

# START <sup>#1 Guide To Atari ST</sup>

Volume 4, Number 6

January 1990

USA \$14.95 • Canada \$19.95

**Double  
START Disk  
Inside**

## ATARI'S CD-ROM

### A Small Tour of UNIX Part II

LUCASFILM GAMES  
LAUNCHES

*THE  
BATTLE  
of  
BRITAIN*

#### **ON DISK:**

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LaserDisc Remote Control  
GFA BASIC Text and GDOS  
Mystic Realm  
Softguide II  
Magazine Index

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ST Pictascan  
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**ASSOCIATE PUBLISHER**  
John Taggart

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**Tom Byron, Associate Editor**

**Heidi Brambaugh, Programs Editor**

**Jim Farnsworth, Music/MIDI Editor**

**Merle Davis, Editorial Coordinator**

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Lomonos, Stephen Martin, Mark Hanson, David  
Plotkin, David Knudson, David Small**

**Contributors: Marcos Badgley, Jim Barton, Phil  
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### CREATIVE SERVICES

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### ADMINISTRATION

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**General Offices, Catalog Customer Service: (415) 957-0886,  
8 a.m. to 6 p.m. Pacific Time. START, 544 Second Street, San Francisco,  
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**A**s I write this, the Portfolio is actually in the stores, the STACY is awaiting FCC approval with a projected release date around Halloween and the TT030/2 is next down the pipe. Atari stock is hovering around \$12 per share and even the Lynx hand-held game system is poised for a modest pre-holiday release. Yes, they slipped the release date of STACY and, yes, we're still hoping that the TT will be available before the end of the year. The ST? Well, the signals are mixed — cross your fingers, folks.

Atari has never had a sterling record of shipping products on the originally announced schedule, but if you take a look at the industry, delayed shipments are the rule rather than the exception. How about NeXT? They held a press conference just to announce that they had finally finished the operating system — months after they had started shipping their \$10,000 computers.

We're not apologizing for Atari. For what they felt were good business reasons, the Tramiels created the weak U.S. situation we all suffer under: too few dealers, too few new products and too little dealer, developer and owner support. But at the same time, we recognize that Atari users are some of the most loyal and enthusiastic computer owners around and that they (and we) long to hear positive news from Sunnyvale. Sometimes, we think that Atari releases product development news too early just to satisfy us loyal but skittish owners. Still, we'd rather hear that *something* is happening at Atari, instead of a silence that gives us no direction at all.

No matter what new products finally emerge from Atan, we're here at START to support them — and you in their use. This issue, for example, we have the second installment of Dave Small's Unix Tour to acquaint you with the TT's alternative operating system. And we offer a unique exploration into LaserDisc control with the ST; optical media is, after all, the future of computing. Nothing else can offer us storage capacity — 550MB! — on a single replaceable disk.

Of course, Atari has had a CD-ROM in the works for years. But finally, it's getting close to release — we've actually seen software running on an ST from Atari's CDAR! Really! START Associate Editor Tom Byron has tracked down the details of Atari's imminent CD-ROM player; read all about it this issue.

We also take a sneak peek at Lucasfilm's remarkable sequel to Battlehawks 1942 and look at the first "PC in a box," Talon's SuperCharger. On the START disk, we have a great music scoring program, a colorful and challenging graphics adventure and the long-awaited portal program for CAD-3D users to convert their files to AutoCAD DXF format. And on Side 2 of the START disk, we have added an updated edition of the well-received Softguide and Madame Librarian, David Plotkin's master index of all of the articles, programs and reviews in ST magazines over the years. ■

ANDREW REESE  
START Editor

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# Dialog Box

## Fading Away

If I try to use white text on a black background on my monochrome monitor, the text fades away, leaving me with a black screen. The degree of fading is inversely proportional to the amount of text on the screen. The screen blacks out completely unless more than a few lines of text are displayed, even with the brightness and/or contrast controls all the way up. This problem happens with any application where you can flip the colors, such as ST Writer Elite 3.0. Is this normal, or is my system faulty?

Randy Deardorff  
Seattle, WA

*We've never heard of this problem and have no answer for you. We'd certainly suspect that this is an equipment problem. Try borrowing a monochrome monitor from a friend, if that works properly, you'll know your culprit. If you still experience the same problem, substitute a different computer and try again. Have any other readers run into this problem? —START Editor.*

## Grateful

I was very grateful for your article on STOS and STAC in the September 1989 issue of START. I have all the issues after Summer 1988 but haven't seen a full review on the Megs. I also would like to find out more about the Brain Storm Hard Disk Systems by Void Productions and NeoDesk by Gribnet Software. Thanks again!

Donald A.E. Johnson  
Nashua, NH

*We received a positive response from our reviews of STOS and STAC and have a "Programming in STOS" column in the works.*

*Our review of the Mega line of computers appeared when they were first introduced and can be found in the Winter 1987 issue of START. Our review of NeoDesk appeared in the October 1989 issue, together with HotWire and VDCS ProQueue. Check the hard-disk overview in the December 1988 issue of START for more on the Brainstorm. — START Editor.*

## Cheers for Psynopsis

This is just to say Psynopsis is a top-notch company. When my copy of Barbarian went bad, I wrote them requesting a replacement. I was pleasantly surprised when their first response — within a month — was a package of two replacement disks. No delay, no form letters (and transatlantic too!). Not only do they have first rate software, but first rate service. I wish all software manufacturers followed their example.

Al Tucker  
Westbury, NY

## Cinko "Raves", CardSTak "Grieves"

First I want to express pleasure over the September 1989 issue, with special appreciation for Michael Gilbert's excellent implementation of Go-Moku. I've been waiting for years to see a variation of this on the Atari. Cinko is a killer, and I had to wait until I bested the algorithm by (barely) a point before writing to

rave. Congratulations to Mr. Gilbert on fine work and a tough opponent.

One of the most useful programs from your magazine was Alex Leavens' CardSTak. I wrote to you following my purchase of START after using CardSTak and discovering it wouldn't correctly formfeed standard 3" X 5" index cards, such as those made by Avery for computer feeds. This makes CardSTak useless! Is a fix available? I raise the point now because you seem willing to add bells and whistles to programs like Slither, such as September's screen editor, but seem slow to upgrade a truly useful application which isn't performing as indicated in the magazine. I would love to see that rectified.

Loren S. Miller  
Brookline, MA

*START is pleased to announce that there will indeed be a major upgrade to CardSTak published in an upcoming issue. CardSTak Professional features improved sorting routines, more flexibility and the ability to view up to four files at once on-screen. It will also include a report menu that lets you set spacing for your cards and insert form feeds wherever you need them. We've received numerous requests for this reporting feature; the original article was in error when it stated that CardSTak could print out files on 3" X 5" cards.*

*We're glad you enjoyed Cinko. Watch START for more of Michael Gilbert's great games. — START Editor.* ▶

# Dialog Box

## PD Programs Down Under

I am writing to you concerning the availability of the Archive Utilities program which you use to compress files for your monthly START disk.

When I came across the extract program on one of these disks [ARCX.TTP], I found the concept a very good way of storing latent files long term without wasting excessive numbers of disks or disk space.

Unfortunately, I haven't been able to find a source of this or any other public domain software in Australia for the Atari, nor have I been able to locate a regional magazine similar to START.

It would be greatly appreciated if you could point me in the right direction concerning this.

Vince Bailey  
Mowbra, Tasmania  
Australia

*We recommend you contact the Melbourne Atari Computer Enthusiasts. They publish a newsletter called "The Australian Atari Gazette" which features information on Australian user groups and resources and ads for Australian ST dealers, many of whom take mail orders. If you join MACE you will be able to take advantage of their PD library to get the utilities you need. Their address is MACE, Inc., P.O. Box 340, Rosanna 3084, Victoria — START Editor.*

## START vs. Amiga Plus

Having been an avid reader of your Antic Magazine years ago and then switching to START upon its creation and my Atari 800 being updated to an ST, there have been numerous times when I have been tempted to

write you but have always hesitated to do so. However, recent notice of your new Amiga Magazine has prompted me to write.

To begin with, I hope that this new magazine of yours will not cause the quality of START to decline. START is one of the very few publications that Atari users can turn to for new product information and news, and I sincerely hope that this will not diminish. Now as to my questions...

Is the new 4096-color upgraded board for the ST computers the logical upgrade to match the new Atari STE's color display or does it mean that I have to trade in my faithful MEGA 2 for another computer?

Having waited so long for a ray-tracing/smooth texturing Cyber addition to my library and not getting one, I recently purchases GFA RayTrace. This is an excellent program that I would recommend to anyone serious about computer graphics if it had one other feature. It saves pictures in a format which is incompatible with anything else. Do you know where I can get a program to convert RayTrace pictures to Spectrum format?

Kerry Mason  
Lunenburg, Nova Scotia

*Although Antic Publishing has recently begun publication of Antic's Amiga Plus, a START-like magazine for the Amiga user, we can assure you that START and Amiga Plus can — and will — co-exist peacefully. By now you should be aware of the additional resources we are devoting to START to bring you even more value for your magazine dollar. That commitment will definitely*

*continue. We have some very exciting programs and features coming in START.*

*JRI's 4096 Board was designed to bring the ST palette up to STE standards and was developed with the advice of Atari personnel. We think you can expect color compatibility, although there may be features for which you might otherwise want to sell your MEGA — such as genlock compatibility, digital stereo sound, bandware scrolling, etc.*

*Keep an eye on the pages of START for a solution to the GFA RayTrace file problem, if there's a way to solve it, we'll do so. And for those of you who don't yet have GFA RayTrace, watch these pages also.* — START Editor

**Do you have questions about using your ST? Is there something you're not clear about? Every issue, START's editors listen to your comments and answer your questions in Dialog Box. Let us hear from you! Our address is:**

**Dialog Box  
START  
544 Second Street  
San Francisco, CA 94107**

**Or leave us a message on CompuServe using the Antic Online Mailbox — just log on and type GO ANTIC.**

## SUBMISSION INFORMATION

START welcomes submissions. Please include both hard copy printouts of articles and program listings as well as disk files on ST compatible disks. Media will be returned if self-addressed, stamped mailer is supplied. START assumes no responsibility for unsolicited editorial materials.

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# News, Notes & Quotes

BY STEPHEN MORTIMER START CONTRIBUTING EDITOR

## Portfolio Shipping

The long-awaited Atari Portfolio, described in *The Traveling Computers* in the October issue of START, began to ship in limited initial quantities to dealers in the United States in September. All peripherals for the Portfolio have been announced as being available by the time you read this. The Smart Parallel Interface (\$49.95) allows direct connection to an IBM PC or a parallel printer. The Serial Interface (\$79.95) connects the Portfolio to such peripherals as a modem or printer. The Memory Expander Plus (\$229.95) adds memory in 256K increments up to a total of 640K. The Memory Expander Plus also adds a second SRAM card drive. A PC Card Drive (\$99.95) lets IBM users read the Portfolio's SRAM cards directly, a much faster and more efficient process than transferring files between computers. Finally, a \$9.95 AC adapter is available to save battery life. Call (800) 443-8020 to order a

Portfolio direct at its \$399 list price.

Prices for SRAM cards have also been announced. The 32K card is priced at \$79.95, the 64K card at \$129.95 and the 128K card at \$199.95. While much higher than a floppy disk (and with less storage space), the SRAM cards have the

advantages of being much sturdier and more impervious to damage. As the market grows for SRAM cards in general and production increases, prices are expected to decline.

Atari broke its long advertising drought in September with a double half-page spread advertisement in the September 19, 1989 edition of **The Wall Street Journal**. The ad, the first from one of Atari's new ad agencies, showed a full-sized Portfolio with its low price strongly featured. Potential buyers were given Atari's (800) number to call Atari direct to order, as Atari is not shipping Portfolios to all of its dealers.



## Rainbow TOS Released

Rainbow TOS, the new ST operating system previously known as TOS 1.4, should now be widely available to users who want to upgrade their STs. After being tested extensively, the new OS is reportedly very solid with compatibility better than the Mega TOS (1.2) version. Only a few new features have been added to Rainbow TOS with respect to the Mega TOS. Most of the changes are in the optimizing and debugging of the code to achieve a faster and more robust operating system.

On the desktop, users can rename folders, move files and even format disks in an IBM-compatible format.

Disk access speeds have been dramatically increased. Other features include a revised file selector, the ability to run GEM programs from the AUTO folder, compatibility with high resolution monitors and a keyboard combination that resets the computer. Finally, memory management has been improved and a provision has been made for hard-disk archive bits. The latter option is designed to aid hard-disk backup programs.

Since documentation is not being shipped with Rainbow TOS, here are some useful hints. To move a file (copy a file, then delete the original), press and hold

# WORDUP

# 2.0

WordUp is the only Atari ST/MEGA™ word processor that can integrate multiple fonts and pictures.

## New Features!

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[Control] while dragging the files to be moved. For a warm reset, press [Control], [Alternate] and [Delete] simultaneously. For a cold reset (complete system reboot), press [Control], [Alternate], [Delete] and the right [Shift] key. A new ST manual covering Rainbow TOS may be made available to current Atari owners. Also, you can find out why it's now called Rainbow TOS by clicking on "Desktop Info..." under the Desk menu from the Desktop.

Currently, only a six-chip version of Rainbow TOS is available. A two-chip version for older ST models is planned for the future. Dealers can modify two-chip computers to use six chips, but this is the reason Atari cares for not making the chip sets available separately. Retail price of Rainbow TOS is \$99.95 plus installation. According to Atari, you can obtain the TOS upgrade from your local Atari dealer. For the location of your nearest dealer, call Atari at (408) 745-2367.

## Fat Bits

- Imagen is currently working on a Terminate-and-Stay-Resident (TSR) version of its popular UltraScript PostScript-compatible interpreter. Users will no longer have to print a PostScript file to disk from a page layout program, then exit and run UltraScript to print out a document. With the TSR version, the process will be virtually transparent to the user. Programs that can output directly to a PostScript printer will be able to use the TSR version of UltraScript and print to any supported printer.
- The price for UltraScript ST for the Atan Laser Printer has been lowered to \$179. UltraScript ST-1 (the 1MB version of the program that prints to many different dot-matrix printers and the HP DeskJet/LaserJet) still sells for \$229 but now includes the Times and Helvetica fonts in addition to the Lucida and Courier families.
- CMI's Processor Accelerator, reviewed in the previous issue of START, now has a blitter-chip option. Atari has agreed to sell chips to CMI for inclusion on its boards. Current users can upgrade their accelerator with a blitter chip for \$40. The ST-PA is \$339.95 with a blitter chip installed or \$299.95 without the chip.
- Fast Technology has released the FASTBLIT board that retails for \$49.95. It offers users the opportunity to add a blitter chip to any ST for the price of the Fast board and the chip. FASTBLIT also lets pe-ditto II work with Fast Technology's T-16 accelerator board. ■

If you have a hot tip let us know at **News, Notes, & Quotes**, START Magazine, 544 Second Street, San Francisco, CA 94107.

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**HILLSFAR** is the training grounds for your heroes. Transfer your characters from **Pool of Radiance** or **Curse of the Azure Bonds** and increase their skills through real-time workouts such as combat, maze-running, lock-picking, archery and horseback riding. Succeed in **Hillsfar** and your characters' statistics will actually improve. They will emerge from **Hillsfar** more prepared than ever to survive further adventuring.



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# Products Update

## New ST Software & Hardware

Compiled by Marta Denke

### New Games from Broderbund, ReadySoft and Britannica Software

Sure to be next in the line of addictive games, **Shufflepuck Cafe**, is Broderbund's latest release. In this simulated air-hockey game, you're pitted against nine different opponents, all of whom are regulars at the "Shufflepuck Cafe," a seedy saloon reminiscent of the bar in "Star Wars." Each of the nine opponents has a distinctive appearance, personality and style of play. Their abilities cover a wide range, from the easy-to-beat Wimp Skip Feeney, to the murderous General, and their tactics also change as they play. **Shufflepuck Cafe**, \$39.95. **Broderbund Software**, 17 Paul Dr., San Rafael, CA 94903-2101. (415) 492-3200.

Following up last year's hit, **Dragon's Lair**, ReadySoft brings you **Space Ace**, another Don Bluth adventure. The evil Borf has just kidnapped the beautiful Kimberly, and is plotting to take over the planet with the help of his dreaded weapon — the Infanto Ray. Only you can guide the heroic Ace through treacherous battles to destroy the Infanto Ray, save Earth and rescue Kimberly. **Space Ace**, \$59.95. **ReadySoft**, 30 Wertheim Ct., Unit 2, Richmond Hill, Ontario, Canada L4B 1B9 (416) 731-4175.

Experience the power of the gods



Scattered somewhere throughout the burial chamber are your father's body parts. With the Eye of Horus, you must find them before the evil Set finds you. The game runs on a color system only.



In **Space Ace**, the latest hit from ReadySoft, you must survive treacherous obstacles to destroy the dreaded Infanto Ray, save the Earth and rescue Kimberly.

with **Eye of Horus**. Britannica Software's new arcade game. As Horus, son of King Osiris and Queen

Isis and god of all that is light and good, you must conquer Set, god of evil and night, who takes the form of ▶

a dragon. Set has slain your father and scattered his body throughout the burial chamber. Inside the confines of this maze, you must recover and reconstruct your father and, putting your skill and magic against his, destroy Set once and for all. *Eye of Horus*, \$39.95. **Britannica Software**, 345 - 4th St., San Francisco, CA 94107, (800) 572-2272.

## SSI RPGs

If you like role-playing games, Strategic Simulations has been thinking of you. Three new adventures have just been released for the ST.

**Hillsfar** and **Dragons of Flame** are episodes in SSI's popular Advanced Dungeons & Dragons series. In *Hillsfar*, each character is sent on several quests, which the game automatically modified depending on the class of character you've chosen. You're put to a number of tests on these quests to earn valuable items. *Hillsfar* is the first AD&D game in the series, while *Dragons of Flame* takes you and your ten Companions on a mission to rescue slaves held by Dragonarmies. Of course, you'll be lucky even to reach your destination in this world of Giant Wasps, Griffins, Wraiths and Zombies.

**Star Command** is an SF role-playing game created by Doug Wood, author of the *Phantasia* trilogy. In *Star Command*, you control a crew of eight star troopers, traveling through the galaxy on an assignment from the Star Command.

## PC Speed from MichTron

If you have taken advantage of your ST's ability to emulate other computers like the Mac and IBM, you know that sometimes the software requires the patience of Job; it's grindingly slow. MichTron has just released their answer to this problem, **PC Speed**.

PC Speed gives your ST the ability to emulate an IBM PC through hardware. It runs with a Norton factor of 4, which is 33 percent faster than the advertised Norton factor of 3 of pc ditto II. In the real world, this means that PC Speed is nearly three times faster than an IBM XT, comparable to an IBM AT. PC Speed runs on a monochrome monitor, emulating Hercules graphics or on your color monitor in CGA mode. PC Speed, \$399.95. **MichTron**, 576 S. Telegraph, Pontiac, MI 48053, (313) 334-5700.



If you survive the trek through ever-increasingly dangerous lands, you must then lead your companions to the evil Dragons of Flame and emancipate their slaves.

