4 will be the ending keyframe object.

Then, using CyberSculpt, the compression tools in Chronos, or other software, you would press and squeeze clone #1 into a puddle; clone #2 into a blob, halfway through the hole in the glass; and clone #3 into a puddle on the other side. By using copies of your original object to generate intermediate forms, you insure that the forms all have the same number of faces and points. The morph functions require this, in order to work. Chronos can tween between objects with different numbers of faces, but it's not as smooth as morphing.

AE: You can really do this on an ST?

LS: (Laughing) Sure! On a TT, with our new color board, Chronos can render up to 25 million colors at resolutions higher than SVGA. Beyond what I've described above, the difference between you working at home on your Atari, and what ILM did in T2, is mostly artistry and skill.

It all goes into learning to use the tools, and becoming good enough at it so that they're an extension of your creative sense. To be a good computer animator, you have to understand the physics of motion and inertia, down to a very detailed level. But learning this stuff doesn't have to be a complicated or academic process.

Suppose there's a motion you're interested in: like that of a darting fish. Find yourself a videotape of a fish, load it up on a decent VCR, and get a few sheets of inexpensive acetate. Pause the videotape, outline the fish on the acetate, and cut out a silhouette, just a little bigger than the image. Advance one frame at a time, until you've done 30 or 60 frames. Then move over to Chronos, load up your "fish object," alter the perspective and zoom so that it matches that of the videotape, and generate frames, using your acetate outlines as a guide.

Run through Chronos in cycle, you'll suddenly realize not only that you can begin to capture motion this way, but you'll have motion files you can use forever.

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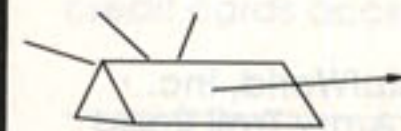
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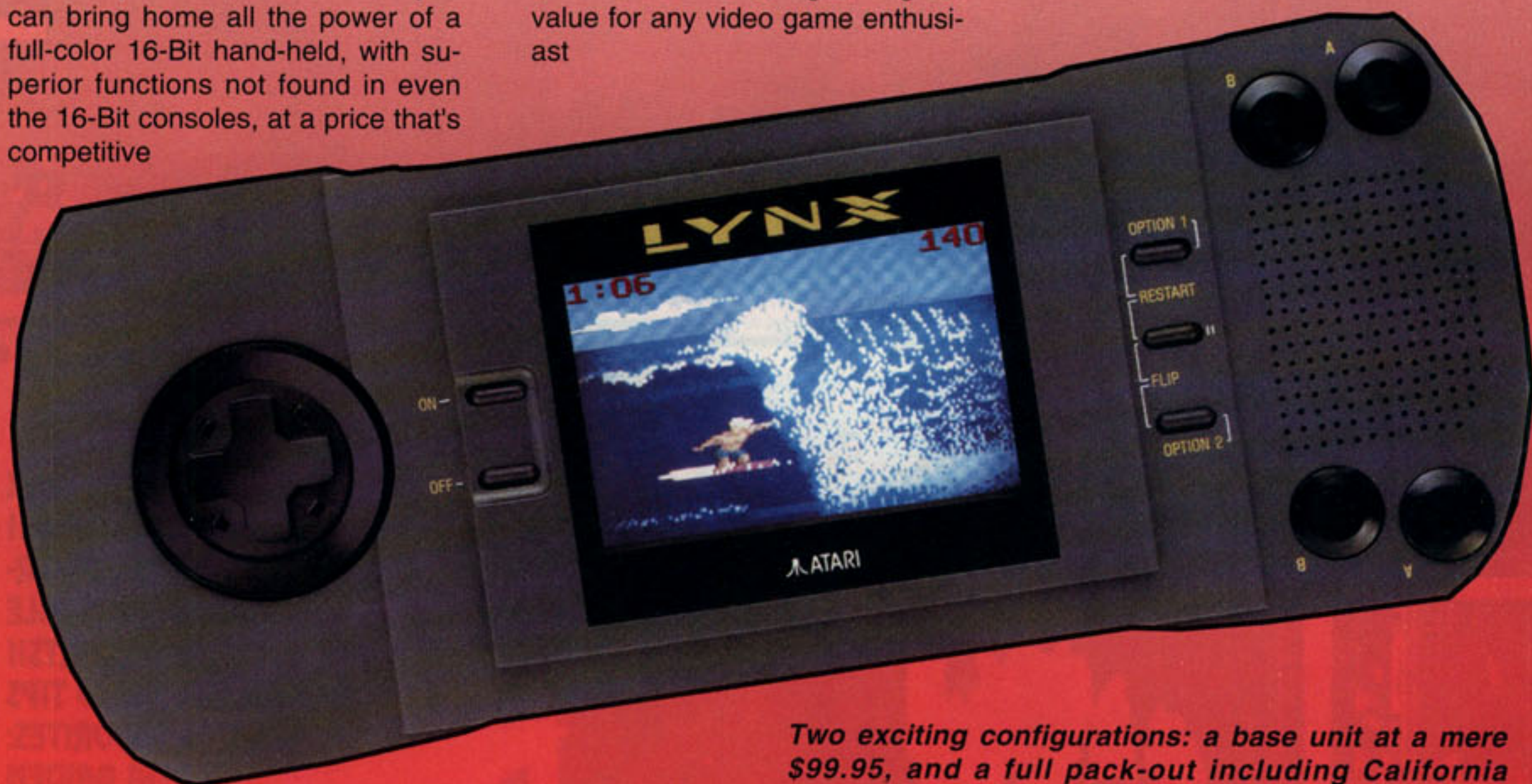
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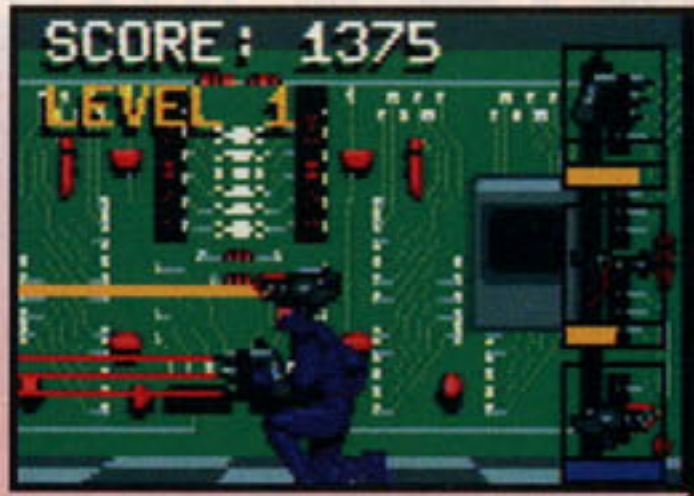
How has the Lynx changed between the new set and original \$149.95 set - once again a great value for any video game enthusiast

