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#1 GUIDE TO THE ATARI ST

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Volume 3, Number 9 April 1989 USA $14.95 • Canada $19.95

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JIMMY HOTZ AND MICK FLEETWOOD

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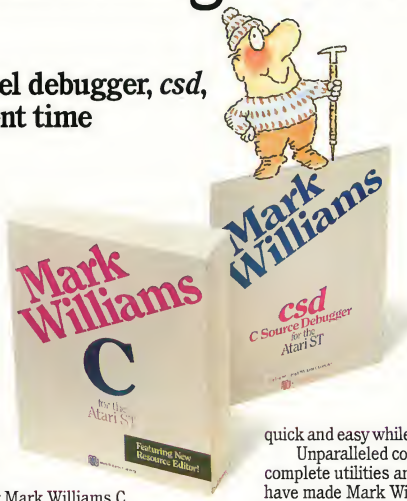

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START®

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PUBLISHER
James Capparell

ASSOCIATE PUBLISHER
John Taggart

EDITORIAL
Andrew Reese, Editor
Heidi Brumbaugh, Programs Editor
Gregg Peartman, Assistant Editor
Tom Byron, Assistant Editor
Marta Deike, Editorial Assistant

Contributing Editors: Tom Hudson, Alex Leavens, Stephen Mortimer, Mard Naman, Jim Pierson-Perry, David Platkin, David Small

Contributors: Jan A. Bell, Marta Deike, Wolf Griffey, Jim Kent, Jamie Krutz, Mihai Manaliu, Bruce Noonan, M.D., Mike Perry, Caralyn Rogers and Scot Tumlin.

CREATIVE SERVICES
Jim Warner, Art Director
Dwight Been, Associate Art Director
Marianne Dresser, Design Production Assistant
Georgia Salkov, Photo Editor
Kate Murphy, Ad Production Coordinator
Julianne Osaska, Collateral Printing Coordinator

Cover Photography: Susan Werner
Art Direction: Dwight Been
Cover Computer Graphics: Andrew Reese

ADVERTISING SALES
Austin Halian,
Western Region, (415) 957-0886
David Kester
Eastern Region, (415) 957-0886

CIRCULATION
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ADMINISTRATION
Marguerite Birch, Credit Manager
Fidez Bituin, Accounts Receivables Supervisor

General Offices, Catalog Customer Service: (415)957-0886, 8 am to 4 pm Pacific Time. START, 544 Second Street, San Francisco, CA 94107. **Credit Card Subscriptions and Catalog Orders:** (800)234-7001. **Subscription Customer Service:** For change of address and inquiries, include subscription label and write to START Subscriptions, PO Box 1569, Martinez, CA 94553 or call (415)372-6002, 9 am to 4:30 pm Pacific Time.

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Editorial

As I write this, it's the first day of Winter—but you'll read this as Spring arrives. It's difficult to prognosticate the state of the Atari world two or three months from now, but certain events have occurred recently that may foretell significant changes in Atari's U.S. fortunes.

Atari President **Sam Tramiel** announced at COMDEX last fall that 1989 would be the year Atari returns to the U.S. market in force. A number of new products are scheduled for 1989 release, everything from the Laptop ST to the ATW to the TT. Everyone we've spoken to at Atari has seemed very upbeat about Atari's hopes and plans. Although it's easy, based on 1988's experiences, to be skeptical about what may "really" happen with Atari, things do seem to be changing.

For example: every month I stop in at my local (and excellent) Atari dealer, Software 1st in Santa Rosa, California to keep current on the dealer situation. On my last visit, I was amazed to see a stack of previously scarce **1040STs on sale**. There were also ample supplies of 520s, Mega 2s, Laser Printers and peripherals—everything a prospective computer buyer could want. This is a wonderful change that bodes well for 1989: dealers will actually have Atari computers to sell. Plus, with Atari signing up 30 percent more new dealers, there will actually be Atari dealers to sell the products.

And there's more. In this issue of START, we present an exclusive interview with record producer and inventor **Jimmy Hotz** that reveals what may be the most spectacular advance in music, well, since the piano. And what computer is the new Hotz Instrument designed for? The ST, of course. We hear that higher-ups at Atari are *very* interested in this new creation, so much so that it just may carry an Atari label, if things go well.