The earth has been annihilated and your mission is to rescue the remaining inhabitants of the galaxy from pirates and aliens. They could be anywhere.

*Hillsfar*, \$39.95. *Dragons of Flame*, \$39.95. *Star Command*, \$49.95. **Strategic Simulations, Inc.**, 675 Almanor Ave., Sunnyvale, CA 94086, (408) 737-6800.

## GFA BASIC 3.0 Compiler Ships

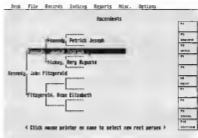
Antic Software has announced that the long-awaited GFA BASIC 3.0 Compiler is ready to ship. The Compiler converts GFA BASIC 3.0 code into high speed, stand-alone programs and also can generate Desk Accessories. Antic is packaging

the Compiler with the latest version of the Interpreter, GFA BASIC version 3.07, which promises faster disk access within programs and improved TAB functions in the Editor, as well as a new command to draw Bezier curves from four control



points

Owners of GFA BASIC can upgrade by sending their original disk to Antic Software; upgrades from GFA BASIC 3.0 are \$29.95, and from 2.0 \$69.94. The upgrades include both the Compiler and the new Interpreter version 3.07. GFA BASIC 3.0 Compiler/3.07 Interpreter, \$139.95. **Antic Software, 544 Second St., San Francisco, CA 94107, (800) 234-7001.**



**Plot your family line!** Family Research Manager is a new genealogy program for the ST from Data Horizons. With it you can chart your ancestry as far back as you wish.

## Family Data

Ever want to give your family roots? A new genealogy program for the ST called **Family Research Manager** has just been released from Data Horizons. The program includes a GEDCOM interface that reads and writes files compatible with PAF 2.1 and Roots III. Intuitive record

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Manager, \$74.95. **Data Horizons, 2991 Stillmeadow Drive, Dublin, OH 43017, (614) 792-9029.**

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BY DAVID SMALL START CONTRIBUTING EDITOR



A SMALL TOUR OF

# UNIX

PART  
2

*Last issue, in anticipation of the UNIX-capable TT's release, we asked Dave Small to start our readers off on a tour of UNIX. Dave's first installment covered the basics of UNIX file structure and several important UNIX concepts. In this issue, Dave starts out with a discussion of the "root" and UNIX's oddly named commands and then takes you on a walkabout of a typical UNIX system.*

**A**ll UNIX systems include an "ultimate user" called root. Now UNIX gurus will wince as I say this, since I'm glossing over minor points of precision, but essentially this user, root, can go anywhere and do anything. Root can ignore such trivialities as permis-

## My guess is that Atari will supply Bourne with the C shell optional.

sons and can read anyone's private mail if root so chooses.

Of course, on big UNIX systems, root is used by the system gurus, who use the sign-on to keep the system running and bail the system out of crashes, when permissions and such would just get in the way. And you can bet the password to root is a closely guarded secret.

On your own individual TT/UNIX system, you may very well choose to log in as "root" all the time and dispense with all the permissions/protection folderol I discussed last issue. This would be particularly appropriate if you're really the only user. However, root can do some fairly nasty stuff to the system that other users cannot, if you're not careful, it's probably safer to reserve using root for the (hopefully rare) times you need super-privileges and use a "mere mortal" user number for everything else. That way, if you try to do something that's *certain death* for the system, UNIX will protect you from yourself.

### GEM? No, Command Lines

On the ST, it's easy to take a "walkabout" inside the disk system and look inside of folders. To open a folder, just point at it with the mouse and double-click; you can then see its directory on the screen.

The TT is said to have something like this graphical-interface capability, but no one, including me, has seen it as of presstime, so let's continue on with command lines. I *guarantee* that you'll spend a lot of time in command lines in UNIX.

Command lines? If you don't know what they are, you'll probably recognize them in a moment.

On the ST, there are many command-line programs. These let you see directories by typing DIR, let you change directories by typing CD and so forth. Many command-line programs are very much like IBM MS-DOS, so that you can have AUTOEXEC.BAT (batch files (groups of commands executed on startup), DEL for delete, COPY for copy, RENAME for rename and so forth. Sound familiar?

Since UNIX systems grew up before graphics were available in a standard terminal (back when the teletype-33 was the standard), they are very command-line oriented. Graphics have only recently been tacked onto UNIX and aren't well integrated into the system yet. Hence, resign yourself to staring at an 80-by-24 screen and typing lots of commands.

### YACCety Yak: These Awful Command Names

Are you a poor typist? Well, UNIX "helps" you by shortening command names. For instance, instead of DEL to DELETE a file, you use *rmi* to REMOVE a file. MOVE (RENAME) becomes *mv*. COPY becomes *cp*. You can, with some effort, teach the shell (what you talk to) to understand commands like COPY or DEL or DIR, but it's not easy.

On the one hand, the short commands are nice for the two-finger typists. On the other hand, the replacements for the long commands are often hard to remember.

Part of UNIX's reputation for being user-hostile comes from these command names. It went from, "Well, it saves a couple of keypresses," (COPY to cp) to pure

stiffness: *grep* (GREP?) for "Search through files for a particular data item," *YACC* (for — no kidding! — Yet-Another-Compiler-Compiler) for complex language generation, and, of course, BISON for a clone of YACC (right, as in Yak, the animal). I'm not kidding, BISON is real.

Now you know why people often regard UNIX with quiet amusement when they consider new users. New users have a hard enough time just double-clicking on an icon. How are you going to teach them to run a program or do something when commands are named stuff like *jpg* or *grack* or *murf*?

### Shells and Scripts

Well, okay, let's log into the UNIX system. First, you'll get a prompt (*#*), telling you that you're talking to a shell, a semi-intelligent program that will "help" UNIX understand your commands.

For example, if you type "cp \*/dave" (which copies all files to a sub-directory named dave), the shell does a directory of all of your files, and generates something like "cp file1 & file2 & file3 & . . . & last file to /dave" to the underlying system.

Shells may also have "scripts," which UNIX calls Batch Files, written for them. These can be incredibly complex and do darn near anything many people program UNIX just with the shell, avoiding the "C" language like the black death. (In my humble opinion, this is deserved, but I am given to understand that not everyone shares this view.) Anyway, I can do little more than touch on shell scripts, but they are there and can automate most common tasks, such as getting a beginner into a ▶

## Root can go anywhere and do anything.

program safely. You do have to be a reasonably adept guru to write a shell script.

There are three different shells in common use in UNIX-land. There's the Bourne shell, which is default. C-language hackers tend to like the C shell. AT&T loyalists like the Korn shell. I don't know which Atari will supply; all three have fierce loyalists. It'll probably depend on which shell Atari's hackers like. My guess is that they'll supply Bourne with the C shell optional.

### A UNIX Walkabout

Okay, so I'm logged in and in my shell. Let's find out what files I have in my home directory, /usr/dsmall. Instead of DIR, as you're probably thinking, I type `ls` (I know, I know — `ls`). What UNIX gives me is a thumbnail description — just the names — of all of the files and subdirectories/folders I have, with no length, type-of-file (program? data file? love letter?) or even if it's a subdirectory. See *Figure 1*.

## One Berkeley programmer named his new command for his girlfriend.

There are good reasons that UNIX gives you so little information. Here's one: The `ls` command was designed for those poor old teletype-33's, which typed at a whopping 10 characters per second. (Your ST

probably does 1,000 a second). Thus, when remote users wanted to see their files, they got by with the absolute minimum of information back, because it took so long for the system to type it out! (`ls` also has another design purpose, but we'll leave that for the future when we cover pipes and redirection.)

To get a saner view of your files, try `ls -al`. This gives you a complete description of the files, including permissions, owner, "group" (don't

the subdirectories.)

```
#cd heidi    [Get into Heidi's folder area.]
#ls
mark.harmon bruce.willis
clipboard.txt
```

Thus, we have three files. We could find out more about them by typing `#ls -al`, but, alas, we can't read them, since Heidi has wisely turned off anyone's but her own ability to do so.

Back to my directory. This time, let's go straight there, instead of going down to /usr then back up to /usr/dsmall:

```
#cd /usr/dsmall
```

```
#ls
dave subdir antic start letter mail program.c
#
```

Figure 1: *ls*

worry about it), length, type and even shows you hidden files. `start` is a subdirectory. To get into it and look at the files there, type `#cd start` [change directory to start, very much like the ST.], then `#ls -al`. Now, we'll return to our "home" directory, /usr/dsmall:

```
#cd          [remember, cd by itself takes you home.]
```

Let's be snoopy and go check out User Heidi's files. As we set up our theoretical system last issue, "heidi" and "dsmall" are both subdirectory/folders of "usr". So we need to back up and change to the `usr` directory, then change to "heidi" and look over her files — the ones she's let me look at, anyway. This is called *rooting around the directory tree*; it is exactly like closing a folder named DSMALL and opening the HEIDI folder on the ST.

```
#cd ..      [This changes me to /usr, same as closing the dsmall folder.]
#ls
dsmall dwheller heidi    [These are
```

To TYPE a file out — just list it to the screen — type `#cat letter cat`? That's short for "concatenate," I think, or perhaps the UNIX programmer that thought it up liked cats. I don't know. And don't fool yourself — some of the UNIX command names were thought up first, then have had clever rationalizations added to them as to what they stand for. One Berkeley programmer named his new command for his girlfriend ...

Anyway, what `cat` does is take the *input* you specify, and copy it to standard *output*. This standard output stuff is mighty cool, as you'll see next issue, but for now, it's just your terminal. ■

**Contributing Editor Dave Small is one of a small circle of ST gurus who have helped to make the ST as popular as it is. Dave has been a pioneer in developing Macintosh emulation on the ST, culminating with the release of his latest triumph, Spectre GCR.**

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*In late 1985, Atari Corp. explored the development of an amazing ST peripheral that would read disks with over 500 megabytes of storage space — enough for an entire set of encyclopedias. It was the CD-ROM and Atari hoped to incorporate this technology into their new 520ST. Now four years and a few false starts later, the famous computer maker is gearing up for the CD-ROM's U.S. release. With that exciting news, START takes a close look at some of the reasons for the delay, and some of the software in development.*

# WAITING FOR CD-ROM



It's a simple law of economics: if a market doesn't exist, then go out and create one, and in the summer of 1985, the newly revived Atari Corp. did just that. Under the direction of Jack Tramiel, former head of Commodore, Atari entered the high-powered 16-bit arena with the introduction of the 520ST. It was a computer that coupled power with a low, affordable price and it was an instant hit.

Riding on the crest of its own sudden success, Atari needed an encore. Almost immediately it explored the commercial viability of a low-cost CD-ROM (Compact Disk, Read-Only Memory), a revolutionary peripheral that, according to Tramiel, "would give people a

good reason to buy my new computer." Considering some of the amazing things the CD-ROM could do, Tramiel's words carried a strong ring of truth.

Of course, it wouldn't be that easy, and Atari quickly found that what worked for its computer, wouldn't necessarily work for the CD-ROM.

## The Chicken and the Egg

It's been almost two years since Atari formally announced the CD-ROM and the United States has yet to see a finished product. But according to Atari, the CD-ROM is finally ready to ship and, in fact, should be at your local dealer as this story reaches you.

To what exactly the delays can be attributed are varied and complex to be sure, but one in particular stands out: a distinct lack of software.

"It's basically a 'chicken and egg' situation," Atari Corp. president Sam Tramiel told a room full of dealers and developers at last spring's Comdex. "You can't sell hardware that has no software, but on the other hand, who's going to develop software ▶



# Is Atari's CDAR-504 Finally

for a product that doesn't have a market yet?"

Finally, even the lack of software is no longer a problem as new and varied products make the CD-ROM more attractive. And encouraged by strong sales in Europe and the debut of the TT, the new software should create healthy sales in the United States. Dubbed the CDAR-504,

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## Riding on the crest of its success with the ST, Atari needed an encore.

---

Atari's CD-ROM player is reported to have all the features Atari promised it would have: the ability to read disks with up to 540MB of storage, a remote-control that detaches from the main unit and lets you play, pause, stop, reverse and forward scan on a standard audio CD. It can also access track programming, music search, left/right channels and all of the remote's features through an ST desk accessory. The CDAR-504 also includes a headphone jack with volume control and stereo connectors.

But Atari didn't stop there. Because of a special operating-system extension called Meta-DOS, the CDAR-504 can read any CD-ROM disk, for any machine in both the High Sierra and the more recent ISO9660 disk formats. Such compatibility increases the CDAR-504's appeal because it potentially makes available the disks that have made

## The ST Software Library

### All the Public-Domain Programs You'll Ever Need — and More

With all of the excitement surrounding Atari's recent release of the STACY laptop, the Portfolio and the TT, START was surprised when Carl Bacani called and asked if he could give us a demonstration of software his company developed for the CDAR-504. How could we say no?

Bacani and David Bass make up D&C Enterprises, a company headquartered at Computer Rock, an Atari dealership in San Francisco. "We and Atari go way back, and we really want them to do well," says Bacani.

If the CDAR-504 is as big a hit as the ST, both Atari and D&C will do well; indeed the D&C software should do nothing but help those sales. Together Bacani and Bass compiled "The ST Software Library," a CD-ROM disk comprised of over 5,000 public-domain files that take up about 150MB of space (sound like a lot? — then consider this: the disk has a 250MB capacity!). The thousands of programs, desk accessories and demos were culled mainly from the Current Notes (newsletter of the Washington Area Atari Computer Enthusiasts user-group) archives and online services such as CompuServe and GENie. According to Bacani the disk took over two months to compile.

The D&C disk will retail for \$69.95 and, says Bacani, will also be offered as part of a promotion from Atari. The disk was mastered with a Sony Optical Magneto read/write drive and was then duplicated by Discovery Systems of Dublin, Ohio.

— Tom Byron

Mindscape's games could probably fit on one disk, for example).

Meyer continued, "One of the marketing problems Atari has to the IBM CD-ROMs popular (Apple uses a proprietary disk format). Moreover, the Atari unit will retail for \$595, a significant price advantage compared to its IBM and Apple counterparts.

#### From Atari

Rick Meyer is Atari's product manager for the CD-ROM and he is well aware of the CDAR's stormy past. Despite that, he remains optimistic

that a product will ship as planned.

"Drives are out to developers and the CD-ROM is on the verge of shipping in the United States," Meyer told START. He further explained that he is negotiating with some of the "major software houses" for their retrieval software, a move that would definitely widen the CD-ROM's consumer appeal. Retrieval software is the code that a company writes for all their software so that the computer can read the CD-ROM. If Atari can obtain that, then Atari could conceivably offer compilations of publisher's complete catalogs (all of



# Ready to Ship?

overcome in the U.S. is how to appeal to the consumer. The CD-ROM is doing very well in Europe, especially in West Germany, where the ST is the number one business computer, and France where the ST is widely used in medical applications. In both cases, the CD-ROM has appeal because it's mainly used as a huge information-retrieval device.

"On the other hand, the ST in the U.S. is limited to home users and special niche markets such as MIDI — Atari must make the CD-ROM appealing in those special areas and therefore needs software that complements these market strengths. The software that's available now and the deals we're still working on should strengthen the CD-ROM's appeal."

No formal rollout for the CDAR-504 is planned; it will be like other ST peripherals, sold direct through Atari dealers.

## The Software Developers — So Far

As with any new software-dependent hardware, don't expect an avalanche of titles for the CDAR-504. But as the product gets into people's hands and sales increase, you can naturally expect more and more compatible software. Meyer was understandably reticent concerning the software developers — he would tell START nothing beyond the retrieval-software deals already mentioned and even then gave no specifics. As to the software developed in Europe and whether or not we can expect any of it to show up in the U.S., Meyer could not elaborate.

Yet there is software out there and/or in development for the CDAR-504.

- As START reported in "News, Notes & Quotes" in the January 1989 issue, Software Mart has made available a "multilingual visual dictionary" that takes advantage of the ST's sound and video capabilities.

- Hybrid Arts has managed to manipulate its present Macintosh CD-ROM sound libraries so that they'll run on the Atari unit through Hybrid Arts' ADAP digital sound editor.

- Grolier's Encyclopedia will reportedly be available.

- D&C Enterprises, a small start-up in San Francisco, has compiled a disk crammed with public-domain programs, desk accessories and demos for the ST. See the sidebar for more information.

- Whistler Mageware is developing a role-playing "heroic adventure quest" called The Golden Immortal. The company is planning to show the game at the Fall 1989 Comdex.

- Theoretically, pc-ditto II and Spectre GCR emulators will let the Atari CD-ROM run any and all CDs for the PC and Macintosh.

## Will Atari Come Through?

Given Atari's less-than-stellar track record on the CD-ROM, it's easy to be skeptical of the CDAR-504's promised release. Carl Bacani of D&C Enterprises (one of the CD-ROM developers) is optimistic: "You wouldn't believe what it takes to get products out the door. But I believe it's really going to happen this time."

Meyer echoes this sentiment: "Like I said, developer kits are available now and the product is doing well in Europe. There are still a few bugs in the operating system, but the drivers are ready and the product will be out on time." ■

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# Marcus' Marvelous Mug Maker

## Part II of A Step-By-Step Guide to Computer Cartooning

BY MARCUS BADGLEY

I've developed a technique for drawing cartoon faces that can be used by someone with little or no drawing experience. It's based on basic geometric shapes and the lines which appear in the human face. In a way, it's a combination of the two techniques I described in previous columns: drawing freehand with the mouse and using CAD-3D.

Figures 1 through 16 show the techniques step-by-step. Follow along on your ST as we go through them. You'll need DEGAS Elite, SEURAT, NEOchrome, Cyber Paint or any other paint program that you like.

**Figure 1.** Starting with the first frame, our goal is to create a three-dimensional head. Imagine looking at a globe of the Earth with its lines of longitude and latitude, that's exactly how this method works, except that only one of each line is used. Begin with a cross-line in a color that contrasts with the background.



**Figure 1**

Then, with the Circle tool, create a large circle by placing the mouse at the 12 o'clock position and then moving the mouse toward the 12 o'clock position. One cartoon cranium coming right up!

Next, create two "dimension" circles. These are guides that determine the horizontal and vertical direction toward which the face is looking. To do this, use the Circle tool again and create the vertical ellipse (centerline) so that it intersects with the top and bottom of the cranium circle; do the same with the

horizontal ellipse (eyeline), except that it is lined up with the width of the head.

**Figures 2 and 3.** The next step is to create the eyes and nose of our character. Circles usually work best for eyes. Placed on the eyeline on either side of the centerline, unless you're trying for that abstract look. Next, add the nose. The nose can be virtually any shape of ellipse or circle. Once you have the shape you want, position it in between the eyes. (A tip: place the nose a tiny bit closer to the far eye to help enhance the sense of depth.)

**Figure 4.** At this point, remove the undesired lines and the face will begin to take shape.

**Figure 5.** So far all we have are a few dull circles and ellipses. Let's add some life! In the center of each eye we'll place a small black disc with the Disc tool. ▶

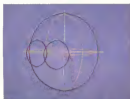


Figure 2



Figure 3



Figure 4



Figure 7



Figure 8



Figure 9



Figure 12



Figure 13



Figure 14

Decide first from which direction you would like to have the light fall in the drawing, then use Polygon or K-Line with white Fill to cut the reflection arc out. Remember, all shading will be determined as a result of this operation. Next, fill the eyes with white and whisk! Those glowing eyes affect some with fits of giggling, others with madness!