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In the 31st century, two warring factions are tearing the Federation apart. Are they going to solve their dispute with an intergalactic fire fight? No, they going to play Robo-Squash. Go against the computer or use the ComLynx to challenge a friend in a deadly 1-on-1 tournament.

RYGAR

You are the chosen one who is to rid the land of hideous monsters and powerful, lurking creatures. In this translation of the arcade game you must battle your way through 23 challenging levels in order to restore peace to the People of Good. This game features great graphics and game play. If you fail, evil will rule forever.

SHANGHAI

In this version of the ancient solitaire concentration game, you must match tiles of the same style. Remove all the tiles and you win. Tiles are arranged in the shape of dragons, bears, fish and other Chinese symbols. Challenge 7 different puzzles in this game of intricate moves and timeless strategies.

SLIME WORLD

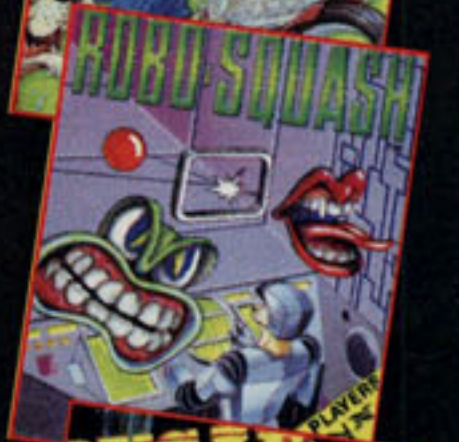
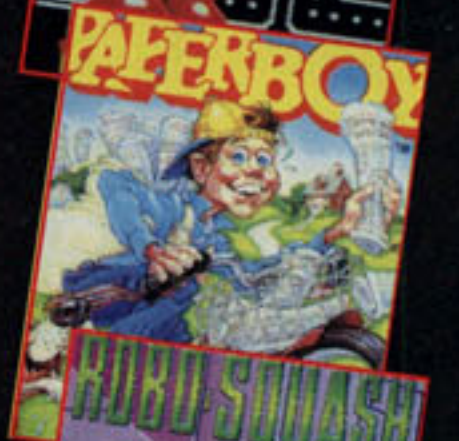
You are Todd, a brave and fearless explorer and you want to conquer Slime World, a world filled with bizarre creatures, flowing rivers of slime, and man-eating plants. 8 players can join in and fight their way through 6 complex and challenging levels. A fantastic adventure with lots of huge slime filled caverns to explore.

XENOPHOBE

The excitement of the arcade classic can be relived when up to 4 players join in on this alien extermination mission. The space station is infested with every kind of disgusting alien creatures. Pick up special weapons along the way and clear out the base before it self-destructs.

ZARLOR MERCENARY

You are a mercenary hired by the Zarlors, the arch enemy of the ruthless Merdicants. Your mission: to fly across the Merdicant lines and cripple their army. Choose from 7 different characters and blast your way through 6 exciting levels alone, or with 3 other mercenaries in this explosive shooting game.





MARTIAL ARTS!

ARCADE ACTION!

This visual masterpiece for the Atari Lynx system sports intense graphics and excellent sounds. Ninja Gaiden has all the excitement, powerups, and weaponry of the original coin-op classic. Rare is a game translation that retains the phenomenal feel of its parent game.

A particular surprise in Ninja Gaiden is the graphic integrity of the backgrounds and character animation. The colors are vibrant and lack no luster at all. Also, the animations are brilliant and smooth.