Along with the new this issue, we've also included a touch of the old: the latest incarnation of ST Writer. Dr. Bruce Noonan picked up the ST Writer banner from Atari a few years ago and has carried it well and proudly since. **ST Writer Elite Version 3.0** adds some features that everyone has asked for, like ASCII Save and direct Atari Writer file conversion. To top it off, we've included German and Spanish versions, as well.

We also have for you the **absolute fastest hard disk copier** anywhere. Would you believe one megabyte every four seconds? Naturally, it's by David Small. Look for it in his column, Small Tools.

If you want to have some fun, try **Poker Solitaire** on this issue's START disk. If you're a programmer, check its source code. Poker Solitaire is written in Modula 2 and it's the first program in this language that we've published.

This issue is full of the regular features, columns and reviews you've said you want, like Getting Started, Mac & PC On the ST and MIDI news and reviews. But in honor of this issue's April cover date, we've added a touch of humor here and there. Like Dave Plotkin's **New TOS Error Codes**, a review of the **Binary Bible** and a "serious" analysis of Single Instruction Set Computers.

Enjoy! Have a laugh with us at the same time you're using all the great programs in this issue. ■

Andrew Reese
Editor
START, The #1 Guide to the Atari ST

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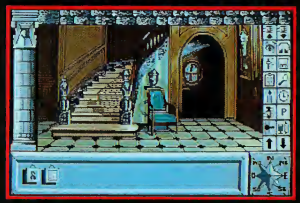
CHRONO QUEST



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You will be presented with many objectives; ultimately you will have to travel through time to collect the fragments of magnetic card to drive the Time Machine into the future. There you will have to . . . Meanwhile, the immediate objective is to find the time machine . . . Sorry, a more Immediate objective is to find the room with the time machine in it . . . But its dark . . . Very sorry, an even more Immediate objective is to be able to see where you are going . . . 3 hours and 250 minutes and even more immediate objectives later, you are standing in the hallway thinking . . . hellpppp!!!!!!!

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Dialog Box

Letters From Our Readers

Buenos Dias

Since your article "ST Writer Returns" in the Fall 1987 issue I've been anxiously awaiting the new ST Writer in Spanish. I have checked with the dealers here, and they don't have any information.

Also, I've been using your program STARTKey from the Winter 1987 issue, but I have a problem with it and many similar programs. I use my Atari 520ST with an autobooting hard disk, without an A or B drive. In order to use START-Key, I have to have MACROS.MAX drive A. How can I get around this?

Brigitte Tetzner
Caracas, Venezuela

You're in luck! The Spanish version of ST Writer is on this issue's START disk in the file SPANSTW.ARC. This is the newest upgrade of ST Writer Elite (version 3.0), with all known bugs fixed and some exciting new features. Read Bruce Noonan's article in this issue for details.

There are two ways to solve the START-Key problem. One is to edit the path name for the default macro file in the STARTKey source code and recompile the accessory. The other is to edit the STARTKEY.ACC file directly, using a program such as Byte Mechanic from Special Issue Number Four of START. Simply load the file into Byte Mechanic and replace both occurences of A: with, for example, C:. (The first A: refers to the drive to load macro files from; the second, the drive to load MACROS.MAX from automatically at boot time.)

You can modify most programs and desk accessories this way, but edit the file using Byte Mechanic's "overwrite" mode so you don't change the length of the file, as inserting even one additional byte can cause the program to crash. Given this limitation, you do have a good deal of flexibility in customizing the file. For example, you can change A:MACROS.MAX to C:MACROS.MAX or, if you want to store your macros in a folder, C:\M\MAC.MAX.

Always work from a backup copy of the program. Since this is a desk accessory, test it by booting from a floppy disk with the hard disk disconnected so you won't hang up your hard disk at boot time if something goes wrong.—START Editor.

Videotrax VCR Backups

I enjoyed reading about our Videotrax VCR backup product in Dialog Box (December 1988). However, your response to a reader's request for information about our product was incorrect by stating that "one such product is Central Computers Product's Videotrax." Videotrax is actually a patented product from Alpha Microsystems, while Central Computer Products is one of our Videotrax resellers.

Additionally, Alpha Micro has been utilizing the Videotrax technology (hard disk back up to a VCR) for eight years. The reliability of this system actually exceeds that of the hard disk itself by providing a reliability ration of 1 X 10-11. Add to that the convenience of being able to use your own VCR, plus being able to store 80 megabytes of data on a standard two hour tape and you can see that this is truly one of the most exciting technologies in computers today.