**Figure 6** Now for our jaw. Quite simply all that is needed is a guide line that drops down from the base of the nose. The line I've shown is vertical, but this line can vary and will alter a character's appearance. Once this line is created,

use K-Line to draw a jawline. Since this is a freehand technique, it requires a bit more effort, especially since the placements of the sides of the jaw are crucial in order to keep the perspective in alignment. You may have to do some touch-up in Zoom mode.

**Figure 7** When creating the mouth, use the same technique as with the jaw. Create a frown or a smirk; try creating several expressions on the same head—it's amazing how much the mouth alters the expression.

**Figure 8** This is a transformation step

Use K-Line to add the shoulders and ear, then fill the character with a skin tone.

"Doctor! I think I saw a move!" Igor exclaimed.

"Don't be silly—it's been dead for over two weeks!" replied the doctor.

**Figure 9** Now draw in the facial details. Again, using K-Line, freehand Draw and Zoom, develop the eyebrow lines, eyelids, the wrinkles in the cheek.

"Did you see that? It twitched again!" shouted Igor in fear.

Draw in the hair freehand with a smattering of airbrush here and there.

**Figures 10 and 11** Here, you can begin



Figure 5



Figure 6



Figure 10



Figure 11



Figure 15



Figure 16

to shade the character. Since I usually use low resolution, my punchy palette is limited to 16 colors and their usage is crucial. Since I want a more natural complexion I have dedicated four colors to the skin. First use K-Line with each of the skin-tones from dark to light, then Fill with the appropriate color. After this, use the Airbrush to smooth things out a bit. On complex areas, work in Zoom mode.

**Figure 12** For the eyebrows and hair, use Freehand and Airbrush in several different shades of brown to create a more realistic look.

**Figure 13** Take a figurative step back and look at your picture. The whole look could be enhanced by adding a slight highlight, just as you added the other shading colors. The character obviously also needs some clothing, I added a green garment, thus making him look like some insane dentist.

"Oh, no! Not a dentist!" screamed Igor with trembling knees.

"Yes, Igor! Your teeth are in terrible shape, and I'm in no position to fix them!" the doctor stated with a terrible calm.

**Figures 14 and 15** In these two frames, add more hair as we did before. My crea-

ture, at least, is nearsighted, so I added glasses by creating two black Circles in black, then filling them with a standard Fill Pattern. Adding the glasses makes the eyes less pronounced.

**Figure 16** In this last frame, I added the tongue and the word bubble, which completes this demonstration. Since he started out kind of quacky, I decided to finish him the same way.

Now it was the doctors turn for hysteria. He cried, "It's alive! It's alive!"

It's important to point out that we could have taken him in a completely different direction earlier on by altering the facial expression, ears, and skin color. With the addition horns and fangs he'd be another animal altogether. Also of note is that this particular technique is great for facial perspectives that are not too extreme. More extreme positions will require more development in the construction phase. The same principle, however, can be used to construct profiles, entire figures and other cartoon inventions. ■

Marcus Badgley is proprietor of Gravity Design, a graphics arts studio in San Francisco, and frequent contributor to START.

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## Review

# New PC Emulator and Spectre GCR Hit the Streets

BY DAVID PLOTKIN    START CONTRIBUTING EDITOR



Talon Technologies' SuperCharger is a 512K "PC in a box" that plugs into the DMA port and offers easy PC compatibility without opening up your ST. And for the price of \$399, it's cheaper than a PC clone.

**T**hanks to the continued development of add-on hardware, the ST's ability to emulate other computers is at a new high. Until now, the only truly effective emulation has been for the Apple Macintosh. But because of the difference in disk formats, the ST could only read Mac disks through the slow and expensive Translator One. PC emulation also has been slow because Avant-Garde's pc-ditto has done the whole job in software. But

now things have changed.

### TALON TECHNOLOGIES' SUPERCHARGER: A FULL-SPEED PC

The news of the first full-speed, hardware-based PC emulator comes from a surprising quarter, a heretofore unknown company called Talon Technologies. Its SuperCharger was designed in Germany, is manufactured in California and is being distributed by an English company. The SuperCharger is a small box that contains an NEC 8-MHz V30 micro-

processor, RAM and supporting chips and plugs into your ST's DMA port. The V30 largely duplicates the Intel 8086/8088 family and, therefore, runs PC/MS-DOS software. In fact, since the V30 is a full 16-bit chip, it can run some programs, such as MS-Windows 286, which normally run only on an 80286-based machine.

The SuperCharger provides excellent performance for two reasons: it has a fast chip (almost twice as fast as the original PC's 4.77 MHz) ▶

and connects to the Atari's speediest bus, the DMA.

### What You See is Less Than What You Get

The SuperCharger comes packaged with the main unit, 512K of RAM (1M is available as an option), a power supply, DMA cable and DOS. The SuperCharger's memory is used to run the PC software, not the ST's memory. To connect the SuperCharger, you must plug it into the hard-drive chain, preferably as the last item in the chain. The unit has a second DMA bus port to pass signals through if it can't be last in the chain. SuperCharger is a SCSI device and comes factory preset with an ID of 7, although this can be changed by altering some jumpers in the unit.

The five-volt power supply plugs into the back and the power switch is rather inconveniently mounted in the back. On the front of the unit are power and data lights and a reset switch.

SuperCharger's software is quite simple. You run a driver program to start the emulation. When you run the program, it prompts you to insert the MS-DOS disk in the drive and press [Return]. If all is well, then the SuperCharger boots MS-DOS and the next thing you see is the familiar "A>" prompt.

Also included is a utility to configure the driver to set certain parameters, such as how many drives you have, whether to use the internal drive as A or B (and thus the external drive as B or A) and to set the step rate of the disk drives. (A slower step rate is necessary to use a 5-1/4-inch drive for PC software.) You can also set whether you are using a 50 or 60 Hz color monitor (SuperCharger is also sold in Europe) and whether you have an 8087 math coprocessor chip installed. The SuperCharger has an empty socket

for the 8087 and installing the chip is as simple as plugging it in. Unlike math coprocessors for the 68000, the 8087 is widely supported by PC software. It significantly speeds up such programs as Lotus 1-2-3.

### Hard-Drive Support and Graphics

If you want to autoboot DOS from a hard drive, you must use the utility software to prepare it. You must give up a small partition to use as the autoboot partition, but you can specify which partition you want to use (it need not be the C: drive as

however, you find yourself exactly where you left off in your PC program. Although you can't freely jump back and forth between the two modes (the ST reboots every time), this feature is very handy if you find you have to return to your ST for awhile, but don't want to end the PC session.

There are a few tricky things about SuperCharger. The reset button must be pressed upon turning on your ST or the SuperCharger may interfere with the boot-up sequence. Talon is looking at making this reset automatic. Further, because the device is installed in the drive chain, it may cause problems with autoboot hard drives. This should not be a problem if the SuperCharger is the last item in the DMA chain, as recommended. However, if your hard drive (like mine) does not have a "pass through," then the SuperCharger has to be installed before it and may interrupt the boot-up sequence. This makes it impossible to use with an autoboot hard drive, especially if the autoboot software "polls" the drive chain looking for drives. Talon is looking into this problem and should have a fix shortly.

The instructions that came with my SuperCharger were preliminary, but even so were well written and easy to follow. They gave no technical information about the unit, nor anything about setting up MS-DOS to work with the ST's disk drives. As covered in "Mac and PC on the ST" (START, November 1988), it's fairly complicated to set this up right. Talon is working on revised documentation that should provide much more information.

Talon Technologies promises some interesting support products for the SuperCharger. First is a miniature VGA card that will actually

*continued on page 36*

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## Things have changed in the emu- lation market.

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with pc-ditto). After preparing the partition you want to use, you need only copy MS-DOS to it and you're all set. A driver is included with SuperCharger so that the emulator can recognize and use your ST's hard drive.

The stock SuperCharger supports CGA graphics — 320 by 200 (color) in four colors or 640 by 200 in two colors (color or monochrome). The monochrome display is somewhat faster, because more calculations have to be done to convert character displays to the ST's graphics-based display in color. Unfortunately, SuperCharger does not support the EGA base mode of 320 by 200 in 16 colors.

There's also a "hot key" sequence that lets you switch between PC mode and ST mode. When you press these keys in PC mode, it reboots the Atari and brings you back to the standard Desktop. Upon running the driver program again,

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fit inside the SuperCharger's case. With a multisynch monitor, you'll be able to run VGA graphics and ST color and monochrome — all on a single monitor! Further, the PC bus is available inside the case and Talon plans to bring out an expansion box so that PC cards can be used with SuperCharger.

#### Important Questions

The important questions about SuperCharger are: does it work and is it fast? The answer to both is yes. It works, running all the PC software I tried. The SuperCharger is also fast — it ran PC programs such as Lotus 1-2-3 and Microsoft Word quickly. Graphics-based software was very fast, although the text software had a somewhat slower screen update speed. With SuperCharger, it is now feasible to bring PC-based work home from the office. Although the unit we tested was a late prototype, it

## The stock SuperCharger supports CGA graphics.

worked well. Provided that Talon can handle the DMA chain problem with SuperCharger, this is a product that can change your ST from a friendly, powerful computer to an unfriendly, powerful computer: a PC!

#### SMALL'S SPECTRE GCR: A NEW MAC

Spectre GCR is also making its debut as this is written. For those of you who aren't aware, Spectre GCR is produced by Gadgets by Small and lets the ST emulate an Apple Macintosh. The emulation isn't perfect: there are some programs that won't run or that crash when you attempt

to use certain features. However, most Mac software that "followed the rules" runs very well on Spectre. And with each version of the Spectre software, more programs run correctly.

As mentioned above, the main problem has always been how to move software from Mac format disks (GCR) to a format readable by Atari drives. Data Pacific's Translator One works, but it is very slow and costs \$300. As you can probably guess from the name, Spectre GCR can directly read, write and format Mac disks. At \$300, it is the same price as Translator One, but it includes the Mac emulator itself. All you need to add are a set of Macintosh ROMs, available from a number of sources.

Spectre GCR is a very large cartridge, the largest I've seen. You must open the cartridge to insert the Mac ROMs as detailed in the excel-

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lent manual, then close it up and plug it in. You then must plug the floppy drive(s) into the appropriate sockets on the Spectre GCR cartridge. The cartridge supposedly works best when it is at the end of the drive chain, although I have had no problem with it being in the middle.

To use a program or data disk, you simply pop it into the drive as you would with a Mac. Spectre GCR reads the disk, determines its format (Magic, Spectre or Mac) automatically and configures itself to read and write to that format.

Spectre GCR comes packaged with version 2.0 of the software. This release has some bug fixes and the necessary code to support GCR's new capabilities. Version 2.0 no longer supports Data Pacific's Translator One. Obviously, this isn't a problem with Spectre GCR, but it does mean that users of earlier

Spectre cartridges will have to continue to use version 1.9 of the software in order to use Translator One. As with earlier versions, version 2.0 supports sound and alternate video and can format a hard drive for use with the Mac. It also seems to work well with version 6 of System and Finder, which is more or less the latest version.

Version 2.0 Mac sound seems to work quite well. You should use an Atari monochrome monitor for best results, but if necessary you can display your screens on the Atari color monitor in medium resolution. Here you must make a choice — either look at half the screen at a time (with a button to toggle between views) or lose every other scan line on the screen. Neither is very satisfactory, but the color display is limited by its lower resolution.

Spectre GCR has been a long time

in coming but it was worth the wait. With it, you get the premier Macintosh emulator that can handle most of the things a Mac can do — and at full Mac speed. If you're serious about running Mac software on your ST, this is the product for you. ■

**START Contributing Editor David Plotkin is an avid ST user, but has been forced to use those "other" computers at Chevron U.S.A., where he works as a chemical engineer.**

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# THEIR FINEST HOUR

## Lucasfilm Games Launches The Battle of Britain

BY ANDREW REESE    START EDITOR



**Their Finest Hour:** The Battle of Britain from Lucasfilm Games lets you choose sides in this momentous 1940 conflict over southern England. This view is from the cockpit of a Bl-109E against the defending Spitfires and Hurricanes.

**A**re you an aviation nut? A history buff? If you're either — or just enjoy a top-notch computer flight simulator — you'll love Lucasfilm Games' new World War II game *Like Battlehawks 1942*, released on the ST last year. *Their Finest Hour: The Battle of Britain* is a historically accurate simulation of some of the key air battles of the war.

Historians agree that if England had lost the Battle of Britain, Germany could have invaded the British Isles with ease. Those few pilots who flew against the German bombers and fighters truly changed the course of the war — and the shape of the world. A successful German invasion of England could well have kept the United States out of the European conflict with staggering implications for the shape of the continent today.

### **German or English — Take Your Pick**

Lucasfilm Games' remarkable programmer/producer Lawrence Holland took this crucial era and translated it into a wonderful computer flying experience. In it, you can fly a Spitfire or Hurricane for the Brits against Messerschmitts, Stukas, Heinkels and Dorniers. Or you can fly one of the German planes in an attack against the English.

This unusual symmetry was also one of the most remarkable aspects of *Battlehawks 1942*. Although it went against my grain to fly a Zero against American pilots, it did give me a real feeling for the superiority of the Japanese planes at that stage of the war. I came to appreciate even more the heroism of the American pilots who flew outmoded planes against some of the best aircraft of the war.

In *Battle of Britain*, you have it ►

*Nearly fifty years ago, a handful of British pilots in Spitfires and Hurricanes took to the air as England's sole defense against Nazi Germany's air onslaught. All during the summer of 1940, the waves of German bombers and fighters attacked and were driven back. Now, Lucasfilm Games has brought these battles to the computer screen in **Their Finest Hour: The Battle of Britain**, a great sequel to their award-winning **Battlehawks 1942**.*



## For the aviation buff, Their Finest Hour is a "must have."

selection of missions from the German side. You can fly fighter escort in one of the graceful Bf-109E's or try the first German terror weapon of the war, the Stuka dive bomber. Other options include piloting a Dornier or Heinkel medium bomber or one of the twin-engined Me-110's.

From the British side, your choices are more limited: all the Brits had to put up against the Germans were the Hawker Hurricane and the Supermarine Spitfire. But if you had to choose just two of the contemporary fighters for this interceptor role, these would be two great choices — the Spit was more maneuverable with a higher rate-of-climb, while the Hurricane combined lesser maneuverability with greater ruggedness.

### Gentlemen, Choose Your Mission

The game itself is set up quite a bit like *Battlehawks 1942*. At the start of a mission, you choose a plane (and therefore the side you want to fly on), the role and the specific mission you wish to fly. You can also select the quality of your opponent pilots and the supplies and vulnerability of your own craft. Once you've made these selections, you're ready to fly. An overall map of southeastern England is available to show the distribution of forces to help you plan your attack or defense.

Flying "Finest Hour" is pure pleasure. Although when I tried the game, it was only available on the PC, it runs and looks the same on the ST. Again, it's mouse-driven, one of the few defects I found in *Battlehawks 1942*, but the mouse/flight control interface continues to be amazingly good. And the flight characteristics of these planes are superb.

One of the best features of *Battlehawks 1942* was the Camera feature that let you record and replay critical portions of your mission and then replay them from a variable vantage point. In "Finest Hour," the replay feature has even been improved from *Battlehawks*. Now, you can choose a variety of viewpoints for your replay — including from the nose of one of your falling bombs! Plus, you can save your mission recordings to disk and show your friends how you became an ace. (Watch for a special contest from Lucasfilm Games based on this feature.)

### An Evening in the Museum

To introduce "Finest Hour" to the

press and local dealers, Lucasfilm Games reserved the Museum of Flying in Santa Monica, California for an evening. If you're an airplane nut, be sure to take in this museum if you're ever in Southern California. It's at the Santa Monica Airport, the original site of Douglas Aircraft, and features a variety of Douglas aircraft and memorabilia.

For the folks from Lucasfilm, however, the Museum's primary attraction was a reconditioned Spitfire IX in flying condition. Although a later model than those flown in the Battle of Britain, the Spit provided a perfect focal point for the game. Arrayed around this graceful fighter were a number of computers set up with "Finest Hour" and it was almost impossible to fight through the crowds around the computers for a game. Everyone we talked to who tried the game loved it, including one RAF bomber pilot who served during that era.

Lucasfilm Games has priced "Finest Hour" at \$59.95, a substantial sum for a computer diversion. But that includes a 192-page manual and a flight simulator that is both entertainment and a history lesson in one. For the aviation buff, it's a "must have." For computer gamers in general, be sure to take a look at it at your local software store; it may be just what you want to fill a niche in your game collection. ■

### PRODUCTS MENTIONED

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For The  
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# Strange New Worlds to Conquer

*Into outer space, on Mt. Olympus, or on a weird archipelago, START's stalwart game reviewers take you everywhere this issue. Game quality and originality are excellent in these three offerings from some of the best game publishers in the business. So sit back, read and then check the available balance on your credit card — you'll probably want all three!*

## SPACE QUEST III, THE PIRATES OF PESTULON

Reviewed by David Platkin

Space Quest III: The Pirates of Pestulon is the second sequel in Sierra's popular Space Quest Series. It incorporates elements of standard text adventures with excellent graphics and animation to provide a playable and not-too-difficult adventure. It would be particularly suitable for people just getting their first taste of adventure gaming.

### When Last We Met ...

Space Quest III picks up where Space Quest II leaves off. The hero, a fellow named Roger Wilco, is adrift in space in suspended animation. His space pod, which he used to escape from Sludge Vohaul (the villain in Space Quest II) is picked up by a passing garbage freighter. This awakens Roger, whose goal it becomes to escape from the freighter. To further complicate his life, Arnold the Annihilator is after Roger for a minor debt of 400,000 buckazoids — a fortune in any galaxy! On top of that, the Two Guys from Andromeda (incidentally,

the authors of this program) have been kidnapped by Scumsoft, a software company with a very poor reputation.

Roger Wilco is guided around the screen through the mouse, arrow

from them. The speed of the game is variable from a menu bar that appears only when you press the right mouse button. Other than moving Roger, all commands are given via text input. As you begin to



Sierra On-Line's Space Quest III out-illies its predecessors.

keys, or number pad. The number pad is actually the easiest to use because it gives the finest control, allowing access to accurate diagonals. As with other Sierra programs, Roger can walk around and behind objects, climb up and jump down

type, a small text window appears on the screen, where you can type in your commands. The parser is quite advanced and can generally figure out multiple commands.

As always with this type of adventure, however, you must

phrase your commands exactly right or you get a "don't understand" reply (a silly one to be sure, but one, nonetheless). Unfortunately, things continue to happen as you struggle to come up with the correct phrasing. For example, poor Roger continues to move down the conveyor belt toward the metal-crushing machine as you try to tell him to get the heck off the conveyor belt. Gets real messy if you don't figure it out in time.