Lastly, Ninja Gaiden consists of the one thing that few games offer: marvelous player control and response. Fans of the original Ninja Gaiden will be pleasantly thrilled with this rendition. Every aspect of the game flows smoothly and cleanly. Bravo, Atari!!

EXCITEMENT!



LEVEL ONE!

This is a good place to practice your basic skills as a ninja warrior. Take on the evil Sumo Wrestler at the end.



LEVEL TWO!

There isn't too much room to operate on this level. The Blade Brothers will try to chop you into little pieces.



LEVEL THREE!

Take a tour through the backroads of the local slums. Beware the Dragon Team! Everything isn't as it seems...



GRAB THESE POWER UPS TO SURVIVE!!



Life Pill - These are scattered throughout the four areas. Get them all.



Ninja Sword - This mighty weapon will slice through the enemies like butter.



Power Pill - This life pill will restore all of your hit points. Do not miss these.



Bonus - This life pill will restore all of your hit points. Do not miss these.



Extra Man - It's always nice to find a free man inside a box or phone booth.



Time Restore - Time is replenished when you locate the rare Time icon.



THE ENEMY

These Jason look-alikes will try to stop you.



FRONT SWING

Knock the enemy back with this blow.



SMASH 'EM

Break phones, cans, and boxes for icons.



REAR SWING

A devastating rear blow to the enemy.



HIGH JUMP

Jump straight up to reach high altitudes.



FRONT PUNCH

A quick and powerful blow to the face.



NINJA SWORD

Grab the icon for this powerful weapon.



FRONT KICK

Weaken the enemy with the front kick.



WALL JUMP

Flip off the walls for surprise attacks.



ROUND KICK

Finish off the enemy with this move.



ENEMY FLIP

Toss the enemies around with this move.



BAR SWING

Similar to the front and rear swings.



BAR SWING

Move on the bars to avoid the enemies.



POWER PULL

Pull yourself up or lower yourself down.



TOURNAMENT CYBERBALL



Gaze into the future, nearly a century away! After phenomenal advances in technology, football is being played by highly sophisticated (and mass produced) robots. Man has been replaced by gears and wires, no longer engaging in physical activities. Enter a world of atomic footballs, nuclear explosions, and unending fun with Tournament Cyberball for the Atari Lynx System!

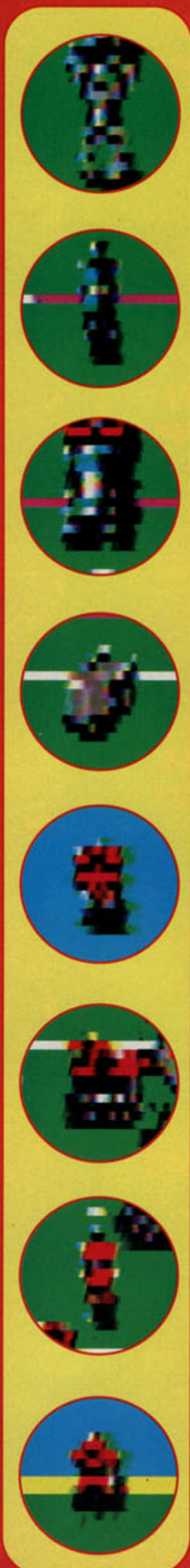
Passing, running, and option plays, are all offensive choices that only you can make. Remember, however, that even robots can breakdown after taking massive hits from a pumped up defense, so be careful! Once a robot starts smoking, replace it quickly. Save the team funds for high quality robots like wide receivers and running backs whenever possible.

Underestimating the offense is fatal. Coaches should never let receivers get in the clear or leave a wide open lane for agile running backs to squeak through. Killer plays for defense allow multiple blitzes, prevents, or man-to-man coverages depending on the type of situation.

Superior sounds, intense graphics, and fluid game play make Tournament Cyberball an armchair quarterbacks dream!



Atari Adventure



DON'T FORGET TO DEFUSE THE BALL!!



Careful!! Many good players have lost powerful running backs, agile wide receivers, or star quarterbacks to a fiery explosion!

PICK YOUR RIVAL!



BE READY FOR ACTION!



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RUN

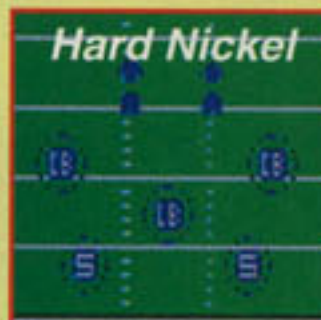
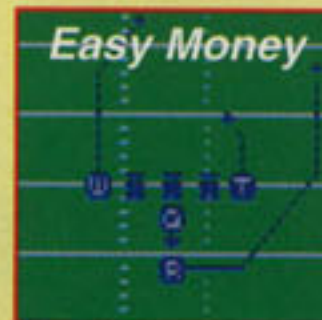
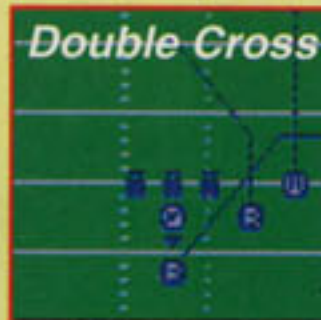
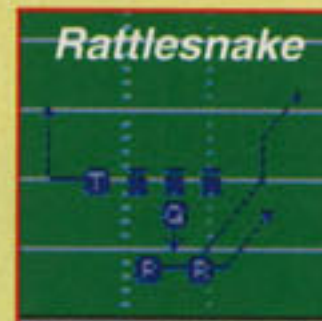
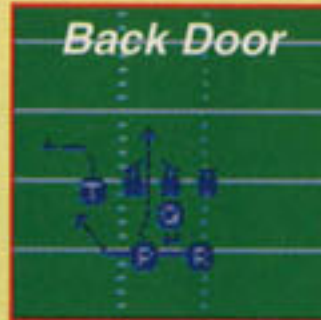
Use the powerful running back to break through the defensive lines!