Alpha Micro incorporates this technology in its own line of super microcomputers, as well as the IBM PC and clones and PS/2 family of computers. We are working on a version for the Macintosh which will utilize an external SCSI box. This SCSI box has been of interest to OEM/Developers, several of which have expressed interest in developing this system for use in the Atari market.

Denny Michael
Manager, Videotrax
Alpha Microsystems
P.O. Box 25059
Santa Ana, CA 92799
(714) 957-8500

Thanks for correcting us and letting our readers know the status of this important product.—START Editor.

Vanna, Let's See the First Letters!

I just received my January 1989 START with disk, and eagerly tried out the Xref program. It ran okay, but the variables all had their first letters removed! The removal of the first letter was not a printing error, since the variables were sorted by the (original) second letter. Please let me know of a fix as soon as possible, since I could definititely use this program.

Chris Williams
Columbus, OH

Xref requires that all variables, procedures and function names be in lower case letters and GFA BASIC keywords and commands ▶

Dialog Box

be in upper case. To set the file up correctly, run GFA BASIC and load the program you want to cross reference. Press the Esc key to enter command mode and type DEFLIST 0 and press Return. Press the Esc key again and Return to go back to GFA's menu screen, then save the file in ASCII format (Save,A) with the extender .LST.—START Editor.

START Back Issues

I have a complaint. I am a devoted START subscriber, since 1987. A couple of months ago, I wanted to learn the format of block files created by DEGAS Elite. The DEGAS Elite manual merely referred me to Tom Hudson's article in the Fall 1986 issue of START. I tried to get the information directly from Tom over CompuServe, but he didn't answer, so I called your office and explained what I wanted. The woman who answered said that all she could do was to sell me the START issue.

So, I ordered it, to the tune of something like $18.95 (including handling charges, I guess). Since then, I learn from a recent START issue that you do have a policy of sending copies of articles for only $1! That is exactly what I needed. Now, I'd love to sell you back the issue which I did not need. I don't expect you to refund the $18.95, but would you credit it to my subscription account, toward future issues? Then I wouldn't feel ripped off at having paid almost one-quarter of a year's subscription fee for an issue I never wanted.

Alan Pollack
Newton Centre, MA

I'm afraid you're confusing apples and oranges, Alan. Our policy is that we will make a copy of an article for a reader for any issue that is sold out. *Unless an issue is sold out, however, any reader wanting an article will have to purchase the entire magazine.*

Because disks for all issues are still available, this policy is primarily a service we provide so that readers can receive documentation for a program on a back-issue disk they've ordered. If you request such an article, be sure to enclose a self-addressed, stamped legal size envelope and $2 for each article for handling. Sorry about the price increase, but what was originally intended as a one-time offer has become an industry in our office, and a costly one at that!

Sorry you feel "ripped off." I hope that when you examine the disk and magazine you purchased, you will find you received a good value.—START Editor. ■

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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.

Alert Box

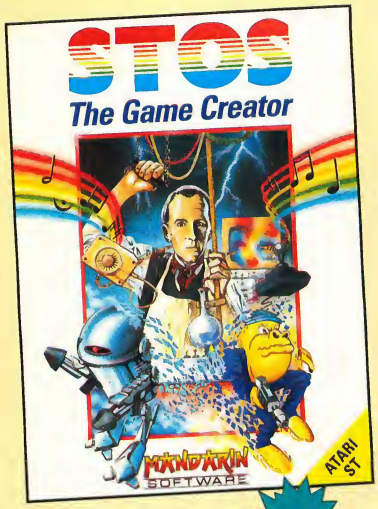
The Tortoise and the Hare

Dave Small's Meg-A-Minute Elite hard disk backup program (November 1988) is speedy as a hare and, since it doesn't sleep on the job, it could easily win Aesop's famous race. If Meg-A-Minute Elite finds a problem in the hard disk, it will alert you that it is performing a "slow read" of the sector. In this case, slow and steady is not the best policy—*the backup disk is simply not to be trusted.* The danger is that if the problem carried over to the backup disk, you won't find out about it until you're in the middle of a recovery operation, that is, until it's too late. Because Meg-A-Minute Elite uses an *image* backup system, one bad disk can cost a number of files.