### Excellent Graphics

The graphics and animation in Space Quest III are excellent. Characters are animated through many frames, making motion smooth and believable. As you guide Roger around the screen, he even has a shadow in the lighted parts, and gets smaller if you move him farther away toward the back of the current room. The price you pay for all this is that each new room (and its associated animations) must be loaded from disk, an interminable process if you're using floppy disks.

The game itself is distributed on three double-sided disks. If you have only a single-sided disk drive, you can send for the game in that format by paying an extra \$10. But since the game is not copy-protected, you can load the whole mess on your hard disk if you have one, which cuts the load time for each screen considerably. Space Quest III's sound is excellent and features something new: MIDI support. Plug a MIDI synthesizer, such as the popular Casio CZ101, into your machine and you can hear the musical score written by Bob Siebenberg of Supertramp through it. It sounds tremendous.

### Outrageously Silly

All of the Space Quest series have had a touch of silliness, but Space

Quest III is the most outrageous of them all. Everywhere you turn, there's off-the-wall humor. If you fall off a ledge, you get a humorous message accompanied by a graphic you won't soon forget. The "Worlds O' Wonder" sequence on a planet called Phleebbit and the Astro Chicken arcade game are my two favorites, but the game is laced with subtle silliness. For example, inside the destroyed head of an awesome battle robot are several giant Tinker-toys! The Starship Enterprise makes an appearance, and Roger even does an imitation of the Honeymooner's Ralph Kramden (the character immortalized by Jackie Gleason).

There's but one caveat for people considering the purchase of this fine piece of software. When you sweep away the superb music, animation and graphics, this is essentially a text adventure. You must solve puzzles and second-guess the parser, and get killed lots of times trying to figure



In the close-up map in the foreground, the walkers who worship you (their god) spread out over the landscape to settle and raise families — who will also worship you, of course. The goal of Populous is to guide, cajole and force your own followers into out-settling and out-fighting your rival's followers. All kneel!

out how to get past one hazard or another. In the process, you'll load the same screens over and over again, and watch the same animation ending in the same result many times. Keep this in mind and you won't go wrong. But for lovers of adventure games and people

wondering what all the excitement is about, this game is highly recommended.

## POPULOUS

Reviewed by Andrew Reese  
START Editor

There are a number of classic types of computer games: paddle ball, scrolling shoot-em-ups, flight simulators — and role playing games. In good RPGs, artificial programming lets a player assume a different persona to fight evil or find a hidden treasure. But the ultimate role to be played on a computer has to be that of a god. And Electronic Arts' new import from England, Populous, lets you take just that role.

In Populous, you are a god, complete with followers, whom you, of course, desire to favor. But you are not the only god in the universe. If you have chosen to be a good god, there's an evil god scheming to overwhelm your flock. Or you can

choose to be an evil god and fight against good. Your opponent can be either the computer or another human on a second ST connected via a Hayes-compatible modem.

### Modes of Play

There are two modes of play in ▶

Populous, Custom and Conquest. In the Custom mode, you can set a number of variables prior to the game to handicap yourself or your opponent. For example, a divine being can cause earthquakes or volcanos to disrupt a rival's followers, but these godly powers can be disabled at your choice. If you're playing the Conquest series of nearly 500 pre-designed worlds, you can't change the setup. Your challenge is to beat the computer in a series of ever more difficult worlds with fewer and fewer powers available yourself.

Populous uses a unique interface and display that show a great deal of care in their design. The basic playfield is a close-up 3-D map, shown in three-quarter view. Across it, your followers wander, build houses and castles and fight battles against their (and your) foe. In the upper-left corner of the screen is the Book of Worlds, an overall map that

you can use to keep track of settlements and topography and to move the close-up map to another area quickly.

Around the close-up map are a number of icons that you can select to influence the behavior of your followers, to zoom the close-up window to a specific location or to cause cataclysms, such as floods, swamps, earthquakes or volcanos.

In the upper right of the screen is a manna bar that shows your power (manna). Next to it is an Information Shield that keeps track of the two follower populations and specifics about settlements, combatants or walkers. (Walkers are those followers of yours who wander out across the landscape settling new territory.)

Populous is played entirely with the mouse. Depending upon which command is active (and how much manna or power your followers have gained for you), you can raise or

lower land, place your Papal Magnet, create a knight or cause a disaster. In order to encourage your followers to settle, breed more followers and add to your follower population (and manna), you must level out the area where your walkers or their settlements are. The greater the flat area, the larger the settlement your followers will build, and the greater will be your power.

### Don't Die in the Desert

There are a great many subtleties in Populous. Depending upon which of the four types of terrain exists in the world, your walkers may die more easily or your population may increase more slowly. You must adopt a strategy that fits the world you're in — and that takes some experimenting. But since you can complete most games in less than a half hour, experimentation time is not a problem, it's a pleasure.

## A further development

Propero Pascal and Fortran for GEM have long been established as standard programming environments for professional developers using the ST. Propero C is also gaining wide acceptance as the first ANSI conforming C compiler for the ST.

Building upon the experience that we have acquired and the feedback we have received from our users, we have launched the Propero Developers Toolkit for those who wish to extract the most from their ST. The features of the Toolkit are:

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| <b>Macro assembler</b>     | We wrote this for in-house use because no available assembler satisfied our requirements; it is now available to others with similar exacting requirements.   |
| <b>Resource editor</b>     | Resource editor for creating and maintaining AES resource files.  |
| <b>Make facility</b>       | This automates the process of compiling and linking files, and is invaluable for large programming projects. We also include a suite of programs to generate make control files!  |
| <b>Command interpreter</b> | When the Atari desktop proves cumbersome this MS-DOS style command line interpreter proves invaluable. With the command line interpreter, you can handle groups of files quickly and efficiently, with full batch capabilities making it ideal for project maintenance. |
| <b>Workbench</b>           | Based upon the acclaimed workbench supplied with our compilers for the Atari, but enhanced to allow all three compilers, plus the assembler, make facility and command line interpreter mentioned above to be used with single key simplicity.                          |
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The Propero Developers Toolkit costs just \$US 96. For further details of this or other Propero products, phone or write to the address below.

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There is only one goal in Populous: to defeat your rival god. As you move about the landscape creating lands for your followers and disrupting your rival's civilization, you'll see your opponent trying to do the same to you. If you're clever, you'll eventually gain the upper hand and start to build a population edge. When your population reaches a peak, you can call for the ultimate battle, Armageddon, and the game will be resolved in one clash between the leaders.

Populous has a mild form of on-disk copy protection that gave no loading problems and didn't threaten to tear the head off my drive. No off-disk type-ins are necessary. If you have a double-sided "A" drive, you'll have some added music at start-up and digitized voices during the play; with a single-sided drive, you lose these effects—but it's not a great loss, anyway. The greater loss is the

theme music and heartbeat from the Amiga version.

You can save a game in progress and return to it at any time, an extremely desirable feature in a game with some 500 levels (and 128,000 possible world combinations). Bullfrog, the English software group that designed Populous, seems to have thought of everything. Kudos especially to Peter Molyneux, the creative force behind Populous.

Populous is a fascinating, fun and challenging game. It's unlike any other computer game I've ever seen, ever. Don't miss it, unless you're a dyed-in-the-wool arcade gamer who has no time for strategy.

## ARCHIPELAGOS

Reviewed by Carolyn Cushman

In the far future, Earth has been poisoned and it's up to you to purify the land in Archipelagos from Britannica Software. The island

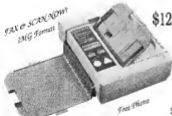
chains (or archipelagos) you'll visit come in the most imaginative shapes, but have been poisoned and perverted. To cleanse the islands you must seek out and destroy the power nodes scattered about and the obelisks that control them. On each archipelago a single black obelisk controls the nodes. A node can be destroyed only if land connects the node and obelisk, so you must build bridges of land between the islands.

## Strategy

Archipelagos strategy varies with the layout of each set of islands. First, you need to locate the obelisk and nodes and work out the most efficient means of connecting the islands and nodes. Then you must also look out for the strange creatures inhabiting the islands, which do their best to make your job difficult. At first, the only dangerous creatures are the Viral Trees, which slowly ▶

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## FOR THE FUN OF IT

move toward you, infecting the ground as they go.

Then there are the Necromancers beginning in Archipelago 13. These giant eyeballs rise out of the land, then sink down again, turning good land to sand, and sand to water, eating away your landbridges faster than you can build them. On level 20 the Eco-Eggs first appear, poisonous to touch, but not mobile. When they hatch, however, the eggs spill out deadly red poisons, flooding any connected islands. A more mobile nuisance, the Arcleaners appear on Archipelago 25. These erratic but deadly red whirlwinds career from side to side on their islands. However, like the rest of the denizens of these islands, these whirlwinds are neither fast nor intelligent enough to be serious threats — as long as you keep moving.

You can spend as much time, or as little, in any session as you want.

Despite some notable exceptions, few levels take more than 20 minutes to complete, and many take less. Once you complete a level, that information is recorded on the disk, and the next time you play you can go straight to the next level, if you want.



## Bizarre Designs

After the first few archipelagos, the difficulty increases rapidly, then levels off. The strategic problems vary enough to keep the game challenging, even intriguing, as you tackle some truly odd island chains. Particularly entertaining, every fifth

With up to 9,999 levels, Archipelago, from Bratonic Software, offers even the most ardent game-player hours of challenging fun.

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level up to Archipelago 100 has a specially designed shape, including a butcher's chart of a pig (level 20), the outrageous "Wanted Dead or Alive — Tony's Barber" (level 85) and maps of Europe (level 50) and the United States (level 25).

Once you complete Archipelago 100, you're free to select any archipelago from 1 to 9,999. However, without the specially designed worlds to add interest, and without any significant increase in difficulty, the upper levels can prove quite similar to one another.

The vivid and weird graphics capture the spirit of the game. The eerie landscape is a simple, clashing checkerboard of poisonous reds and bright greens set against a grey sky and vivid blue water, inhabited by twisted creatures drawn in creepy detail. Full of strange reverberations and eerie melodies, the sound also helps create an appropriate, ominous mood — and warns of the presence of certain creatures.

Function keys are used to create land, view a map or perform a quick U-turn. Other movements are controlled by mouse, with a simple

point and click technique used to move from square to square or to collapse nodes. Smooth scrolling enhances the very convincing illusion of 3-D space and movement across the islands. However, you seem to float above the ground, always looking straight ahead. Anything beneath you, even a few squares away, is hidden — an annoying and potentially fatal problem.

### Lasting Impressions

The manual includes basic instructions, a guide to the island lifeforms, some tips and hints — and four pages filled with a numbered grid that provides the game's copy protection. (You'll want really good lighting to read those tiny numbers printed on dark red-brown paper.)

Overall, Archipelagos is one of the most original games I've seen, both in gameplay and in overall concept. The sharp graphics and music combine to provide an odd and eerie setting that works despite an essentially forgettable scenario. Despite the seek-and-destroy nature of the game, this is no shoot-em-up,

but rather a futuristic fantasy strategy game. If you like graphically vivid puzzles, or truly weird challenges, Archipelagos is definitely worth checking out. ■

*Contributing Editor David Plotkin works as a chemical engineer for Chevron U.S.A. Carolyn Cushman is the Associate Editor of Amiga Plus and Antic magazines. This is her first review for START.*

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# Disk Instructions

Now Using Your START Disk is as easy as 1, 2, 3!

## Running the START Menu Program

**From a Floppy Disk:** Put your START disk in drive A and turn on your computer. The START menu program will come up automatically.

**From a Hard Disk:** Boot your computer as you normally would. If you're using a color system, set the computer to medium resolution. Put your START disk into either drive A or B, and double-click on the drive's icon. After the disk's directory appears, double-click on START.PRG. *Note: Do not run the menu program from your hard drive!* Each issue's disk has its own START.INF file which must be in the same directory as START.PRG.

When the menu program first runs, it will ask you to describe your floppy disk drive configuration. It is very important that you enter this information correctly, as the program will use the information later to correctly back up and prepare your program disk. Click on Single or Double sided for both drives A and B; if you only have one drive, the Drive B buttons will be greyed out. If you are unsure whether your drives are single- or double-sided, click on Help.

## What Then?

This is where accessing your START programs gets easy. Just follow these three steps:

### Format Disk

1. Here, you can format a single- or a double-sided disk in either drive A or B. Click on the drive containing the disk to format, select Single or Double sided and then click on Format. Formatting a disk will delete that disk's contents. Do not format your START disk.

### Backup START Disk

2. We recommend that you make an archive copy of your START disk, which is in the special Heidi format. If you have a single-sided drive you can back up Side 1 of your disk onto one single-sided disk. We also recommend that you borrow a friend's drive to back up Side 2 of the disk onto another single-sided disk. If you have a double-sided drive, you can back up the disk onto one double-sided, Heidi-format disk. The computer will rely on the system configuration information you entered earlier to tell you which disk needs to go in which drive.

### Prepare Disk

3. This is the heart of the START menu program. The Prepare a Disk option brings up a window that lists the names of the programs, source files and demos on this issue's disk. The names of the programs will be given in full, you don't have to worry about the specific names of the archive files. If a program has accompanying source code on the back side of the disk, the entry will be listed separately. For example, one entry may be "Avecta I: Ebona" and an entry further down would be "Source Code for Avecta I: Ebona."

Next, a dialog box will ask for the destination directory, and whether you wish to send the program files to a folder. The destination directory may be a floppy, hard drive or RAM disk. If you wish to put the files in a folder, the program will offer you a default folder name. Press (Return) to use this name or edit the path directly. If the folder does not already exist, the program will create it. If you select drive A or B as your destination drive, the program will ask

you if you want to format the destination disk. The menu program will then un-ARC the files directly to the destination drive, and will minimize disk swapping by analyzing the drive configuration you specified earlier.

## Bonus Options

Each month, your START disk menu program will include special bonus information ranging from the issue's disk contents and coming attractions to special subscription offers and the latest-breaking Atari news. Click on the various menu buttons and scroll through the main menu window to read this information.

## And There You Have It

For more detailed instructions, click on the Help button. Click on Exit to return to the Desktop. And that's all there is to it — un-ARcing START programs was never easier!

Your START disk format and interface was developed by some of the most talented programmers in the ST world. Contributing Editor **David Ramsden** wrote the interface for the menu program and the custom un-ARcing routines that use as much as 40 percent faster than ARCX.TIP. Contributing Editor **Dave Small** and **Dan Moore** wrote the H-adi formatter that made the back side of the START disk accessible for the first time. **Charles Johnson** of Codehead Software wrote a custom version of the STARTGEM program that lets the menu program run at boot time even though it's GEM-based. **Keith Gerdes** of Double Click Software wrote DC SQUISH, which lets us compress the START menu program executable and resource files to save valuable space on the front side of the disk.

# Disk Contents

Programs on Side 1 of Your START Disk

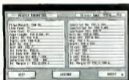
## DANCE TO THE SCORE OF A DIFFERENT DRUMMER



ScoreST .....page 80



LaserDisc .....page 62



GDOS Subroutines .....page 95



Mystic Realm .....page 62

Musicians take note — or even an entire score — with **ScoreST** by Phil Comeau. Now you can create and edit an entire musical score on screen using a toolbox with 64th, 32nd, 16th, 8th, quarter, half and whole notes, accidentals, clefs, dynamics, text and more! Simply select a symbol by clicking on it, then place it anywhere on the page with the mouse. File SCOREST.ARC and INSTST.ARC; requires a monochrome monitor.

Now you can share your dynamic CAD-3D objects with the rest of the computing world using Dave Edwards' **CAD-3D to DXF converter**. DXF is AutoCAD's industry-standard object format. Once your files are converted, you can port them to high-end workstations such as the IRIS for texture-mapping and output. The source code for the converter program will run unmodified in Microsoft QuickBASIC, so you can convert your objects directly on the PC. File CAD3DDXF.ARC; runs in medium and high resolution.

This issue's Programming in BASIC column is a printer double-header: The archive file for Ed Frank's **Printer Driver** contains a program to create printer drivers for text output as well as source code you can merge into your own programs to load a printer driver. File DRIVER.ARC; runs in medium or high resolution. And if graphics output is what you need, use Jim Burton's **GDOS Subroutines** for high-quality output in GFA BASIC. File GFAGDOS.ARC; requires GDOS and runs in any resolution.

Control a Pioneer LaserDisc from your ST — and open the door to accessing a wide range of interactive videodiscs with Michael Riley's **LaserDisc Remote Controller**. The GFA BASIC source code is included so that you can begin writing your own LaserDisc programs. Requires a compatible LaserDisc player and a serial interface adapter (see the article for details). File LASER.ARC; runs in low resolution.

This issue START's feature game will keep you busy for hours. In **Mystic Realm** by John Lince, you take the role of the Prince or the Princess to enter the perils of the dungeon on a rescue mission. Fight bats, ghosts and goblins as you negotiate fourteen levels — each more complex than the last! Need a hint? A slideshow presentation of the dungeon maps is also on your START disk. File MYSTIC.ARC and MAPS.ARC; runs in medium or low resolution.

AND  
THERE'S  
MORE...

# Side Two

Programs on Side 2 of Your START Disk

## AT YOUR FINGERTIPS

In the Summer 1988 issue of START we published an on-disk index of all ST programs, articles and reviews from Antic's ST Resource and START Magazine up to that point. Now Contributing Editor Dave Plotkin, who compiled the original list, brings you an updated index and database manager **Madam Librarian**. Not only does this contain an update of the original index file, it catalogs all ST coverage in *Antic*, *START*, *ST Log*, *Analog* and *Compute's Atari ST Magazine*.

With over a thousand entries, you're sure to find what you're looking for! The Madam Librarian program is an easy-to-use database manager that lets you scroll through entries by title, then "zoom in" on an entry by clicking on it. Complete documentation is on disk. File *LIBRARY.ARC*, and *LIBSRCARC* runs in medium and high resolution.

And speaking of updates, the newest **ST Softguide** is here! We received a great response to Softguide when we presented it in October, so this issue we're bringing you the first update to this comprehensive index of commercial ST programs. Softguide's authors Dain Leese and Fred MacGregor have added even more entries and have modified the program to include a scroll bar for easier access to the programs you need.

This month's **source code** bonus is for **ScoreST**, our feature program on Side 1 of your START disk. Although this is the complete Mark Williams C source code for the program, it will not compile due to some of author Phil Comeau's special modifications to the libraries. See the *README.DOC* file in this archive for more information. File *SCORESRC.ARC*; program runs in high resolution.



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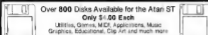
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# CAD 3D TO DXF CONVERSION

BY DAVE EDWARDS

*The Cyber system makes complex object creation amazingly easy, but until now, you couldn't do photo-realistic rendering of CAD-3D objects. With Dave Edwards' CAD-3D-to-DXF Converter, you can translate your CAD-3D files into an AutoCAD-compatible format and have the entire world of PC and high-end graphics systems available to you. The program runs in medium or high resolution and was written in LDW BASIC.*

---

Move CAD-3D objects to super graphics systems with CAD3DDXF.ARC on Side 1 of your START disk.