OPTION

Decisions, decisions. Pass, Run, or Bootleg? It's your choice!

PASS

The ultra-quick wide receivers can outrun nearly any defense.



SHORT

These patterns are great against the run or short yardage plays.

MEDIUM

Short passes are hopeless when facing this defensive lineup.

LONG

Critical and long? Stop them short with the long formations.

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PICK YOUR TEAM!



Thunder



Crushers



Lasers



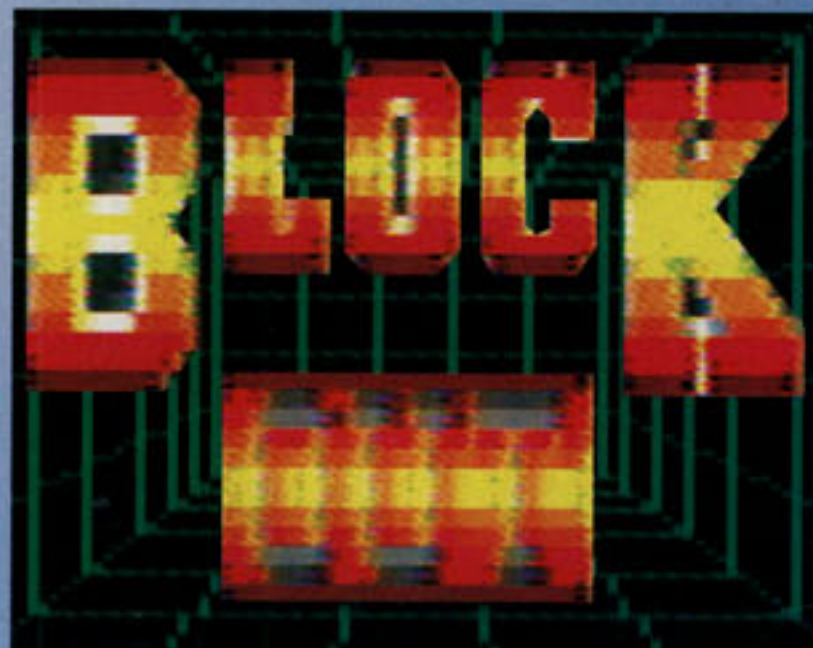
Force



Lightning



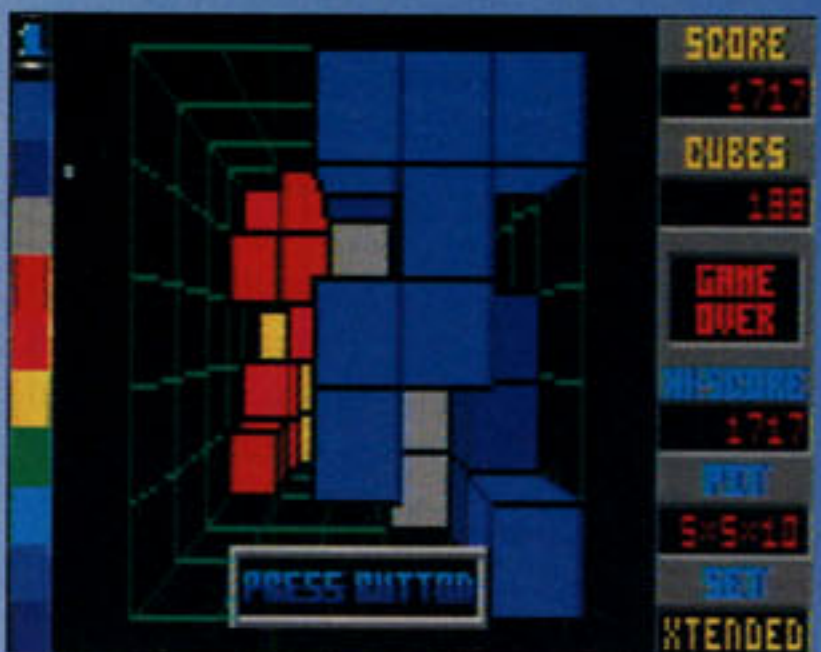
Machines



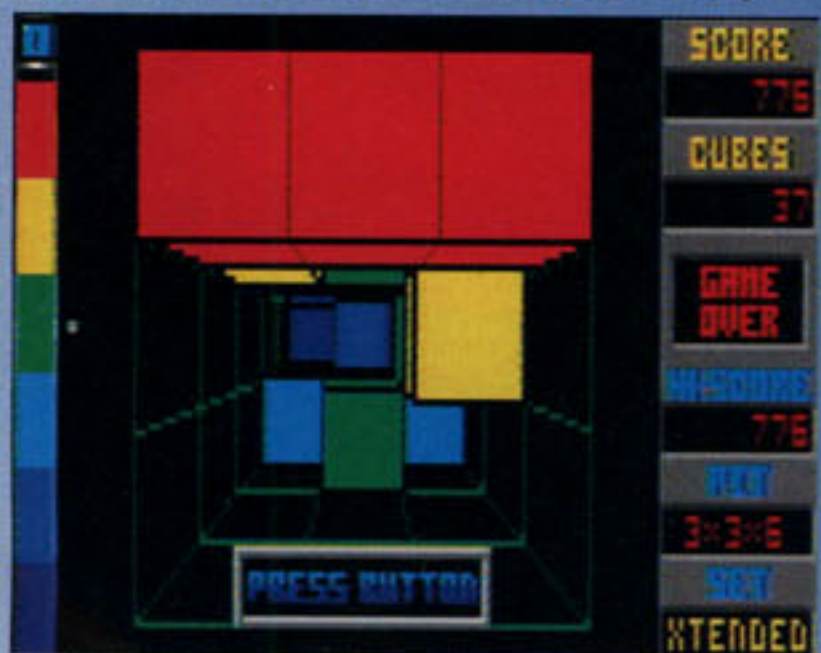
THE 3RD DIMENSION...

A new game for the Atari Lynx system, Blockout gives the falling block theme a whole new look and feel. This added dimension opens up a whole new bag of worms since 3D blocks can be almost any shape or size.