The best practice when you discover such a hard disk problem is to perform a *file* backup with a utility such as Turtle, George Woodside's public domain program, then reformat the hard disk and recover your drive from the file backup. ■

Wrong Address

In the product information to Editor's Choice (START, January 1989), we listed the incorrect address for the Mark Williams Company. The correct address is 601 Skokie Highway, Lake Bluff, Illinois 60044. Our apologies for the mix-up.



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TAITO

COMING SOON, THE CLASSIC MIND GAME, QIX.

News, Notes & Quotes

What's Happening in the Atari World

by Stephen Mortimer
and the START Staff

ST Makes Sports Cards

Toronto-based Photopreneurs, Inc., has released their Sportscard system, based on an ST and the Atari SLM804 Laser Printer. The Sportscard software was written by Alan Page, author of Flash and X*Press and now an employee of Photopreneurs. The system is used to create personalized sports cards similar to those of professional athletes. The Atari system is used to create the backs of the cards. The name, date of birth, height, weight, team, position and sport are entered into the software that then prints out a custom card on the Atari Laser. The card is then combined with a picture and heat-sealed in a plastic holder.

Photopreneurs chose the Atari system for its fast, quality output and inexpensive price compared to other systems. The system will be sold to concession stands at amusement parks, sports arenas and other locations.

Atari Games Sues Nintendo

Atari Games Corporation of Milpitas, California (not affiliated with Atari Computer of Sunnyvale), has filed suit in Federal District Court charging Nintendo, the home video-game giant, with several antitrust violations. The lawsuit follows an earlier Atari decision to develop and market its own game cartridges for the Nintendo hardware.

According to a recent story in the *Wall Street Journal*, Atari's decision threatens to undermine Nintendo's recent lock on the lucrative home video-game market. With control of 80 percent of that market, Nintendo of America, Inc. expects 1988 sales of over $1.7 billion. Much of the growth has come from careful control of the development and distribution of its games. Atari alleges that this control is expressly meant to stifle competition.

Epyx Wins Copyright Suit

In what has been called a "major victory" in the software copyright field, a Federal Court of Appeals reversed an earlier decision that Epyx, Inc. had violated copyrights of Data East, a Japanese video-game maker.

The suit, brought against the computer game publisher based in Redwood City, California, was an attempt to secure copyright protection for Data East's Karate Champ Game. The appellate court upheld the right of game developers "to create and distribute products that express the same ideas, even if the products are similar."

Commenting on the decision, Epyx chairman and CEO David Morse said, "We believe this is the first time in the computer industry that a 'look and feel' lawsuit has been decided in favor of the defendant."

Ethernet Comes to the ST

The TAXI controller board lets the ST connect to Ethernet networking systems and has many other options. Developed in Canada, TAXI stands for The Atari eXtended Interface and is being developed by FutureDOS. TAXI comes in three configurations: a stand-alone box with its own 68000 processor, a board for the Mega's internal bus connector, or a unit that connects to the DMA port on 520 and 1040 ST systems.

TAXI can be custom-designed for each application. Features available on TAXI include the aforementioned Ethernet interface, a true SCSI interface, up to eight full duplex bidirectional serial lines and two parallel printer interfaces.

The Ethernet interface will be the first one available in the United States for the ST. Ethernet is one of several industry-wide communications interfaces and is used on PCs and mainframes. An Ethernet network among ST systems will allow file serving and peripheral sharing in addition to the ability to interface with almost any computer. The serial lines allow the ST to act as a multiplexing system between computers and serial peripherals.

According to Avygdor Moise of FutureDOS, TAXI will cost "somewhere between $1,000 and $2,000," depending upon component costs and options installed. TAXI is still under development at press time. For more information, contact FutureDOS R&D, 1207-120 Torresdale Ave., North York, Ontario M2R 3N7, (416) 736-0321. ▶

News, Notes & Quotes

Atari Third-Quarter Results

Atari Corp. achieved sales of $153.9 million for the third quarter of 1988, an increase of 91 percent over 1987. In the same period, operating income fell $15 million to $5.2 million. Net income was down $9 million to $900,000. For the first three quarters this year, sales are up 126 percent due in part to the purchase of Federated Group. Overall, net income has fallen from last year's $38.7 million to $12.1 million.