---

I have to admit that I've fallen in love with the CAD-3D family of programs. The entire Cyber system is a complete and very useful animation system, but since much of my work requires IBM PCs, there have been many times that I wished I could have used a CAD-3D file in a PC program. There just aren't any programs available on the PC with the kind of power to create the beautiful objects that CAD-3D and CyberSculpt are known for.

Since virtually the entire PC (and Mac) CAD world uses AutoCAD's Drawing Exchange Format (DXF) for file transfer, it was only right that there should be a DXF translator for CAD-3D files. Such a translator

would allow CAD-3D files to be brought into AutoCAD — or any other 3D program that uses the DXF format. I found out that no one had written this program, so I did it myself.

The code I wrote is designed to run in many different BASICs without modification. I use it on my PC clone compiled under MicroSoft QuickBASIC and on my Atari under LDW BASIC. The code should have no problems even on the Macintosh or the Amiga. I normally run it on the fastest machine I have.

#### Running the Converter

To convert your files you first must know the target AutoCAD version

(Version 9 or 10) and the colors of the CAD-3D objects. In Release 10, the edges of 3DFACES can be hidden so that a series of triangles can appear as a more complicated surface.

To run the Converter, boot this month's START disk, the START menu program runs automatically. At the main screen, click on Prepare, then select "CAD-3D to DXF Converter." The program will un-ARC directly onto the destination disk you specify.

Double-click on CONV2DXF.PRG. Next, type in the names of the CAD-3D and DXF files. You must include the filename extenders, but you can specify different paths for each. You'll then see a chart of the



## EXTENDING THE GRAPHIC LIMITS



AutoCAD colors and their corresponding numbers. The program will then check the CAD-3D object, determine which color scheme was used and ask you to key in the appropriate AutoCAD colors. Once this is finished, it will then process the CAD-3D objects. Your DXF file should then be ready to go straight into AutoCAD or other programs. To abort the program operation, press [Control]-[C].

A couple of comments on the DXF file: CAD-3D files can convert to very large DXF files, so be sure to run the Converter on a hard disk or large RAM disk. (This is the main reason I run it on my PC, because some of the files I've created have



been 3MB in size! Also, if the file is going to be used on a PC, you might as well create it there.) In order to make changing colors or other properties in AutoCAD easy, I have

assigned the CAD-3D Object Name to be the AutoCAD layer name.

As a test of the program, I loaded Darryl Anderson's ANTHROBOT from Antic Software's Microbot ▶

This is a "plain vanilla" program without any GEM bells and whistles, but it has the advantage of being compatible with different BASiCs on a number of platforms. On the ST, it runs in LDW BASiC and on the PC, it compiles perfectly under MicroSoft QuickBASiC.

## I've fallen in love with the CAD-3D family of programs.

Design disk into CAD-3D and saved the complete file to disk. I then ran the CONV2DXF program and loaded the file into AutoCAD. In AutoCAD, I could move my view around and then do a hidden line removal.

### So It's DXF — What Now?

Using this translator, the Atari Cyber system makes a great front end processor for three-dimensional CAD files, but that's certainly not all you can use a DXF file for. There are many firms around the country that do "photo-realistic" renderings of AutoCAD 3D files and they normally don't have translators for Atari files.

To see just what these graphics firms are capable of, I contacted John Wright of Viewpoint Animation Engineers. He was very interested in working with me on this project and

couldn't have been more helpful. The DXF file I created first had to be translated by them into a format acceptable to their Personal IRIS system. Then they texture-mapped the surfaces. (Texture mapping is where a computer image of a material such as marble, silver or chrome is "wrapped" around each object.) The objects were then placed into "smoothing groups" which tell the computer which sets of 3D triangles are to be smoothly shaded, removing all of the faceted edges. Finally, they added a granite base and a blue sky with clouds.

The object we used was the Safari Tricycle, also from the Microbot library. As you can see from the illustrations, this photo-realistic technique produces some incredible images. John Wright and his crew

had a lot of fun with the file and their hard work really shows. Contact Viewpoint if you want to do renderings like this; they can even do animations of your CAD-3D objects in this quality. Check them out; I owe them a great big *thank you!*

I hope that this will help users to make this type of file transfer. Objects which can be created easily on the ST would be just about impossible in AutoCAD. Perhaps more AutoCAD 3D users will use STs to create their complicated objects and really blow away some of their competition.

It's also fun to have your own CAD-3D objects photo-realistically rendered. This process is by no means perfected, but it certainly adds a lot to CAD-3D rendering. Be sure, however, to ask for prices before

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## CAD-3D files can convert to very large DXF files.

giving the go-ahead; photo-realistic rendering takes a lot of CPU time — and money.

### Notes and Limitations

As written, the converter program can only handle object groups with fewer than 5,000 total points. This was done to insure that the program did not exceed the 64K array limits in many BASICs. In LDW BASIC, however, arrays may be of any size up to available memory. If you have the LDW Interpreter and Compiler, you may increase the array dimension to the full 15,000 points available in CAD-3D. Simply change the first program statement DIM T(5000,2) to DIM T(15000,2) and recompile. ■

*Dave Edwards runs a CAD consulting service and is START's*

*resident CAD expert. When he's not writing about CAD, you'll find him training others on VersaCAD. He's also a MIDI consultant, professional drummer and managing editor of "The MIDI Insider, The MIDI Power User's Newsource."*

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The Discovery Cartridge does not bog down the execution of Mac programs, like the Translator does. In just about 3 minutes, the Discovery Cartridge converts an entire disk side from Macintosh format to Magic, Spectre, or Aladin format. This includes read, format, write, and verify. Once the Macintosh disk is converted, the Discovery Cartridge does not have to be present for your ST to access the converted disk.

You can even use your Discovery Cartridge directly with the Spectre, and run Macintosh programs directly from Macintosh formatted disks. The Spectre 128 is required, which is not sold by Happy Computers. You can also access data and files from Macintosh format disks, without the need for any emulator.

No special Macintosh drive is needed. The power of the Discovery Cartridge's HART chip allows Atari ST drives to directly read the variable speed Macintosh disks, without any need to vary the drive speed. Either MFS or HFS, single or double sided disks can be converted. A double sided drive is needed to access double sided Macintosh disks.

### OPTIONS

Option package #2 adds a battery backed up clock, ROM / EPROM sockets with a program select switch, plus the circuitry and connector needed to support direct access of a 3rd and 4th floppy drive. Other option configurations are available, including a second cartridge port. A technically inclined user can install their own options. Complete documentation is included with each unit. The standard unit which has no options, can perform all disk backup and Mac disk conversion.

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*Pull Mystic Realm off your START disk, plug in your joystick and get ready for hours of fun! This dungeon game is reminiscent of Gauntlet: maneuver through a maze of rooms in fourteen levels as you fight ghosts, bats and evil minions. By first-time START contributor John Lince, Mystic Realm was written in GFA BASIC 2.0 and requires a color monitor.*



# MYSTIC REALM

## START's Hot New Role-Playing Adventure

BY JOHN LINCE

Step into the dungeon with *MYSTIC.ARC*, *MAPS.ARC* and *MYSTICSRC.ARC* on Side 1 of your *START* disk.

**K**idnapped by an evil vagrant, a beautiful princess lies captive in a damp dungeon. Unless a large ransom is paid, the vagrant will kill the princess. Unfortunately, the kingdom is poor and cannot afford to pay this ransom. Inevitable catastrophe awaits the princess unless a valiant young prince can avoid destruction while trekking his way through dungeons guarded by ghosts, slime monsters, bats and other vile creatures.

If you're tired of the old "rescue-the-princess" premise, *START* brings a new twist to the "valiant-hero" theme typical of video games. In *Mystic Realm*, you select your character at the beginning of the game and can play either the prince or the princess as the main character.

### Getting Started

To play *Mystic Realm*, boot this month's *START* disk; the *START* menu program runs automatically. At the main screen, click on Prepare, then select "Mystic Realm." The program will un-ARC directly onto the destination disk



you specify. To run *Mystic Realm*, double-click on *MYSTIC.PRG* from medium or low resolution. The files *CHAR.DAT*, *INFO\_FILE* and *MYSTICRE.ALM* must be in the same directory as *MYSTIC.PRG*.

*Mystic Realm* was written in GFA BASIC 2.0; the ASCII source code is on Side 1 of your disk.

### Gameplay

When the game is completely loaded, a title screen will appear. At the top of this screen a prince and a princess stand ready. Simply pull the joystick (any direction) until the word "hero" (which is currently under the prince) disappears and the word "herone" appears under the princess. As you would expect, the roles of the prince and the princess are reversed—the prince is now stranded in the dungeon and the princess must perform the rescue!

Underneath these two on the main screen are your enemies. You can get away from them either by finding alternate routes, destroying them or using your cloaking time (see below). The higher your level, the more damage the enemies can inflict.

Right under your enemies is a row of possible sources of power. Throughout the dungeons you must con- ▶

stantly eat and drink to keep your strength up. Under each item is a point value, for example, the fruit is worth 75 power points. If at any time your power reaches zero, the game is over. Your maximum power is 999.

Throughout your quest you'll need to gather all the weapons you can find. Although swords and axes are shown, only knives are actually used. The point value under these items tells how many knives the item is worth. For example, when you grab a sword you gain 25 knives. The game becomes very difficult if you run out of knives — and they can be hard to come by!

There are other items you'll find in the dungeon. Both shields and the scroll have no major importance in the game other than to increase your total score. The gemstone is used to power the energy transmuters (see below). Keys unlock doors. The money bag contains an unknown amount of gold coins which will be used later in the game to buy power and knives. The hook with the cup of flames on it is very useful — it is the magical book of a long forgotten wizard that restores the holder to full power! Also, there's a time clock which gives you a certain amount of cloaking time. During this time, you can walk right through the enemies without being harmed. One strategy is to use this time instead of wasting knives on the enemies.

There are nine kinds of barriers in Mystic Realm and there is no way to get past six of them. You can annihilate the wooden gate (which appears as a boxed-in 'X') by hitting it with two knives. If you have a key, you can open a door by simply walking into it. The energy transmuter (which is the last item in the "barriers" row) becomes active when you walk into it with a gemstone. You'll need to also place a gemstone

in a second transmuter nearby, when both stones are in place energy will be sent between the two and destroy anything in between them.

**Playing the Game**

You'll need a joystick plugged into Port 1 (the mouse is in Port 0). At the title screen, hold down the joystick's fire button or press any key. This will place you in the first room; if this is your first time playing I suggest you press the space bar to pause the game at this point so you can study the screen. Resume play by pressing the space bar again.

Mystic Realm's play screen includes your status information. On the top line is your power level, the number of knives you have and the current dungeon level. On the second line are icons representing the number of gemstones and keys you have. (Nothing appears there at the beginning of the game because

Note that when you leave one room by exiting to the left you'll start in the next room at the far right of the screen.

At the bottom left of the screen there is a small clock and an orange line after it. This is your cloaking time. To activate it, press [C] when playing the game. Your character will blink and you will hear a dull tick. To deactivate the cloak, simply press [C] again. When the orange line is gone, you're out of cloaking time and pressing [C] will not help you. In the bottom right corner are miniature versions of yourself; this indicates how many lives you have left.

**Game Control**

In Mystic Realm, you move around the rooms by moving the joystick up, down or diagonally. Remember you can only exit a room if there is an arrow at the top of the screen



**The Mystic Realm play screen. On your journey you will need to collect knives, food and treasures.**

you don't have any keys or gemstones.) On the far right of this line are one or more arrows indicating which direction(s) you can go to leave the room. An arrow pointing down, for example, means that you can exit the room by going down. Multiple arrows mean that there is more than one way to exit a room.

pointing in the direction you want to go. Each level will have a space labeled "This way out." Land on this space to go to the next level. To pause or restart the game, press the space bar; to start over, press the [Escape] key. Press the [Escape] key at the title screen to return to the Desktop.



## The Mystic Realm Maps

To view the maps of Mystic Realm, use the START menu program to Prepare a disk with the Mystic Realm Maps. Double-click on MAPS.PRG to begin viewing the maps. The space bar freezes the screen so that you have more time to study it. Press the space bar again to continue to the next map. The only way out of this program is to reset the computer.

The maps may be a little difficult to understand, especially if you look at them before playing the game. The black indicates walls, grey indicates where you can walk and the light grey indicates where each individual room ends. If you look at Level 1 on the map, the light grey divides the map into four separate rooms. The higher the dungeon level, the more rooms it has. The maximum number of rooms a dungeon level can have is 40 (levels 11-14). One difficulty with the maps is that every item in each room is shown as a single, color-coded pixel! I strongly suggest that you play the game a few times before looking at these maps. It will help you to understand the symbols' meaning.

## Shooting

Throwing a knife isn't too difficult, but there are a few rules. Rule 1: you must have a knife to throw! Rule 2: there must be some room to throw the knife. If you're right next to a brick wall and attempt to throw a knife in that direction, nothing will happen because there is nowhere for the knife to go. Rule 3: you can't throw diagonally. The easiest way to throw a knife is to stop, press the fire button and pull the joystick in the direction you wish to throw. Don't pull too long or you'll end up throwing more than one knife. At any one time, you can throw up to three knives.

## Breaks

After you complete the first four dungeon levels you'll come to the first break. At this point the program will show your power, knives, score and gold coins. You can now use your gold coins to buy power and weapons. Press [P] to begin buying power or [K] to begin buying knives. To stop buying, press the space bar. When you're all done buying and wish to continue the game, press [D] (done). There will be a slight pause

while the next set of dungeons are loaded, and then the action will begin again!

## Hints

- Whenever you can, grab a key, a gemstone or anything else that looks interesting. These objects can be carried with you from dungeon to dungeon.
  - Watch when you eat the food! If you're already at or near maximum strength (999) it might be worth passing the food and coming back to it later.
  - Escape your knives — use them only when you must.
  - There are shortcuts. You don't need to enter every room of the dungeon to win, but since you don't yet know which rooms can be avoided (and how), you might as well scurry on through them!
- Good luck! If you get very good and plan to complete the entire game, I hope you have a couple of hours to spare (it took me over three hours — and I wrote it!) ■

*John Lince lives in Warren, Michigan. This is his first program for START.*

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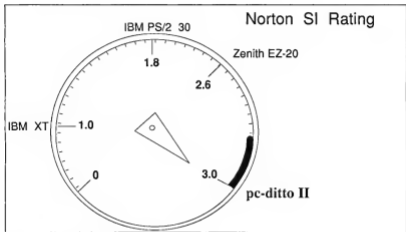
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## LaserDisc Remote Control

# Expand Yo

*Add a new capability to your ST: control a Pioneer LaserDisc player from your keyboard! With Michael Riley's (dare we say it?) pioneering program and a serial-interface adapter, you can access a wide range of interactive videodiscs—or use the basics learned here to create your own Space Ace game. The LaserDisc Remote Control was written in GFA BASIC 2.0 and requires a color monitor, a compatible LaserDisc player and an interface.*

---

*Control your LaserDisc the easy way—from your ST! See the file LASER.ARC on Side 1 of your START disk.*

---

**A**re you a LaserDisc owner (or thinking of becoming one) who would like to take advantage of the interactive capabilities offered by 'Level 3' CAV LaserDiscs? Now, with the assistance of an ST, a device called the Serial Interface Adapter for non-RS232 LaserDisc players (SIA-IIR) and the LaserDisc Remote Control program on your START disk, you can easily learn how to de-

velop controller and indexing programs for your favorite interactive LaserDiscs.

### **Required Equipment**

In order for the LaserDisc Remote Control program to operate properly, you must have access to a Pioneer brand consumer model LaserDisc player with System Remote (SR) compatibility, a CAV format LaserDisc, a television or video monitor to view the LaserDisc material, an ST with a color monitor and an SIA-IIR device available from Visual Database Systems.

### **Making the Connections**

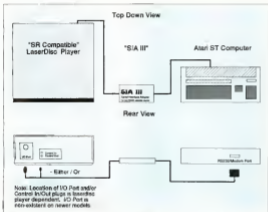
Refer to *Figure 1* for assistance with connecting the LaserDisc player to the ST via the SIA-IIR device. Installation is relatively straightforward. The SIA-IIR box may be connected to a LaserDisc player in two ways. First, if the player is an older consumer model (CLD-700, 900 or 909), a nine-pin female DIN input/output port exists on the back of the unit. A male adapter for this plug is included with the SIA-IIR package and is recommended for these models since the screen display is disengaged during frame searches. Newer Pioneer players (CLD-1010 and above) are equipped with Control In and Control Out microplugs exclusively. These jacks are intended for daisy-chaining SR-compatible Pioneer units together so that only one remote-control unit is required to operate several different audio/video components. For these models, simply plug the male microplug of the SIA-IIR into the Control In jack.

Next, insert the RS-232 connector of the SIA-IIR into the RS-232 (modern) port of the Atari ST. Apply power to the SIA-IIR unit prior to turning on either the player or the computer. Once the red light indicator on the SIA-IIR is lit, turn on the LaserDisc machine, then the ST. Insert a CAV format LaserDisc into the player. If the disc begins to play, use the player's controls to stop or pause the disc. You may now use the LaserDisc Remote Control program



# ur Horizons!

BY MICHAEL RILEY



**Figure 1.** Between the Pioneer SR-compatible LaserDisc player and the ST is the SIA-III Serial Interface Adapter from Visual Database Systems. It translates ASCII characters sent from the ST's serial port to the pulse train that the player can understand. The actual hook-up is quite simple.

to control this system.

## Using The LaserDisc Remote Control Program

To run the LaserDisc Remote Control, boot this month's START disk; the START Menu runs automatically. At the main screen, click on Prepare, then select "LaserDisc Remote Control Program." The program will un-ARC directly onto the destination disk you specify. The well-commented GBA BASIC 2.0 source code (in ASCII format) is on Side 2 of your START disk; at the START Menu's main

screen, click on Prepare, then select "LaserDisc Remote Control Source Code."

When you've finished, you should have two files: LASER.PRG, and LASER.PCL. LASER.PRG is the compiled program and LASER.PCL is the LaserDisc Remote Control program screen in DEGAS Elite picture format. With LASER.PRG and LASER.PCL in the same directory, set your ST to low resolution and double-click on LASER.PRG.

The LaserDisc Remote Control screen should appear, as shown in Figure 2. The program emulates a typical remote-control unit included with all Pioneer consumer LaserDisc players (the one illustrated is the unit that accompanies a CLD-909). To operate the on-screen remote, simply place the cursor over a remote button and click the left mouse button. ▶



**Figure 2.** The LaserDisc Remote Control program emulates a standard Pioneer consumer wireless remote control. It can be operated by clicking on the various buttons on the remote control image or the function key screen buttons.

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## Imagine an ST at the heart of your next audio-video center!

If all the hardware has been properly connected, the LaserDisc player will respond to the command issued by the on-screen remote. You may also click on the "Function Key" graphics representing common player commands or press the keyboard function keys and the ST's numeric keypad for faster frame or chapter number entry.

Note that all other keys on the ST except for those used by the LaserDisc Remote Control program have been disabled. The accompanying chart lists the more common commands and their control codes. For a complete listing, refer to LASER.LST. These control codes are the same for Pioneer's industrial players, which have an RS-232 port built-in. However, since the retail price of an industrial player is roughly \$2,000, an SR-compatible consumer model (which can be purchased from catalog showrooms for less than \$500) combined with the SIA-III interface clearly provides an economical alternative.