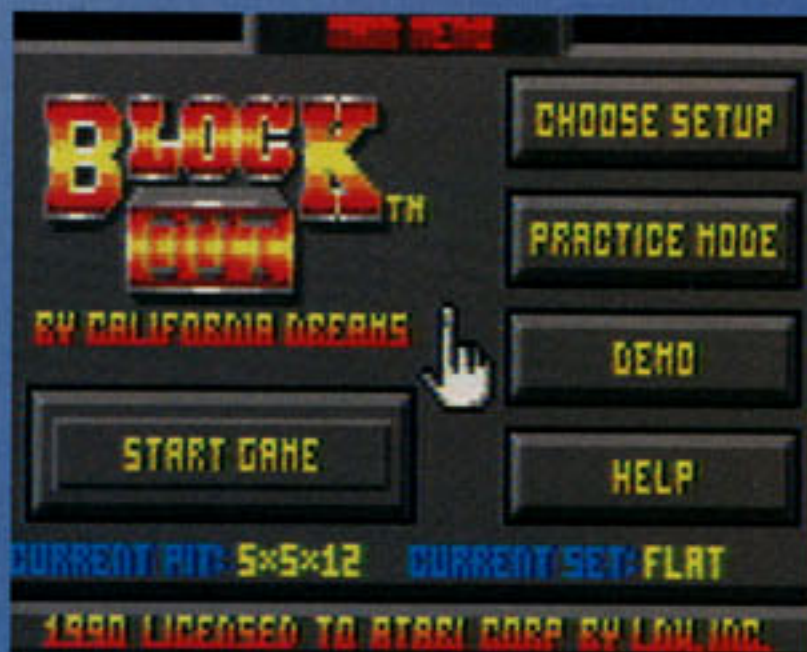
Boasting superior graphics and better difficulty settings than most puzzle-block games, Blockout is a challenge for people with a strong will and heart! Numerous unending levels of fun await the serious gamer who never gets enough of those twisting, colorful shapes. The best of the best will have a hard time keeping up with Level 9, the fastest game in town!!



Ugh! This is what happens when you don't practice the rotations. The extended block set is for pros only.



Atari Adventure



The Main Menu allows you to view a demo, practice, learn, or customize a game according to your skill level.



Use the Help screen to learn the various moves and rotations. Wise players master the Z-rotation first.



Use the speed and set-up screens to start at lower levels, then move up as you learn the different techniques.