The Computer-and-Video-Game division accounted for $97 million of Atari's total sales. This represents a 21 percent increase over the $80.4 million of the year before. Operating income was $11.9 million compared to $15 million.

Growth of the Computer division was restricted by the high price and shortage of memory chips. The higher cost of memory chips adversely affected profit margins and contributed to the lower earnings. Also, Federated Group had an operating loss of $6.7 million on sales of $56.9 million.

Positive notes include the announcement of a contract between Atari and a major DRAM producer that assures Atari of enough chips to expand the Computer division in 1989. Also, research and development expenditures were almost $6 million, the highest they have been since the fourth quarter of 1987.

Calamus Update

ISD Marketing, distributors of Calamus, the desktop publishing program for the ST, has just signed a major agreement with Font Technologies, a subsidiary of Compugraphics. The nature of the agreement involves the licensing of 84 Compugraphic Fonts, beginning in February 1989. Some of the fonts include Garamond, Old English and Cyrillic.

An interface has been developed for the ST that allows Calamus to print directly to Linotronic typesetting machines at resolutions in excess of 2,000 dpi. The interface connects from the ST directly to the LI-2 port on the Linotronic machine and actually bypasses the RIP (Raster Image Processor). ISD hails this as a major breakthrough for DTP on the ST.

Fat Bits

• In the laptop computer race, Atari seems to be the winner. According to Apple chairman John Sculley, a laptop version of the Macintosh probably won't be available until the end of 1989. As reported in the March News, Notes & Quotes, Atari's laptop prototype was unveiled at the Fall '88 COMDEX and is scheduled for a first-quarter '89 release.

• Atari had over 20 positions open in its Computer Systems Engineering Development group in the fourth quarter of 1988. These positions opened as a result of Atari's expansion into the UNIX market in addition to expanding their current capabilities. Positions were available for product engineers, software programmers, drafters, managers and product test-and-support personnel. Three positions were also available in Atari's integrated circuit group.

• The Spectre 128 Macintosh emulator will soon be upgraded to read and write Macintosh disks. The Spectre GCR upgrade will be available to all current Spectre 128 owners. GCR stands for Group Coded Recording, the method used for storing data on Mac disks. Contact Gadgets by Small for more information.

• A new version of Fleet Street Publisher, formerly marketed in the United States by Spectrum Holobyte, will be available from MichTron in January 1989. Version 2 will support a wide variety of printers, including Postscript, and the ability to load text from any ASCII word-processing file. If you send Fleet Street Publisher Version 1 (or any other desktop publishing program) and $50 to MichTron, you'll receive a copy of Fleet Street Publisher Version 2.

• The number of Atari computer dealers appears to be mushrooming. In the fourth quarter of 1988 alone, the count was up 30 percent over the previous quarter.

TOS 1.4

After many months of development, TOS 1.4 is nearing release. It may in fact be available by the time you read this. Atari is considering the release of a disk-based version of the new TOS before the ROM-based version is available.

According to Atari, the new version of TOS fixes almost every known bug. There are also many new features that the user will appreciate. It is faster in almost every respect, especially with hard disks. With several minor changes, TOS 1.4 is compatible with the 68030 processor that is reported to be the heart of the forthcoming Atari TT.

The major changes in TOS 1.4:

- The 40-folder bug has been alleviated to the point of improbability. A folder only takes up space when "active." The only limit now is the depth of folders and the accumulated depth of open files. FOLDRxxx will still operate properly.
- Soft Reset ("warm boot") is now available from the keyboard by pressing [CTL][ALT][DEL] simultaneously, if the standard keyboard handler is used.
- A keyboard Cold Boot is available that clears all available memory by pressing [CTRL][ALT][right SHFT][DEL] simultaneously.
- Floppy formatting is "more compatible" with IBM-PC format.
- A file may be moved (i.e. copied and deleted) in one operation.
- File Copy/Delete/Move can be interrupted with "undo."
- GEM programs can be autobooted from disk.
- If a name conflict occurs during a file copy, Copy/Skip/Quit are allowed.
- A folder may be renamed via "Show Info."
- The static file allocation limit of 400 is removed; the only limit is now free memory.
- "Show/Print File" routines are completely rewritten.
- File copying on a single floppy system uses all available memory for buffers to minimize the number of disk swaps.
- Improvements have been made to the detection of disk changes.
- All date separators are now "/".
- Sector buffering has been greatly improved, and "CACHExxx" allows expansion of the buffers.
- The File Selector has had a major rework, to wit: there are now 16 drive buttons; an application can send a "title" string to FSEL; FSEL now takes the first <RETURN> on the edit of a pathname as the end-of-edit; FSEL remembers where it was in a file list; static file allocation of 100 files is removed; long pathnames and "ABORT/CONTINUE" are now handled correctly; the current DTA buffer addresses, clip rectangles and default directories are preserved and new bindings are available.