### Technical Information

What makes the LaserDisc Remote Control program work is the SIA-III interface. This device was originally conceived by Visual Database Systems for use with Macintosh computers, since many LaserDisc software companies have focused their development on Apple's systems. Companies like Voyager Press have released a number of information-packed discs for the Macintosh, such as Grolier's Encyclopedia on a single-sided CAV LaserDisc and a National Gallery of Art artwork anthology, accompanied by Mac "hyperstack" indexes. With the LaserDisc Remote Control program, you can access any of these discs—although without

the Mac indexes, of course.

The SIA-III emulates the NEC uPD6802G remote-control transmitter chip, the same one found in all of Pioneer's remote-control units. The chip generates a command word consisting of a series of 34 pulses containing one leader pulse followed by 32 data bits. The pulse spacing

determines whether the bit is a 0 (pulse repetition of approximately one millisecond) or a 1 (pulse repetition of approximately two milliseconds). Thus, it is the combination of bit timing that determines the control code sent. Refer to Figure 3. For more detailed information on how the NEC chip operates, obtain a ▶

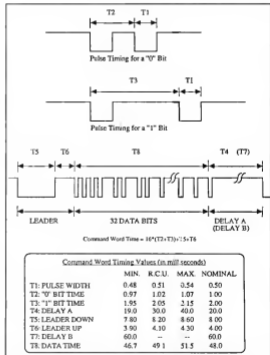


Figure 3. The Command Word format and timing. This is the pulse train sent from the serial interface to the SR-compatible LaserDisc player. For further details, obtain the LaserDisc Interface Manual from Pioneer at the address in the article. (Illustration courtesy of Pioneer Electronics, U.S.A.)

## I developed the program as a springboard for other applications.

### Common LaserDisc Commands and Their Control Codes

Command	Description	Code
PLAY	Spin up disc and playback at normal speed	/17
FRAME	Request frame number input to search or display	/41
SEARCH	Perform search for desired frame or chapter number	/42
CLEAR	Erase previously entered frame number for reentry	/45
DISPLAY	Display current frame or chapter number	/43
STILL FWD	Freeze frame or advance one frame forward	/54
STILL REV	Freeze frame or beck up one frame prior	/50
CHAP FWD	Search to the next chapter marker and play	/52
CHAP REV	Search to the previous chapter marker and play	/53
EJECT	Spin the disc down and eject it from the player	/16

copy of the "LaserDisc Player Reference Guide and Interface Manual" from Pioneer Communications.

Connected to a computer, the SIA-IIIIR receives ASCII characters sent from the RS-232 port and translates them into the pulse format recognizable to the SR-compatible component. This means that any SR-compatible Pioneer component can be controlled from the computer.

#### Endless Possibilities

I developed the LaserDisc Remote

Control program as a springboard for other applications. Once the communication protocol is understood, ideas for LaserDisc interactions flow like water. It is now possible for ST owners to write index programs like those found on the Mac for CAV information discs. ST owners can even go one step further by writing simple BASIC software drivers for interactive LaserDisc-based arcade games like Dragon's Lair and Space Ace. And because the SIA-IIIIR box is compatible with any SR component,

it's possible to create a comprehensive control program managing all aspects of the Pioneer SR line! Imagine an ST at the heart of your next audio-video center!

#### Acknowledgements

I would like to thank the following people for their cooperation with me on this project: Marie Jenkenson at Pioneer Communications for providing the LaserDisc Interface Manual, John Blakerty at Visual Database Systems for assistance with the SIA-IIIIR controller and Bruce Frankler and Paul Benson for additional guidance. ■

*Michael Riley is currently completing an M.S. in Physiology with an emphasis in exercise stress. His desire to exercise both body and mind are evident in his first commercial release Fitness Manager, marketed through Mad Scientist Software. This is his first program for START.*

#### PRODUCTS MENTIONED

**Pioneer SR-compatible LaserDisc players,** \$600 to \$2,500 depending upon model. Pioneer Electronics, U.S.A., 2265 East 220th Street, Long Beach, CA 90810, (213) 835-6177.

Circle 147 on Reader Service Card

**Serial Interface Adapter SIA-IIIIR for non-RS232 videodisc players,** \$250. Visual Database Systems, 614 Bear Creek Road, Scotts Valley, CA 95066, (408) 438-8396.

Circle 148 on Reader Service Card

**LaserDisc Software,** \$50 to \$125 depending upon quality of information. Voyager Company, 1351 Pacific Coast Highway, Santa Monica, CA 90401, (213) 451-1383.

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# ScoreST

**Musical Desktop Publishing for Your ST**

BY PHIL COMEAU

*Just as desktop publishing gives you the power to create finished documents on your ST, ScoreST lets you prepare a finished musical score with the ease of the ST's GEM point-click-and-drag interface. From an orchestral score to a worksheet for music students, ScoreST can do it all. Phil Comeau — author of Julia, START's buttonless drawing program for kids — wrote ScoreST. The program was written in C and requires a monochrome monitor.*

Score one for START! Files SCOREST.ARC and INSTST.ARC on side 1 of your START disk; SCORESRC.ARC is on side 2.

**W**riting a musical score by hand neatly enough to be read by sight is a wrist-cramping exercise that I'd just as soon never go through

again. Clearly, musical scoring could benefit from the same advantages that word processors and desktop publishing packages have brought to text. ScoreST is a graphical music notation processor that provides just these advantages.

With ScoreST you can draw musical symbols like notes, clefs and staves on the screen using the mouse, print them and save them to

disk for later recall and editing. It's completely GEM-based, and offers a number of features that will have you producing professional-looking scores in short order.

ScoreST can be used by:

- Composers and arrangers to produce fair copies of their work.
- Performers to create custom scores for solos.
- Music teachers to create special-



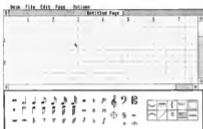
ized lessons, examples, scale and fingering studies and exams

- Musicologists to archive research material for reference and to create display figures for publication
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ScoreST requires a 520ST or

wish to print your score. At ScoreST's main screen, click on New under the File menu and the Editing Window and Symbol Palette will appear as shown in *Figure 1*.

To customize your own printer driver, return to the START menu program, click on Prepare and select



**Figure 1.** The basic work area of ScoreST. At the top is the Editing Window with an optional overlaid grid at 1/4-inch intervals. In the lower left corner is the Symbol Palette and to its right is the Toolbox.

1040ST with a monochrome monitor, but if you own a color monitor, fear not: I've tested ScoreST on a color monitor using the Monoware shareware monochrome emulator by Mick West and it works just fine. To print scores, you'll also need a printer with dot-addressable graphics capability. ScoreST comes preconfigured for Epson printers, but includes a program that lets you customize your own printer driver; see INSTSST\_ARC on your START disk for instructions on how to do this.

### Running ScoreST

To run ScoreST, boot this month's START disk; the START menu program runs automatically. At the main screen, click on Prepare, then select "ScoreST." The program will un-ARC directly onto the destination disk you specify. Then double-click on SCOREST.PRG; the file SCOREST.BSC must be in the same directory as SCOREST.PRG and SCOREST.CFG must be there if you

"Score ST Printer Driver." The printer driver program (INSTSST.TOS) and documentation (INSTSST.TXT) for this program will un-ARC directly onto the destination drive you specify. Double-click on INSTSST.TXT from the Desktop and click on Show or Print to view the documentation.

ScoreST was written in C and you'll find the source code on Side 2 of your START disk.

### The Symbol Palette

The musical Symbol Palette is a collection of symbols used in common musical notation (see *Figure 2*). If some of the symbols are unfamiliar, a book on music theory can help out (a good one is *The Basis of Music*, by Frederick J. Horwood, published by Gordon V. Thompson Ltd.).

To place a symbol, click the left mouse button over the symbol in the Palette, then move the mouse into the Editing Window. Click the mouse button again and the symbol is drawn where the mouse is positioned.

### The Toolbox

Unlike the symbols, which have fixed sizes and shapes, you define how marks drawn by the tools in the Toolbox will look, usually by dragging the mouse. Like symbols, tools are selected by clicking on their icons (see *Figure 3*). You can modify most of the tools using the Options menu.

To use the Line Tool, click on its icon, then move the mouse into the Editing Window. Draw a line by dragging the mouse; the line is

*continued on page 84*

	Whole note, rest		Accidentals: Natural, Sharp, Flat, Double-Sharp
	Half notes, rest		Clefs: Treble, Bass, Alto/Tenor
	Quarter notes, rest		Dynamics: Piano, Mezzo, Forte
	8th notes, rest		Coda, Segno
	16th notes, rest		Dot, Staccato
	32nd notes, rest		Grace note, Turn
	64th notes, rest		Fermata

**Figure 2.** ScoreST's symbol palette gives you almost all of the symbols you need to create a finished score. And those that aren't included can be created easily with the Tools in the Toolbox. (This chart was prepared with ScoreST and printed on an Epson dot-matrix printer.)



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


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	Down Curve Tool		Ledger-Line Tool
	Up Curve Tool		Text Tool
	Beam Tool		Staff Tool
	Line Tool		Trill Tool
	Brace Tool		Selection Tool

**Figure 3. The Toolbox contains ten tools to make score creation easy. With the Selection Tool and the built-in clipboard, you can easily cut and paste one symbol or an entire page.**

placed when you release the mouse button.

The Staff Tool is similar to the Line Tool, but only draws horizontally. The Beam Tool can draw at any angle, while the Trill Tool can draw only at ninety-degree angles. The Brace and Curve Tools also draw when you drag the mouse.

The Ledger-Line Tool, used for drawing extensions to the staff needed by very high or low notes, also draws by dragging the mouse. Position the mouse cursor squarely on the top or bottom line of a staff, then drag the mouse away from the staff until the required number of ledger lines appear.

The Selection Tool marks a symbol or group of symbols for further editing operations. To select a single symbol, click on the Selection Tool icon then click on the desired symbol in the Editing Window. The symbol becomes inverted. To select a group of symbols, drag a rubber-band box to surround them.

Note that only those symbols that are completely enclosed by the selection rectangle will be selected. You can change the lower-right corner of the selection rectangle by holding down one of the [Shift] keys while clicking the mouse. (You can use this technique to make a selection rectangle that's larger than the Editing Window.) The selected

symbols can be deselected by clicking the mouse hutton anywhere within the Editing Window, but outside the selection rectangle.

Once you've selected something you can move the selected symbols by placing the mouse cursor anywhere inside the selection box and dragging the mouse. The selected symbols follow the mouse's movement and will be placed wherever the mouse is released. You can

move selected symbols into and out of ScoreST's clipboard; see the reference sidebar for details.

### Pages

The Editing Window shows a portion of the current page. When you draw a score, you're actually placing symbols and marks somewhere within the page. A page in ScoreST's terms is the same as a standard piece of 8-1/2-by-11-inch paper. This works quite nicely when printing, since a symbol placed four inches from the top of ScoreST's page will appear four inches from the top of the paper page. To facilitate symbol placement, ScoreST overlays the page in the Editing Window with a grid showing horizontal and vertical inch markings. Since the Editing Window makes only a portion of a page visible, use the window's arrows and scroll bars to see the rest of the page. The Page menu lets you



**Figure 4. ScoreST does produce nice, clean music scores. This page was printed on an Epson dot-matrix printer using the Final Print option. It's also fun to use!**

# ScoreST Reference

## The File Menu

**Open...:** Loads an existing ScoreST file for editing.

**New:** Create a new file consisting of one page called "Untitled."

**Save:** Copies the current ScoreST file to disk. If it's a new file, select a name using the GEM Item Selector.

**Save as...:** Lets you save the file under a new name.

**Close:** Abandons the current score. If the file was modified since it was last saved it will be indicated by an asterisk (\*) in the Editing Window title and ScoreST asks if you'd like to save the file first. You can also close a file by clicking on the Close Box in the Editing Window.

**Print (Draft):** Prints the current score very quickly.

**Print (Final):** Prints the current score using a higher print density than Print (Draft); this option is slower.

**Quit:** Closes any open score and quits to the Desktop.

## The Edit Menu

[Note: these options affect the symbols or area selected by the selection tool in the Toolbox.]

**Copy:** Copies the selected symbols into the clipboard. The selected symbols themselves are not affected.

**Cut:** Removes the selected symbols and saves them in the clipboard.

**Paste:** Places a copy of the clipboard contents into the score at the position of the mouse the next time you click. Press and hold the left mouse button and drag to adjust the position of the pasted symbols.

**Erase:** Deletes the selected symbols.

## The Page Menu

**Create New Page...:** Adds a new page (up to number 9999) to the file; press [Return] to add a page after the last existing page.

**Delete this Page:** Deletes the current page.

**Go To Page...:** Changes the current page to the page number you enter.

**Previous Page:** Moves to the previous page.

**Next Page:** Moves to the next page.

**First Page:** Moves to the first page.

**Last Page:** Moves to the last page.

## The Option Menu

[Note: each of the Set options affect the tools shown in the upper-right corner of that Set dialog box.]

**Set Line Width...:** Lets you select the current line width from one to 15 in increments of two.

**Set Line Pattern...:** Lets you select the current line pattern. This only affects the line tool when it has a width of one.

**Set Line Endstyle...:** Lets you select the current line endstyle. This only affects the line tool.

**Set Text Size...:** Lets you select the current text size.

**Set Text Style...:** Lets you set the text attributes. You can select any or all of the attributes.

**Show Grid:** Controls whether the grid is superimposed on the Editing Window. A check mark appears beside the option when the grid is visible.

select which page is currently in the editing window

## Making Music

ScoreST is like a desktop publishing program for music. The first thing you'll want to do when creating a new score is to lay out the page.

Decide on the margin widths and the distance between the staves. Don't forget to leave room for titles, page numbers and copyright notices.

Fill the page with blank staff lines before you add music. Tricks and Tips, below, describes one technique for doing this. Now you're ready to draw the musical symbols.

Most musical symbols are available within ScoreST, but some you'll have to draw yourself using other symbols. For example, drawing a diagonal line through a grace note's stem transforms it into an *acciacatura*. A repeat sign is formed by drawing two vertical lines, one thick and one thin, and adding two dots. Crescendo and decrescendo marks (which look like stretched less-than and greater-than signs) are drawn using the Line Tool.

Figure 4 shows a typical page from a score created by ScoreST and printed on an Epson dot-matrix printer.

## Drawing Beam Groups

Beam groups are probably the most difficult of all musical notation to master. Beam groups are groups of notes, often of similar time value, joined together by one or more thick lines at the ends of their stems. The number of thick lines defines the time value of the beamed notes and is the same as the number of flags that would appear on the notes' stems if the notes were drawn individually.

Beam groups are constructed using the Beam and Line Tools and notehead symbols. Noteheads are ▶

the stemless half and quarter note symbols in the Symbol Palette. I've found that the best way to get the stems to meet the beams is as follows:

1. Draw noteheads representing all the notes in the beam group.
2. Decide the angle of the beams based on the vertical distance between the first and last notes in the beam group. Horizontal beams look best.
3. Using the Line Tool, draw stems on the first and last notes in the beam group, making them long enough to reach the location where the beam will be drawn. This is the difficult part, since you're trying to intersect with a beam that hasn't been drawn yet. Don't worry, the stems can be fixed up later.
4. Using the Beam Tool, beam the stems together starting with the outermost beam.
5. Draw stems from the remaining

noteheads to the outermost beam using the Line Tool.

You can select any symbol you're not happy with and delete and redraw it.

### Tricks and Tips

To make score drawing faster and easier, ScoreST offers a few aids and shortcuts. First, holding down the [Control] key while dragging constrains the mouse to horizontal or vertical motion. Release the mouse button before the [Control] key or the symbol may snap to a different location. This feature also comes in handy when you want to squeeze notes on a staff together or spread them apart. Select the notes you want to move using the Selection Tool, then hold the [Control] key down as you move the selected objects horizontally. The symbols seem to slide along "rails" formed by the staff.

The arrow keys can also be used to move any selected symbols. The arrow keys alone move the selected symbols by a distance equal to one-half the space between lines on the staff. In musical terms, this means the up- and down-arrow keys transpose the selected notes by a semitone. The [Shift] keys in combination with the arrow keys move selected symbols by the size of a pixel, 1/72-inch.

You can delete the last symbol created by pressing the [Delete] or [Backspace] keys. Bear in mind that this only works on the last symbol created; pressing [Delete] five times won't delete the last five symbols.

Use the clipboard to eliminate repetitive symbol drawing. When you begin a new score, draw a staff line and fill in the key signatures. Then copy the staff line you just created into the clipboard. Fill the page with staff lines from the clipboard, and you've got a custom page of blank sheet music, complete with key signatures. If you're scoring a long piece of music, you can paste a copy of the blank page just created onto a special page (with a page number of, say, 9999). Whenever you need to open a new page, copy the contents of page 9999 into the clipboard, then paste them onto the new page. (Don't forget to delete page 9999 after your score is finished.)

The best way to learn how to create attractive scores is to examine professionally typeset music for cues on layout, placement and spacing. Remember that the object is to produce scores that are attractive and easy to read. ■

*Phil Comeau lives in the Ottawa, Ontario area where he works as a software engineer. He wrote the program Julia in the November issue of START.*



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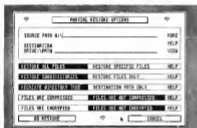
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# Diamond Back and Hard Drive Turbo Kit

Two Handy Hard Drive Utilities

BY DAVID PLOTKIN, START CONTRIBUTING EDITOR



**Diamond Back is one of the most flexible hard-disk backup programs available. With a solid, well-written manual, this is a good package to purchase.**

**H**ard drives are absolutely wonderful—once you've tried one, you can never go back. Hard drives are fast and store lots and lots of data, but they're also cranky beasts, as you know if you've read Dave Snell's series of articles on hard drives in START. The biggest problem with hard drives is that they do store so much data. If a floppy disk goes bad, it's bad enough, but if your hard drive goes bad, you can lose huge amounts of your work. And hard drives do occasionally fail.

The "obvious" answer is to back up your hard drive, that is, copy all of the information on it to floppies (or some other medium) periodically, so that if something does happen, you won't have lost everything. Unfortunately, backing up 20 or 40 or 80 megabytes of data to floppies takes considerable time. Moreover, since you can only fit about 800K on a double-sided disk drive, it also means many, many disk swaps. The end result is that most people just don't bother to back up their drives and hope for the best. Yes, I have been one of those people.

**Most people just don't bother to back up their drives and hope for the best.**



**MichTran's Hard Drive Turbo Kit is actually three programs in one box. There's a very nice backup utility combined with the latest version of TuneUp in a single menu bar, plus M-Cache, a write-through disk cache. Now if MichTran had just included a decent manual...**



There are three approaches to making hard-drive backup easier, so that people will actually do it. The first is to move the data to the floppy faster — Dave Small's Meg-A-Minute Elite with Twister format addresses this rather well. The second is to move more data onto each floppy, so that there are fewer disk swaps. Compressing files with ARC or some other scheme helps here, but compressing the files slows the data-transfer rate, so it's a trade-off between speed and number of floppies.