BLOCKOUT™

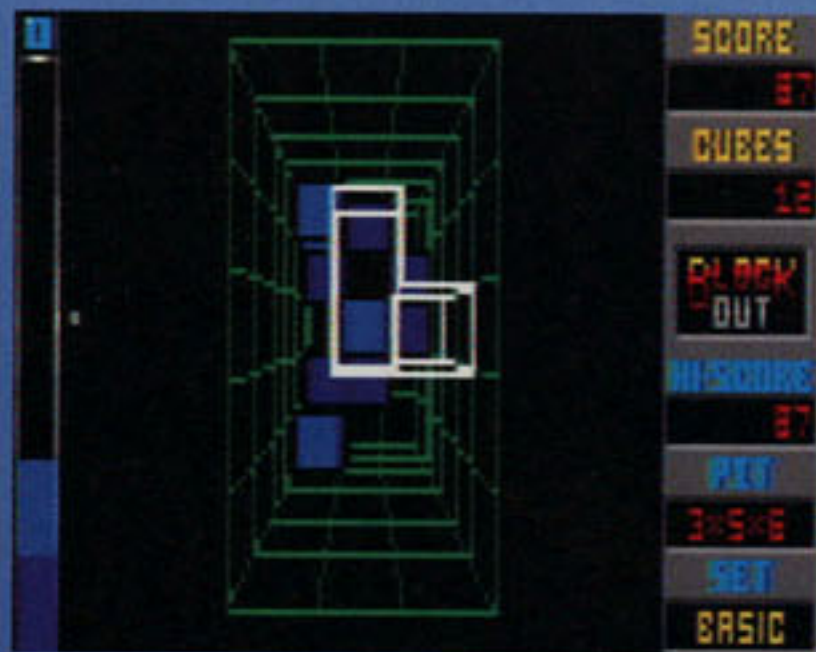
ATARI



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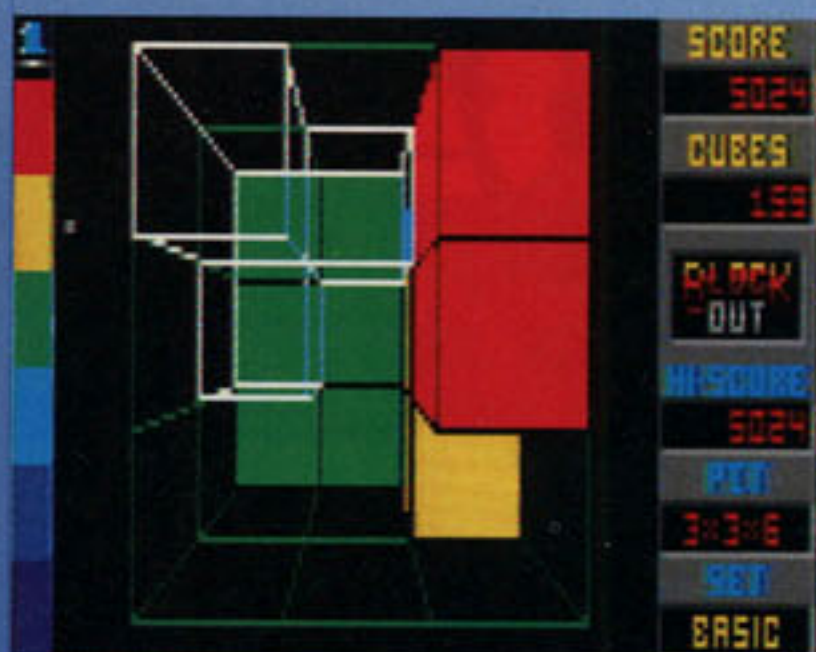
THE HIT

ME!



DON'T PANIC!

By using the color bar to the left, guide the falling three dimensional blocks into their proper positions. The flat setting is similar to Tetris since none of the block have depth; only by rotating the blocks will they have that perspective. Practice at this level until you become comfortable with the rotations and block shapes. Limit the rotations to 2 or 3.



BE CAREFUL!

Never let the blocks get too high, or else you'll run out of room to maneuver the incoming blocks. In order to rotate the blocks, you need space to move. Try to keep the blocks as flat as possible, and do not set them on end unless it is absolutely necessary. Practice in a three-by-three-by-six area to learn quick and accurate rotations.



BLOCK OUT!

This is what the game is about! After careful planning and a little luck, you can clear all of the blocks from the screen. Blockouts are far easier on smaller boards than large boards. Work your way up to larger boards only after mastering the smaller ones. Each Blockout will net you a huge bonus! Try to get them early.



THE Z-ROTATION!

While the X- and Y-rotations are far easier to learn, the Z-rotation is the most valuable rotation at your disposal! It is possible to play without the Z-rotation, but the game eventually becomes far too fast to waste time with multiple X- and Y-rotations. Play the practice game to master it, and you'll begin to play like a pro!



MORE HOT TITLES

THE LYNX IS ON THE PROWL!!