Programmers should also find the following additional changes interesting:

- "wind_update(FALSE)" is set when recovering from an application crash.
- "appl_init" returns version 0130 in global(0).
- Editable fields may now be followed by non-editable characters in dialog boxes.
- "wind_get()" with field parameter WF_SCREEN returns address/length of AES menu/alert buffer.
- "Ptsin" (VDI) allows 512 vertices (true since 4/22/87).
- "vqt_extent": Pixel errors on some 270 degree rotations are fixed.
- "vq_mouse" reliability is enhanced.
- The "Malloc" restriction of 20 blocks/process has been lifted.
- File Allocation Table searching code for floppy and hard disks is *much* faster.
- "Frename" can now rename a folder.
- Archive bit (0x20) is now fully supported.
- Time stamps for "." and ".." are now correct.
- "Fsettime/Fsetdate" match the BIOS and GEMDOS values.
- "Fdatime" input value byteswap is fixed.
- Major improvements have been made to "Ccon*" and redirection in general.
- OS Pool has been reduced to the same size as 11/20/85 ROMs (pre-Mega). This may allow some programs which fail on Mega ROMs to work again.
- Rsconf(-2,-1,-1,-1,-1,-1) returns last baud rate value set by Rsconf.
- Structure of the reserved part of DTA has changed, and remains reserved. ■

Stephen Mortimer is a Contributing Editor for START.

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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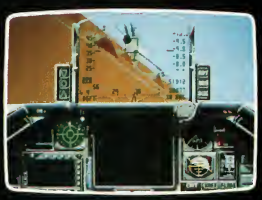

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Products Update

New ST Software and Hardware

Compiled by Tom Byron
START Assistant Editor

New Games from Broderbund, Taito and Datasoft

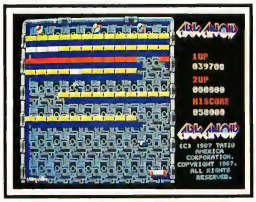
It's the 25th Century and the Olympics are passe—welcome to the age of **Space Racer**! Space Racer brings the excitement of arcade-style graphics and animation to the ST. The game is a full-featured racing simulation with a program depth that's extraordinary: three

Space Racer

planets, three different racetracks and a never-ending stream of hard-riding opponents. Space Racer, $29.95. **Broderbund Software, Inc., 17 Paul Drive, San Rafael, CA 94903, (800) 527-6263.**

Nonstop action thrusts you into a do-or-die battle for survival and thrills you through 33 screens of challenge and excitement in **Arkanoid**, the first game Taito has ever developed for the ST.

As the defender of the galactic cruiser Arkanoid, you must use fast thinking and quick reflexes to control a vaus (paddle) to keep your energy balls in play. Gameplay involves chipping away at increasingly difficult layers and



Arkanoid

patterns of bricks. The 33 exciting levels have notorious twists that test the skill of even the most experienced gamester. Special capsules drop into play, giving the vaus a variety of extra powers. Arkanoid, $34.95. **Taito Software Inc., 267 West Esplanade, North Vancouver, BC V7M 1A5, (604) 984-3344.**

Firezone from Intellicreations (distributed by Datasoft) is a one- or two-player game that provides countless possibilities. It's the year 2160, and Earth has fragmented into four hostile Power Blocs. Battles between these Blocs are fought in close support campaigns called Firezones which involve the latest propulsion systems, beam weapons and energy shields.