The last approach is *incremental* backups. Essentially, what you do is to make one complete backup of everything. After that, you periodically make an incremental backup — that is, a backup which includes just those files which have been changed since the last backup. Since these tend to be much smaller than a complete backup and, therefore, take little time, they are less onerous. There is a special flag in a file's attributes called the *archive bit* which tells a properly written backup program whether that file has changed since the last backup. What you end up with is the main backup and a series of disks of incremental backups. Of course, to restore your hard drive, you must begin with the main backup and then successively restore from the incremental backups. However, this isn't too big a price to pay — hopefully, you'll never have to restore anyway.

#### **DIAMOND BACK**

With all this in mind, let's look at two packages to help you work with your hard drive. The first package is called Diamond Back from Data Innovations, Inc. This program can back up your entire disk, back up only selected directories or files and compress and encrypt files. It has

sophisticated restore capabilities as well.

The backup portion of Diamond Back presents you with a dialog box that lets you choose which disk partition you want to back up and whether you want a full backup or an incremental backup. There is an option to back up just the files in the directory selected or to back up files in contained subdirectories as well. You can also choose whether to compress the files as you back up, although this option slows the backup process considerably. However, Diamond Back uses an efficient compression routine (known as Lempel-Zev) which can reduce the size of your files by 50

percent or more, so you may find it worth using. For file security, you can choose to encrypt your files. If you do so, a password will be requested. You are warned *not to forget your password* because if you do, your files will be useless. This flexibility is very nice to have.

Once you start the backup process, you'll be prompted for blank disks as needed. Diamond Back only uses one drive for backup, which is too bad if you have a two-

---

## **Although they have some similar capabilities, Turbo Kit can do more than Diamond Back.**

---

drive system. George Woodside's Turtle (a shareware program very much worth its small price) lets you use both drives and it will alternate between them if you wish. During the backup, Diamond Back creates a file listing which files which have been backed up to the particular disk. This is a very nice feature, because then you know exactly what's on a disk. It comes in very handy with the Restore function.

You can have Diamond Back format your disks with nine or ten sectors, 80 or 81 tracks and regular or Twister format. Ten sectors and 81 tracks will put more information on the disk, but not all disk drives will be able to read the disks (or write them either, for that matter). I highly recommend using Twister format, since it's much faster. You can also turn off write verify for the floppies, which further speeds up the process (at some small loss in safety).

The most unique feature of Diamond Back is that you can specify exactly what you want to back up. When you select the drive partition to back up, a GEM file se-

lector opens on the screen. You select directories and whatever is shown on the "Directory" line of the file selector will be backed up. Even more importantly, you can type in filenames for backup, using wild-cards such as "\*" and "?". Thus, you can back up just your .DOC files by specifying "\*.DOC" on the Directory line. You can specify up to *thirty* different drive partitions or paths to back up and you can edit these paths before you actually start the backup.

#### **Restoration Flexibility**

If the unthinkable happens and you must restore data from your backups to the hard drive, Diamond Back is helpful here too. The restore dialog box lets you restore to any drive partition, but you must tell the program if the files are compressed or encrypted. Oddly, the program doesn't code this information on the disk, so it can't tell; it's probably a good idea to mark this information ▶

## DIAMOND BACK

on the disk labels of your backup disks. You can restore to a partition that is different from the original and, in fact, you can choose to restore from *any* partition/path of the backup to any partition/path on the hard drive. If a folder does not exist, Diamond Back will create it. Up to 15 different pairs of restore-source and restore-destination paths can be specified.

You must be careful when you have this much flexibility, however. The source path is moved to the destination, including the source folder. Thus, if you tell Diamond Back to move A:\DOCS to C:\DOCS, what you'll get is all of the A:\DOCS files in C:\DOCS\DOCS. If you set the option to restore to the specified destination, everything in the source (including files in subdirectories) will end up in the specified destination path.

You have the option to restore all

files, including those in subdirectories, or just the files in the specified source. And you can choose to restore just the specified files. If you do, then a dialog box appears in which you can list the files you want to restore. You can use wildcards here to include a group of files with one specification.

Diamond Back is a very powerful, flexible program that does the job it is intended to do and does it very well. It comes with an excellent manual and is highly recommended—especially for its incremental backup feature. This feature may convince you to use Diamond Back (of course, it doesn't matter how good a backup program is if you don't actually use it).

## HARD DRIVE TURBO KIT

MichTron also produces a package of hard-drive utilities called the Hard Drive Turbo Kit. This package

includes a hard-drive backup-and-optimizer combined in one program called Toolkit. The other program in this package is called M-Cache, which provides a RAM cache for your hard drive.

When you run Toolkit, you are presented with a fully menu-driven GEM program with quite a bit of functionality. You can create a list of the disk contents, including the size, date, time and filename of each file on the disk and send the list to a printer. Toolkit keeps a log of any backups, this file is written to the disk and can also be printed. You also have the option of formatting floppies, selecting from nine or ten sectors, but without Twister format. The contents of a file can be displayed in a window, though I'm not sure what this function is doing in a package of hard-drive utilities.

Another option you have is to clone a complete directory of one

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more arcane ones. You are left to experiment to see what they do, which is *unacceptable with a hard-disk backup program.*

### TuneUp Really Works!

The second portion of Toolkit is the disk optimizer, formerly sold as a separate package called "TuneUp." When a hard drive is new, the files you save to it are stored contiguously on the disk. However, as files grow in size, are deleted and new files added, they begin to fragment—that is, they are scattered about on the disk as GEM finds and uses empty disk space wherever it finds it. As the disk heads have to move further and further to read the fragmented sections of the file, reading and writing to the file becomes slower. This effect can be quite significant on a hard drive which has been in heavy use for some time. TuneUp unfragments

your files, and as much as possible, ensures that they exist in contiguous disk sectors. (A note to MichTron: contiguous is not spelled contiguous—this is the second version of TuneUp that has suffered from that egregious misspelling.)

TuneUp also moves all of the free space so that it is either at the beginning or the end of the disk. If you choose to optimize the disk for reading, files are placed at the end of the partition with free space at the beginning. Optimizing for writing reverses this order.

TuneUp can also analyze how badly fragmented your disk is. This is important, because it provides a measure of when it is time to optimize your hard drive. Since optimizing can be a lengthy process, you don't want to do it too often! It also shows graphically how blocks of the disk are used, and can even show where on the disk a particular file is

located. You can also check the disk structure to find any inconsistencies or orphaned files. This last can be fixed automatically by TuneUp.

TuneUp works best when there is sufficient free disk space to hold the largest program. It will still work if there isn't sufficient room on the disk, as long as there's enough memory to hold that file. If there isn't sufficient room in memory, then the disk cannot be fully optimized.

### M-Cache

The second program on the Hard Drive Turbo Kit disk is M-Cache. As has been noted, hard drives are fast. As fast as they are, though, RAM memory is faster. That's one reason that people use RAM disks, but RAM disks have a problem: you have to load anything you want to use into it and you must remember to save anything in the RAM disk to a real disk (floppy or hard) before you turn



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Disk caches set aside a portion of memory for storage, just like a RAM disk. Whenever you load information from a real disk, the information contained in the sectors you read are retained in the cache. The next time you go to read the disk, the cache driver checks to see if what you want is already in the cache. If not, then it is read in from disk. If it is in the cache, though, the information is loaded from the cache much faster than it could be loaded from disk. The driver has a special algorithm that analyzes how often various sectors of the disk are accessed and keeps the most-used sectors in the cache. The bigger the cache, the less often you have to get information from the real disk. When you write to disk, this information is written to the cache and also to the real disk (this is called a "write-through"

cache) so that nothing is lost. You can see the advantages over a RAM disk.

M-cache can be run directly from the desktop or inserted in an AUTO folder. To configure it, you must run a separate program, for which there are no instructions in the manual. Fortunately, you just answer the questions as to which drives to cache and the size of the cache in disk sectors. Since most people have no real conception of how big a disk sector is, it is hard to answer that question intelligently. Just hitting return gives the default value of 200 sectors, which is about 100K.

#### And In Conclusion ...

The two packages discussed have some similar capabilities, but Turbo Kit can do more than Diamond Back. Thus, which you should get really depends on what you need. If you feel you can use the cache program

and disk optimizer with a decent (but poorly explained) backup program, then Turbo Kit from Mich Tron is an excellent choice. If what you need is a solid, well-documented, flexible hard-drive backup program, then you can't go wrong with Diamond Back. ■

*David Plotkin is a START Contributing Editor and a prolific ST and Amiga author. Dave is also a chemical engineer with Chevron in his free time!*

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CIRCLE 153 ON READER SERVICE CARD

## COMING NEXT MONTH!

Ring in the New Year: In the February 1990 issue, START brings you more great programs and features. Here are some highlights:

From West Germany, David Neple gives you a detailed report of the inner workings of TT TOS, the TT's operating system.

On the START disk you'll find a hot new version of the very popular CardStak from Special Issue Number Three. It's called CardStak Pro and it has all the reporting features you could possibly want in a free-from database.

Also on next month's disk, AI Doctor, a program that lets you explore the possibilities of artificial intelligence with your ST.

Look for these and more surprises from the February 1990 issue of START, on sale January 1.

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## GDOS Printer Drivers in GFA BASIC

By Jim Burton

---

Use GDOS for high-quality output with GFAGDOS.ARC on Side 1 of your START disk.

---

When you think of graphics printouts on the ST, you probably think of blocky, low-resolution screen dumps. But now you can create those incredible high resolution printouts created by such programs as Easy-Draw and CAD-3D. The "secret" of these programs is that they use GDOS, the ST's Graphics Device Operating System.

GDOS is a part of GEM that lets you access other output devices besides the screen. Atari didn't include GDOS with the rest of the ST's operating system so it needs to be loaded from disk.

To run the program in this tutorial, you'll need GFA BASIC 2.0 from the January 1989 issue of START, GDOS.PRG and a .SYS printer driver (such as FX80.SYS). Due to the special licensing agreement necessary to distribute GDOS, we cannot provide these files on the START disk. However, if you own Easy-Draw, DEGAS Elite, CAD-3D 2.0 or one of many other ST programs that provide GDOS then you already have it. (Although these routines will work with GFA BASIC 3.0, if you're using that language you already have built-in GDOS routines available. See the GFA BASIC 3.0 manual for details.)

### One of Many

The ST's monitor screen is simply one of the many output devices capable of showing graphics such as circles, text, lines and fill patterns. With GDOS, it's possible to "open" a device, such as the printer, and

*Continued on page 96*

## GFA BASIC Printer Driver

By Ed Frank

---

Print it right, print it neat, print it just the way you want with DRIVER.ARC on Side 1 of your START disk.

---

While the Atari ST line is compatible across the board, printers are another story. How do you make sure that users of your great new application are able to print out decent hard copies of their reports? I work for a company that programs for the IBM-compatible market; they solve the problem with a printer-driver utility that's a part of a \$20,000 compiler. The end user either picks from a list of available printers or calls on us to make a custom driver for them. The GFA BASIC Printer Driver has all of the features of the "professional" driver utility, but is far easier to use. Now you can be sure that your GFA BASIC programs will work with virtually any printer.

### A Printer Driver is ...

A printer driver is nothing more than a look-up table of printer control codes. Every printer accepts special character strings to tell it to print in bold face, condensed print and so forth. The GFA BASIC Printer Driver lets you create lists of any printer's control codes and read them into a set of previously defined GFA BASIC variables. As a GFA BASIC programmer, you can now treat printers in a standardized manner. As long as the user has a compatible printer driver, you can be assured that printer output will be acceptable.

The GFA BASIC Printer Driver is limited to controlling text output, since graphic output control codes can vary greatly from one printer to another. Besides, device drivers are readily available for GDOS graphic output.

*Continued on page 97*



Figure 1: This arc was drawn on the screen and printed out on a dot-matrix printer via the ST's built-in screen-dump function.

draw graphics to it at a much higher resolution than the screen. Figure 1 shows a screen dump of an arc, and Figure 2 shows a GDOS printout of an arc. The GDOS version looks much better because the medium resolution screen measures 640-by-200 pixels, while the printer driver's resolution is 960 by 1488!

To use GDOS printer drivers in your own programs, boot this month's START disk; the START menu program runs automatically. Click on Prepare, then select "Using GDOS in GFA BASIC." The sample GDOS listings and ASSIGN.SYS files will un-ARC directly onto the destination drive you specify. Create a new GDOS boot disk with GDOS.PRG in the AUTO folder. Copy your printer driver (FX80.SYS for Epson-compatible printers), ASSIGN.SYS, GDOSPROC.LST, GFAGDOS.BAS and GFABASIC.PRG to the root directory of the boot disk.

That's all you need to access the high-quality printing capabilities of GDOS! But before we go any further, we need to discuss the concept of "ASSIGN.SYS."

### ASSIGN.SYS

Any ASCII file that gives GDOS information as the ST boots up is called ASSIGN.SYS. Run your favorite word processor or text editor and load ASSIGN.SYS from your GDOS boot disk. You'll see the following:

```
01p screen.sys
02p screen.sys
03p screen.sys
04p screen.sys
21r fx80.sys
```

This is simply a list of device drivers for GDOS. On each line is a device number, followed by a single-character descriptor, followed by a filename. The first four lines are the built-in screen drivers; the descriptor "p" indicates that these are permanent. The last line, with device number 21, is your printer driver. The "r" stands for resident, which tells GDOS to load the printer driver into memory at boot time and keep it there. If you're using a printer driver other than FX80.SYS you should change fx80.sys to the name of your driver—be sure to keep 21r in front of the filename. If you make



Figure 2: This arc was printed on the same printer using GDOS, an Epson-compatible GDOS driver and the GFA BASIC routines on your START disk.

any changes, save the ASSIGN.SYS file to disk as an ASCII file.

Now, turn off your machine and reboot using the GDOS boot disk. You should first see a message telling you that GDOS is resident, then the GEM desktop. Run GFABASIC.PRG, then load GFAGDOS.BAS. (Note: if you have a hard disk it's best to experiment with your hard disk turned off, since an incorrect ASSIGN.SYS file can hang up your hard disk at boot time. When you're sure GDOS is working properly, copy the files onto your boot drive.)

### GDOS Printer-Drivers Program

GFAGDOS.BAS is a program that prints three high-resolution graphics to the printer: an elliptical arc, a circle and a box with rounded corners. Before you run the program, let's take a look at it.

**@Openwork(21)** calls a procedure that prepares or "opens" the device. In this case the device number is 21, which is defined in the ASSIGN.SYS file as the printer driver. **@Openwork** returns a number in the variable **Handle%**, which helps GEM keep track of the current device. **@Openwork** also returns the maximum X and Y coordinates of your printer in the variables **Device-width%** and **Device-height%**. For the FX80.SYS printer driver, these values are 0 to 959 across the top of the page and 0 to 1,487 from the top to bottom.

**@Set\_writemode(Handle%,1)** tells GEM how to draw the graphics. The variable **Handle%** must be passed to the procedure first, then a value that represents the drawing style we want. In this case, the 1 means to draw in replace mode, which is the normal drawing mode.

The next seven lines set the various attributes for the graphics, such as line thickness and fill pattern. These attributes must be given a value or they'll default to 0, which in most cases isn't what you want.

**@Drawcircle(Handle%,200,300,100)** draws a circle. The X and Y coordinates are 200 and 300 and the radius is 100. This will put the circle in the upper left area of your paper.



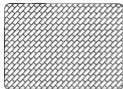


Figure 3: This output from the sample GDOS program has a resolution of 960 by 1488 even though the screen resolution is only 640 by 200.

`@Drawfill(Handle%,200,300,1)` fills in an area with the fill pattern defined by the attribute functions. The values 200 and 300 are the starting point of the fill and the 1 means the fill will stop when the color 1 is encountered. This will fill in the circle, starting in the middle and stopping at the border.

`@Drawellarc(Handle%,500,100,50,75,0,1860)` draws an elliptical segment. The center is at 500, 100. The X radius is 50 and the Y radius is 75. The 0 is the starting angle of the arc, which is to the right of the center point. Angles are passed in degrees times ten, so a value of 1860 will cause this procedure to draw the arc from 0 to 180 degrees. Since the arc is drawn counter-clockwise, the top half of an ellipse is drawn.

`@Set_fillindex(Handle%,10)` changes the fill pattern for the next graphic and `@Fillroundedrect(Handle%,450,300,800,600)` draws a filled rectangle with rounded corners. The top-left-hand corner rectangle will be at 450, 300 and the opposite corner is at 800, 600.

The page will be sent to a temporary disk file; it won't actually be printed out until the procedure

`@Printwork(Handle%)` is called.

Before the program ends `@Closework(Handle%)` closes the printer workstation, deletes the temporary file and frees the memory buffer.

### Making it Work

Before this program will work, you need to merge the actual GDOS procedures. Position the cursor at the end of the program, click on Merge and select GDOSPROC.LST from the Item Selector. Running the program should give you a printout similar to Figure 3.

There are many more GDOS procedures in the file GDOSPROC.LST. They're fully documented so you can begin using them immediately in your own programs — study them and experiment! Remember to close the device with `@Closework()` when you're finished. ■

*Jim Burton lives in Great Falls, Montana, where he is television news production director for KRTV. This is his first program for START.*

## GFA Basic Printer Driver (continued from page 95)

(Editor's Note: See this issue's companion "Programming in BASIC" column on GDOS and GFA BASIC if you want to use GDOS in your program.)

### Running the Program

To run GFA BASIC Printer Driver, boot this month's START disk; the START menu program runs automatically. At the main screen, click on Prepare, then select "GFA BASIC Printer Driver." The program will un-ARC directly onto the destination disk you specify. You will find the files DRIVER.PRG, DRIVER.LST, DRLOAD.LST, DRIVERH.RSC, DRIVERM.RSC and several files with a ".PDX" extension. GFA BASIC Printer Driver was written in GFA BASIC 2.0 and runs in either medium or high resolution. DRIVERH.RSC (high resolution) or DRIVERM.RSC (medium resolution) must be in the same folder as DRIVER.PRG.

Double-click on DRIVER.PRG. When GFA BASIC Printer Driver finishes loading, you'll see the title screen. Click on the exit bar or press [Return] to bring up the main menu.

### Menu Options

**CREATE:** Click on CREATE to bring up the Printer Parameters dialog box. Here you can enter the control codes for a particular printer in decimal, hexadecimal or character format, depending on the display setting. A separate line is provided for most of the major functions of the average dot-matrix printer.

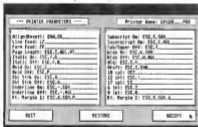
To enter a code, select the appropriate line by using the cursor arrow keys or by clicking on the line with the mouse. The usual GEM editing functions are supported ([Esc] to clear a line, [Backspace] and [Delete] to remove characters). Separate the control codes with commas as ▶

## A printer driver is no more than a look-up table of printer control codes.

delimiters. For example, type in "ESC," (without the quotes) if that is your printer's code for reset.