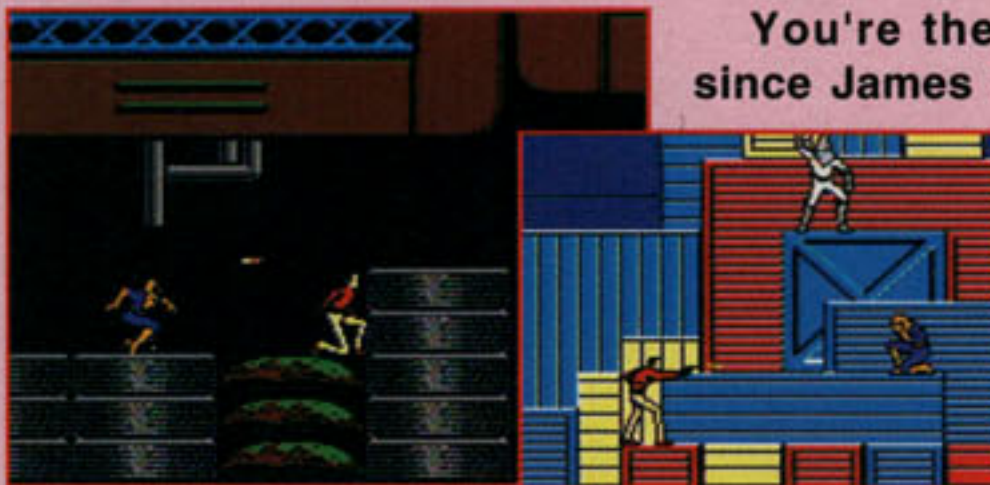
The Atari Lynx is shaping up to be one of the best video game systems around. With some of the most advanced home video game hardware on the market and an ever-increasing line of software, the Lynx is tearing up the competition. Currently there are 17 titles available and over 36 new titles scheduled for release in 1991! Many of the new titles are arcade translations of popular Atari coin-ops such as Hard Drivin', Vindicators, 720°, APB, Xybots, and even more recent hits such as S.T.U.N. Runner and Hydra! Atari also has a great lineup of sports titles for 1991 with NFL Football, Tournament Cyberball, Hockey, World Class Soccer, Golf, and a unique basketball contest called Basketbrawl (where you do a lot more than just play ball)! There are also many eye-catching originals like Barbarian Bodyguard, WarBirds, Turbo-Sub, and Scrapyard Dog – a really fantastic side-scrolling action-adventure for the portable Lynx. With over 40 titles scheduled for availability and a new lower price, it looks like it's going to be a great year for Atari!

HARD DRIVIN'



The Atari arcade classic comes to life on the Lynx with true filled polygon scaling and fast driving action. Choose the speed track or stunt track and test your skills in one of the toughest autoracing challenges ever!

ROLLING THUNDER



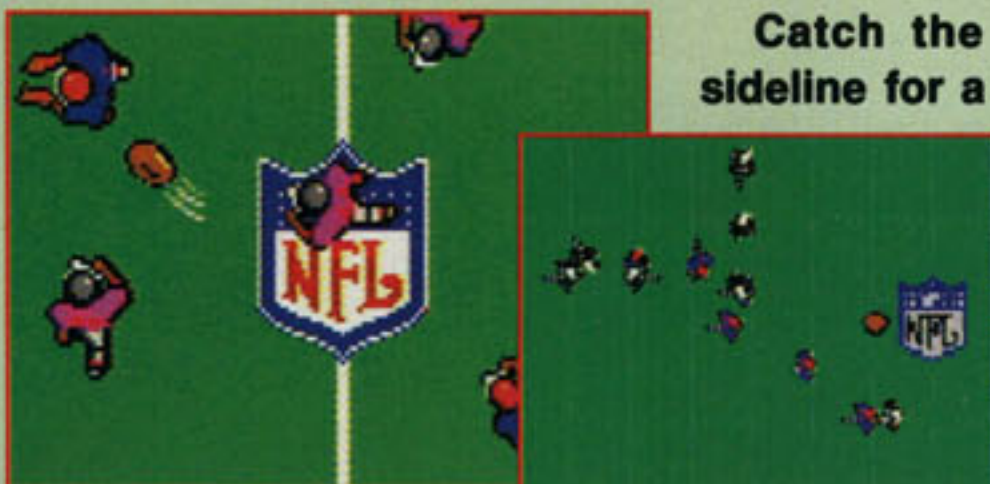
You're the slickest secret agent since James Bond himself! Now you must infiltrate a terrorist organization and rescue your partner - alone! Great arcade action brings you all the looks and feel of the coin-op classic.

HOCKEY



Grab your stick and hit the ice. Realistic game play and smooth scrolling bring all of the fast action of real hockey to your Lynx. When the pressure is on, try not to get in anybody's way or a fight might break out.

NFL FOOTBALL



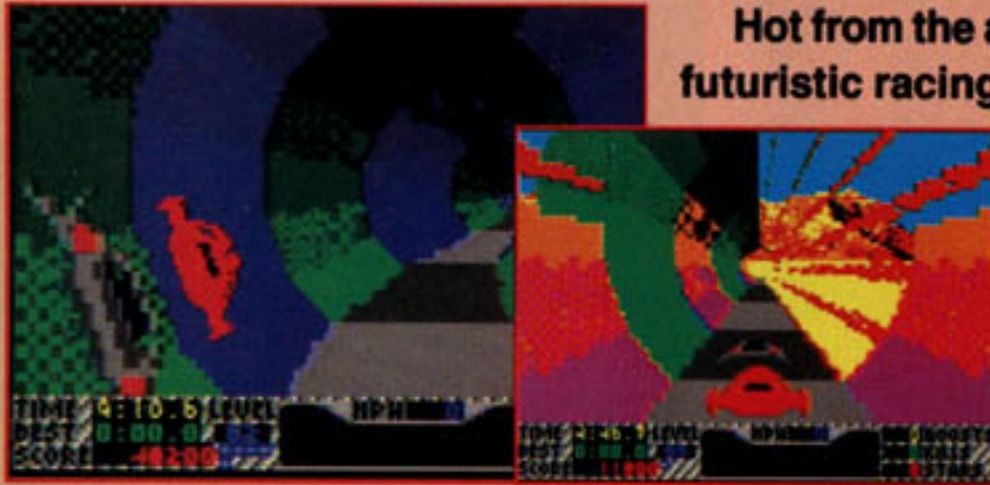
Catch the pass, and run up the sideline for a touchdown! As many as 4 players can pick teams from a list of official NFL organizations! Excellent scaling of the field as well as digitized voices calling the plays!