Some codes, such as page length, quite often require a numerical value to be entered after the control string. Rather than convert this number into hex or character code, you can enter a decimal value by preceding it with the number sign (#). An 11-inch page setting in hexadecimal might therefore look like this: "1B,43,00,#11". This works only in hex or character display mode, since it's unnecessary in decimal mode. You aren't required to fill in every line with codes; in fact, you might like to enter the commands for other functions on otherwise unused lines, such as ringing the printer's bell or clearing its buffer.

At the top of the Parameters box is a line for the printer driver's name. This is restricted to eight characters, since it will also be the name of the driver file. GFA BASIC Printer Driver will append the default extension of .PDX when the file is saved. Click on the SAVE button to save the driver and return to the main control panel. The driver file will be saved in the folder indicated by the SEARCH PATH option, described below. If a driver



GFA BASIC Printer Driver makes it easy to customize your GFA BASIC programs to print text on virtually any printer. Now, that custom database manager you've written can be easily adapted to take advantage of almost any custom print function available.

file with the same name exists in that path, it will be renamed with a filename extender of .BAK. Click on RESTORE to erase all of the entries. Click on CANCEL to exit to the main menu without saving the driver.

**EDIT:** Select this button to open the GEM Item Selector to choose a printer driver to edit. The Parameters box will appear with the control codes displayed in the chosen mode. This is an easy way to create a new

driver, since many printers use similar codes for certain functions. Save the modified driver under a different name. In the EDIT mode, the RESTORE button will restore the codes as they were prior to any changes.

**DELETE:** This choice opens an Item Selector in the folder chosen by the SEARCH PATH option and lets you delete any file.

**HARD COPY:** Click on this button to choose either a printout of a driver's parameters or for performing a print test of the current driver. If you choose to print a driver's parameters, the Item Selector will appear. Choose a driver file and click on OK. The printout is in the same format as the Parameters screen and is a convenient way to document drivers.

If you choose to test the current driver, GFA BASIC Printer Driver will make a two-page print-out using most of the control codes of the current driver. This will let you spot any errors or conflicts in the codes. Both of these HARD COPY alternatives will work on 80-column printers.

**SEARCH PATH:** This lets you choose the path for saving your drivers. It will display the current path and you can choose a default path or enter a new path. The exit buttons let you choose from any of the three displayed paths.

**DISPLAY MODE:** Click on one of the three buttons to present parameters in hexadecimal, decimal or character format.

**MAKE ACTIVE:** The active driver's codes will be used during any printer output from within GFA BASIC Printer Driver. Click on this box to select a driver. The program changes the filename extender of the active driver from .PDX to .PDA and all other drivers in the same folder are renamed with the PDX extension. Drivers in different folders can be made active, but only the active driver in the Present Path (as designated by the SEARCH PATH option) will be used for HARD COPY.

**SAVE SETTINGS:** Click on this button to write the path and display settings to a disk file named DRIVER.CFG. This file must reside in the same folder as DRIVER.PRG itself. The SAVE SETTINGS command does this automatically. When GFA BASIC Printer Driver is first run, it creates the configuration file with the current driver and decimal display as defaults. Your saved settings will become the defaults the next time you run GFA BASIC Printer Driver.

# We hope programmers will see DRIVER.PRg as a standard in printer drivers.

## Using Printer Drivers

DRLOAD.LST will work with any version of GFA BASIC. The file DRLOAD.LST is an easy way to make use of the drivers created with GFA BASIC Printer Driver. Merge DRLOAD.LST into your GFA BASIC program (any version) and call **Get\_driver** as a subroutine prior to any printing. The driver with the .PDA extension will be read into a series of string variables, named to be easy to remember and use. See the accompanying table for details. To turn wide print on, for instance, simply write **Lprint Wideon\$; Lprint Wideoff\$;** will turn off wide print. The string variable names can be changed to suit your needs or if there are already variables with the same names. Your program listing will be more readable, however, if the driver variable names are somehow related to the printer functions they call.

## Driver Loader Variable Table

PARAMETER	VARIABLE	When you create a printer driver with GFA BASIC Printer Driver, the program saves all of the settings into a special file. Merge DRLOAD.LST into your GFA BASIC program and call the procedure Get_driver early in your program. This will search for a driver with the extension .PDA and load it into memory. Each printer attribute has its own pre-assigned variable whose value is set when the driver is loaded. Then you simply use the variable to send a code to the printer. Easy, huh?
Align (Reset)	Align\$	
Line Feed	LineF\$	
Form Feed	FormF\$	
Page Length	PageL\$	
Italic Print On	Italon\$	
Italic Print Off	Italoff\$	
Bold Print On	Boldon\$	
Bold Print Off	Boldoff\$	
Double Strike On	Dblon\$	
Double Strike Off	Dbloff\$	
Underline On	Undron\$	
Underline Off	Undroff\$	
Right Margin 1	Rtmar1\$	
Subscript On	Subon\$	
Superscript On	Supon\$	
Sub/Superscript Off	Suboff\$	
Wide Print On	Wideon\$	
Wide Print Off	Wideoff\$	
NLQ On	Nlq\$	
Draft On	Draft\$	
10 CPI	Cpi10\$	
12 CPI	Cpi12\$	
17 CPI	Cpi17\$	
6 Lines/Inch	Lpr6\$	
8 Lines/Inch	Lpr8\$	
Right Margin 2	Rtmar2\$	

## Additional Notes

The driver files created by GFA BASIC Printer Driver are stored in decimal characters and can be easily modified with any text editor that supports ASCII format. The parameters are written in the same order of the Parameters box with individual codes separated by commas within any given line. A few sample drivers are included to help get you started.

(There's no reason why GFA BASIC Printer Driver cannot be used with daisy-wheel or serial printers, although I haven't tested it with either.)

You'll find that each printer has its own idiosyncrasies. Even if two printers are claimed to be Epson/IBM compatible, there most likely will be small but important differences between them. Some printers have a separate top-of-form command, while others support only a full reset. It's impossible to combine certain print modes on some printers, such as hold print and condensed (17cpi) print. You can get around these conflicts with creative control codes and pessimistic programming.

For example, instead of sending a simple **Lprint Align\$;** to set the top-of-form, you can add commands to be sure that any previously sent settings will stand in effect. **Lprint Align\$; Cpi12\$;Boldon\$;** for example, will set the top-of-form, 12cpi and hold print. Double-strike print will often work in conjunction with print modes that refuse to operate with hold print.

To make your programs compatible with as many printers as possible, you'll find it best not to combine too many print characteristics at once and to cancel them and reset any original values when they're no longer needed.

We hope GFA BASIC programmers will see DRIVER.PRg as a new standard in printer drivers, and that they will support this format. You may use the code to load a printer driver (DRLOAD.LST) in any program you write (commercial or public domain) provided the Antic copyright notice remains on the program. Additionally, any printer driver you create using DRIVER.PRg may be freely distributed. End users after you create a printer driver, make sure the file extension is .PDA. Now you can use your printer driver with any program that uses the DRIVER.PRg standard. ■

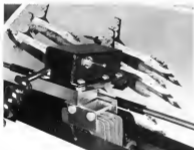
*Ed Frank lives in New London, New Hampshire. This is his first program for START.*

## Review

# ST Pictascan

## Convert Your Printer into an Image Scanner

BY BARON SEKIYA



**Pictascan is small—about the size of a matchbox—and fits on top of the printer head. A one-inch "finger" extends from the box to the image to be scanned.**

A drawing pops out of my printer—but wait!—it wasn't printed out, it was scanned. With Pictascan from E. Arthur Brown, I was able to turn my printer from an output device to an input device. Pictascan is a scanner that plugs into the joystick port on your ST to let you import images from photos and drawings into DEGAS .PI3 format. The package includes mounting hardware for the unit, software to drive it and a manual.

### The Hardware

Pictascan's main housing is a matchbox-sized metal box with a one-inch finger that sticks out to lightly contact the artwork during the scan. The unit rides on top of your printer head as it sweeps over photographs, drawings and other images. The tip of this finger contains both Pictascan's "eye" and a tiny light source to illuminate the scanned material. On the bottom of

the unit is a removable bracket to attach Pictascan to the printer head.

Installing Pictascan is easy. A clamp rides the printer head of my Star SG-80 printer and Pictascan attaches to the clamp. The clamp is made to attach to almost any printer head. The manufacturer also supplies a little plastic piece that can be glued onto the printer head to provide a sturdier bracket mount. Don't worry though, Pictascan won't be permanently glued to your printer

## The Pictascan unit rides on top of your printer head as it sweeps over an image.



On the right is a black-and-white photo scanned with Pictascan; to the left is the result of that scan. The complete image took up a whopping 250K of memory, but the image is easily cropped and saved in DEGAS .PI3 format for a more manageable size.

head—the bracket detaches from the plastic piece easily.

Attached to the back of the unit is a coiled cable approximately five feet long that plugs into the joystick port. If you own a 1040STB520STEM, I recommend that you use a joystick extension cable to save you the trouble of lifting your ST every time you have to plug or unplug the cable.

### The Software

The Pictascan disk consists of PICTASCAN.PRG, the program file, a set of .CNF printer drivers to control the scanning unit and a sample RAW DATA picture file.

The .CNF file lets the scanner read the full width, center half,

half and right half of the page. This is important since you may only want to scan part of a page; and you can even use a 15-inch wide printer to scan material if you have something large to scan. The Pictascan program doesn't use GEM windows, so you can't access any desk accessories.

### The Scan Unit

Pictascan's scan unit has three controls: an on/off switch, a stippling adjustment and a sensitivity adjustment. You'll need a jeweler's screwdriver to adjust stippling and sensitivity on the unit via two small holes in the unit's top. (I think it would have been better if two control knobs had been used instead of the

tiny screws buried in the unit. Even with a jeweler's screwdriver, the adjustment is difficult.)

Run the program, turn on the scan unit and load in the .CNF file for the portion of the page you want scanned. A click on the Send Initialization button sends the necessary codes to your printer. Pictascan's program also lets you customize .CNF files for your printer and the documentation is very clear on how to do this.

The manual presents a walk-through for your first scan and recommends that you use a newspaper photo as your guinea pig. (A newspaper photo is easily scanned because it's made up of dots.)

Scanning line-art is fairly easy ▶

## The Pictascan program doesn't use GEM windows, so no desk accessories.

PHOTOART



This one-dollar bill shows what Pictascan can do with line art. The quality is markedly better than what you get when you scan photographs.

Turn the stippling control off and run a few test scans to adjust the sensitivity. Scanning continuous tone art, such as photographs, is trickier since you must adjust the stippling control for the desired effect. Too much stippling can turn your photo into an indecipherable mess, while too little stippling will leave out most of your picture's details. Half-toned photos like newspapers and magazines reproduce better since the grey areas are just dot patterns.

It takes Pictascan about 15 1/2 minutes to scan a 7 1/2-by-5-inch area. For a 5-by-5-inch area it takes about 6 1/4 minutes to scan. That's one of the reasons you have configuration files so that you don't scan any more than you need.

### Data Files

Since Pictascan scans at over 300 dots-per-inch, your RAW DATA file may be over 250K in size! There's a lot of picture information in that file. Your next step is to size and crop the data file into your final DEGAS picture.

By switching between two full-screen pictures, one for the RAW DATA and one for the DEGAS picture file, you crop what you want to save. Here's where the power of the software lets you control how you want the final picture file to look. You control the image's size, brightness, cropping and distortion. All of the work is done with the mouse. When you're finished you can save both the RAW DATA and DEGAS file to disk.

### Scanning Tips

Since Pictascan has a nasty habit of firing a dot at the start and end of each pass, I suggest you remove your printer's ribbon when scanning. Pictascan does this to let you know what area is being scanned, but I could do without the marring of my photos. In fact, I disconnected the electronic signals to the printer head so it wouldn't fire any pins at all.

Pictascan's eye may get caught on your artwork near the edges so customize your .CNF files so this won't happen.

Many photographs and magazines have slick backings that make friction-feed through your printer nearly impossible sometimes. If you have an adjustable tractor-feed you can make your own sprocket holes in the edge of your artwork. Just use a hole puncher with some computer paper as a guide to align the sprocket holes. I've used this with 8-by-10 prints and it works fine.

I found that the shareware program MegaMatic doesn't work with Pictascan. This is probably due to some problem with its printer spooler. The scanned image went into a stair-step pattern that made straight vertical lines look like the teeth on a buzz saw. If you have a printer spooler it may cause similar problems.

### Should You Buy?

If you're looking for a low-cost way to scan pictures into DEGAS files, Pictascan is a wise alternative to a \$1,000 flat-bed scanner. You also don't need to own video equipment to scan an image. Keep in mind, however, that Pictascan only scans in black-and-white.

The quality of images produced through Pictascan depends on what kind of image you're scanning in the first place. Buy it if you want to scan line art (Pictascan does this very well); better software is needed for photo. ■

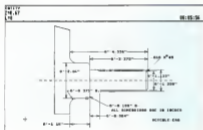
**Baron Sekiya lives in Honolulu, Hawaii where he is a photojournalist. This is his first review for START.**

**ST-Pictascan**, \$149.95. E. Arthur Brown Co., 3404 Pawnee Drive, Alexandria, MN 56308, (612) 762-8847.

CIRCLE 103 ON READER SERVICE CARD

## BetaCAD

BY DAVE EDWARDS



**With BetaCAD, it's very easy to draw very accurate objects with very little effort. You may occasionally wish for other commands not included in BetaCAD, but you should always be able to create the objects you need.**

few commands to get the job done and that the problem with most CAD programs is the sheer number of commands that do exactly the same thing in slightly different ways.

I wholeheartedly agree. It was nice to see a CAD program not designed as if it has to compete feature for feature with every other program. This streamlined approach makes BetaCAD very easy to learn; the end result is that your drawings are done in very short order.

The commands are chosen by holding down the left, right or both mouse buttons and selecting a letter on the keyboard. The commands are referenced by their letter and button combination, i.e., L2 for "L" and the right mouse button. This method keeps both hands going and makes for very fast drafting. A complete list of commands is included with the program so that learning these combinations comes very quickly. The commands can also be accessed through pop-up menus, but the menus stay nicely out of the way until you need them.

As far as command selection, BetaCAD had just about every construction command you'll ever need — and a few surprises. Commands use two different modes of opera- ▶

**W**ith all of the fuss over graphics interfaces, it would seem that they're the panacea for all our computing woes: just point and click and all your software concerns are vanquished. This being the case, it always surprises me when I see "Tips and Hints" for many programs advocating the use of keyboard equivalents to select commands instead of icons or menus.

In the old days of computing, we would always use two hands, but now it seems that computers have become "one-hand bandits." In the CAD area, there's a constant debate over speed and ease of use, as if the

two subjects were mutually exclusive. BetaCAD is a new low-end CAD program that does a wonderful job of bridging this seeming barrier.

#### Enter BetaCAD

BetaCAD is a unique program in many ways and at first threw this old CAD pro for a loop. I have become used to seeing CAD software that always seems to run in the same way. This program takes a completely different approach to CAD — and a very refreshing one. Many of the "normal" CAD commands were missing, but it wasn't until after I had had several phone conversations with the author did I discover the real beauty of BetaCAD. His contention is that you really only need a

tion, either point or entity. Point mode uses "points" for all of its functions and entity mode uses complete objects. To place most objects, you'll locate points that will define the object. There are a variety of ways to place points separately or they can be created at key locations on objects (i.e., the endpoints of lines). I found it very easy to draw very accurate objects with very little effort. At times, I did find that I

wanted to use other commands not included in BetaCAD, but I always found a way to create the objects I needed.

#### Standard Commands Plus

BetaCAD has all the standard commands such as lines, points, arcs, circles and so on. Construction options include trimming, scaling, rotation, etc. The really unique thing about BetaCAD was the number of

commands used to change existing elements. For example, after placing a line you can change its angle or length. You can alter dimensions by just dragging the endpoints to new locations. Other commands include spline, angular dimensions and shrinkage.

What is shrinkage used for? BetaCAD is one of the few programs written specifically for mechanical design (although any kind of CAD can be done with it). The shrinkage command is great for engineers doing designs to be molded in plastic or metal. Shrinkage is always a factor in these designs and now there's finally a CAD program that makes it easy to insure parts are the correct size. In other programs, you have to scale parts by a factor and then rescale them using the reciprocal. BetaCAD does all the calculations for you.

One of the hottest features of BetaCAD is the "BetaBar." This is a bar that shows up whenever a key input is needed. You can enter numbers without hunting for them on the keyboard, but more than that, the BetaBar stores various values used in the drawing and lets them be called up again. For example, say that you've just drawn a box and that now you need a line the same length as one of the sides. Instead of inquiring us to the line's length, you can "load" the BetaBar by selecting the points on the screen; now, this value is available when placing the new line or even when dimensioning.

Another feature that should get rave reviews is BetaCAD's ability to create side views of an object. Points can be placed projected from one view onto another section of your drawing. This gives you a simple and accurate way to define the objects in another view of your project.

I really enjoyed BetaCAD because



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BetaCAD commands are chosen by holding down the left, right or both mouse buttons and selecting a letter on the keyboard. This method keeps both hands going and makes for very fast drafting.

printers is neither provided nor deemed necessary. There are, however, plotter drivers available for Hewlett-Packard and Zencon plotters. The choice of supporting the Zencons is a good move, because they are some of the least expensive plotters available. Once again, streamlined is the code word for output.

it had all the "power" features of the more expensive programs, but left out many redundant commands that can just get in the way. Many commands were a total surprise for a program of this level. You can really tell that a great deal of time went into determining just which commands were needed. The user interface, although not as fancy as, say, DynaCAD, showed much thought

and should make an experienced user very fast indeed.

Hard Copy Output and the Manual Output from BetaCAD is done mostly to dot-matrix printers and the program does a good job of printing. The image can be printed based upon standard sheet sizes or by setting a drawing's scale. This program is designed for the very low-end user, so support for laser

One of the things I would like to see changed about BetaCAD is the manual. Even though I did get an updated version while I was reviewing the program, I felt it could have been better organized for the beginning user. The overview in the front is good, but then it goes immediately to a command reference section listing all of the commands and finishes up with a tutorial. I would rather have seen each command demonstrated in a tutorial and new commands discussed as the tutorial progressed. A big plus for ▶

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## BETA CAD

BetaCAD is that every command in the program has an example given — and a file. This makes it easy to learn each command. I only wish the commands were in a different order.

Additionally, since nobody designs in isolation, it would be nice to have a translator to DXF (AutoCAD format). It would also have been nice if BetaCAD had provided a file format document, so that you could easily write programs to create files to input into the ASCII BetaCAD database.

### Conclusion

This is the way I like to see program-

mers write: get in and get out! Nobody wants to be a slave to a CAD system. CAD should be used as a tool to "hard line" a product design, not to produce the final product. BetaCAD does a great job of giving the user just the commands needed without getting in the way of the design process. BetaCAD should be commended for taking such a noble stand. This is a great program for quick and easy CAD design and is highly recommended, especially for engineers. By the way, BetaCAD was written entirely in GFA BASIC which really surprised me — for a program of this power, you'd think it would have been written in C.

Surprise, surprise! ■

*Dave Edwards is START's resident CAD expert. He is also a MIDI consultant, professional drummer and managing editor of "The MIDI Insider, The MIDI Power User's Newsource."*

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