ATARI®

Atari Adventure

COMING IN 1991!!!

S.T.U.N. RUNNER



Hot from the arcades comes the latest in futuristic racing games, S.T.U.N. Runner. Pilot your vehicle through a vast network of winding tunnels at speeds exceeding 700 M.P.H!! Blast the opposition with lasers to come in first place.

WORLD CLASS SOCCER



An original soccer game from Atari featuring a scaling field that zooms in where the action is. You have to be fast and furious to kick the ball past the goalie. One to four players can challenge the best in world class soccer!

TURBO-SUB



Aliens have taken over the Earth's skies and seas. It's up to you to rid the planet of these other worldly trouble-makers in the air and water! The fate of the extremely detailed Earth is in your hands...and missiles!

VINDICATORS



Controlling the most powerful tank in the solar system, you must infiltrate an alien space station to eliminate their leader. One or two players can play simultaneously in this great conversion of the Atari coin-op hit.



TOKI

This original action game based on the little seen coin-op is a great action/adventure title for the Lynx. You must guide Toki through forests, caverns, and mountains. Along the way pick up the special weapons left after killing certain enemies. Great fun from start to finish!



WARBIRDS

An original flight simulation from Atari. In WarBirds up to 6 players can test their skills in some of the most intense dog-fights ever! Excellent scaling and use of polygon graphics give multiple perspectives and duplicate the feel of true flight!



HYDRA

Based on the recent arcade smash from Atari, this translation is still in the early stages, but looks like it'll be a hot one. Safely transport the cargo back to headquarters in your combination boat/ jet plane. Blast the enemy ships with power-ups gained along the way.



720°

In this coin-op conversion you must ride your skateboard around the neighborhood avoiding traffic and killer bees. Try to pick up enough stray cash to get you into the skate parks and win some serious bucks to upgrade your gear. "Skate or Die!" dude.

THIRD PARTY GAME!



ROBOTRON

A blast from the past! A great translation of the old coin-op from Williams. While the absence of the two joysticks is obvious, once you get used to the new controls it offers THE most shooting action this side of the arcade. Shoot the bad guys and rescue the humans.

SCRAPYARD DOG



This Atari original is still in the early stages, but promises to have lots of hidden secrets and plenty of action. Expanded from the 7800 version, Dog is a great adventure!

A.P.B.



All Points Bulletin! In this arcade translation you must search out and bust the bad guys. Listen to reports from the station to find your criminal. Awesome voices.



CASINO

Now you can play the slots without even going to the city of lost wages. Try your luck at black jack, roulette, craps, slot machines, and poker. Walk around the casino and see where the action is. Don't worry, there's nothing to lose and everything to win!



PACLAND

Pac Man is back in an all new adventure. This time instead of gobbling dots, you must run and jump your way through Pacland. Chomp on fruit, dodge ghosts, and hurl obstacles in this great arcade translation. A cute and colorful adventure that everyone in the family can enjoy.



BASKETBRAWL

An original multi-player basketball game from Atari. If you thought the pros played hard, than wait 'till you play against a group of street punks in a furious "No Rules" game in the street. Pick up the knives and nunchuks when the going gets rough. Get ready to rumble!



XYBOTS

Based on the Atari coin-op, you must go through a three dimensional maze blasting dangerous robots. Collect money along the way to buy special weapons. A great 2-player simultaneous game.



BILL & TED'S EXCELLENT ADVENTURE

Hop in your time machine and try to rescue your two bodacious babes. Travel to many different times and meet many historical people. Lots of fun in this totally "Excellent" game.



GOLF

Go for a hole in one! Pick your challenge from 18 of the hottest courses around. Choose your club, adjust your stance, check the wind, and control your swing. An extremely detailed and realistic first person golf game.



CHECKERED FLAG

An original racing game from Atari that lets you challenge your driving skills on a variety of premade tracks, or build your own using the course edit mode! 1 to 6 players can join in for unrivaled racing action!



VIKING CHILD

Battle your way through an enchanted land to rescue the captive princess! Journey into villages, forests and caves as you collect info and weapons in this original adventure cart from Atari.



GRID RUNNER

It's the sporting event of the future. 1 to 4 players can compete in this futuristic version of soccer. Grab power-ups along the way and carry them to your opponents goal and blast it in before the timer runs out.



GEO DUEL

Maneuver your ship in a grid-like world of speed and danger. Dodge the many obstacles on the grid surface while leaving a wall of light behind you. Try to trap your enemies and make them crash to their doom.

THIRD PARTY GAME!



CRYSTAL MINES 2

Exercise your mind in several challenging and unique puzzles. Blast the rocks in the right order or you might get crushed. This puzzle/ strategy game is the first Lynx game developed by 3rd party licensee Color Dreams.

THIRD PARTY GAME!



FIDELITY ULTIMATE CHESS

Capture the timeless strategy of chess in this detailed simulation from Telegames. Challenge the computer for solo play or a compete against a friend in either 2-D or 3-D mode.

LYNX



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