Firezone features nine separate campaigns of varying difficulty and length. Combat takes place over realistic terrain that includes urban areas, marshes, ruins and woods. Firezone also has a Scenario Generator that lets you invent new combat campaigns. Firezone, $34.95. **Intellicreations (distributed by Datasoft), 19808 Nordhoff Place, Chatsworth, CA 91311, (818) 886-5922.**

Firezone

Signum 2

Signum 2 is more than a word processor, it's a *document* processor that allows the preparation of high-quality, high-accuracy documents to be produced on 9-pin, 24-pin and laser printers. No longer are you restricted by a line format: Signum 2 allows for the exact positioning of every character on a page. Signum 2 comes with eight different fonts, including several text variations, a Greek font and the best math font available for the ST.

Signum 2, $449.95. **Scan-Tech Business Systems, Ltd., Box 9, P.O. Sub #11, Edmonton, Alberta T6E 2G0, (403) 446-1337.** ▸

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-Martyn D., U.K.

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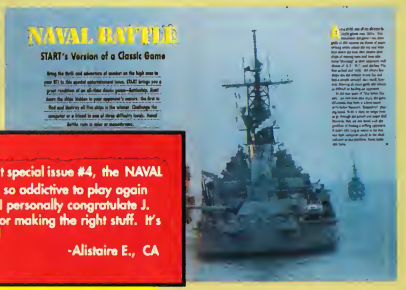
- Ivan T., CA



"In the last special issue #4, the NAVAL BATTLE was so addictive to play again and again. I personally congratulate J. Hutchinson for making the right stuff. It's a winner!"

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Products Update

Horse-Racing Simulations for the ST

If you enjoy going to the tracks and betting on your favorite thoroughbred, you'll like these two horse-racing simulations now available: **A Day at the Races** from Team Software and **Daily Double Horse Racing** from Artworx.

A Day at the Races combines the thrill and excitement of horse racing in a realistic and exciting software package. It includes a comprehensive horse racetrack simulation; a database that tracks up to 500 horses, 50 jockeys and 15 players; a separate database that maintains past performances of the various horses; and complete statistical histories of all the horses and jockeys. A Day at the Races also lets you buy and sell horses, select jockeys, place bets and receive payoffs. A Day at the Races, $39.95. **Team Software, P.O. Box 7332, Washington, DC 20044, (703) 533-2132.**

Spend a day at the track with a full card of 10 races when you play Daily Double Horse Racing from Artworx. This simulation provides you with a racing form that includes past race histories of 180 horses and 12 jockeys competing in nearly 400 races. With this information you can handicap races, taking into account the horse, jockey and track conditions. All types of bets are acceptable—straight wagers, parlays, quinellas, exactas and, of course, daily doubles. The races are run with spectacular animated 3D scrolling graphics. Daily Double Horse Racing, $29.95. **Artworx Software Company, Inc., 1844 Penfield Road, Penfield, NY 14526, (716) 385-1603.**

Aussie Joker Poker

Aussie Joker Poker, the popular Australian computerized card game, has made its way to the United States. In Joker Poker, the computer acts as both dealer and croupier, and distributes the winnings at the end of play. Up to 90 players can compete against one another, and can tailor deck sizes and hands per player.

Aussie Joker Poker was developed by Joker Software International and is distributed in the United States by Mindscape. $49.95. **Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062, (312) 480-7667.**

Up to 90 ployers can enjoy Aussie Joker Poker, the popular Australian computerized card game now ovoilable in the United States from Mindscape.

Prospero C

Prospero Software has released **Prospero C**, one of the first full implementations of the proposed C standard for the ST. The package includes a workbench for easy programming; four-window programmer's editor; a C syntax checker; a C compiler; a linker to build .PRG files; a command line operation support; a cross-reference program; a symbolic debugger; complete GEM AES and VDI bindings; and over a thousand pages of documentation.

Prospero C's output can be mixed with object modules produced by Prospero's Pascal and Fortran compilers. This implementation of C is exactly that of the new ANSI specification, with no exceptions or restrictions. A complete GEM-based programmer's environment makes the use of the editor, compiler and other utilities quick and easy. Prospero C, $149. **Prospero Software, Inc., 100 Commercial Street, Suite 306, Portland, ME 04101, (207) 874-0382.**

Do you have a new ST product? If so, we'd like to hear from you. Please send any press releases and product photos to **Products Update,** *START, 544 Second Street, San Francisco, CA 94107.* ■

Products Update

You Heard It Here First

Rumors? You want rumors? Well, rumors we got. START's usually reliable grapevine has turned up several amazing new Atari products (although Atari hasn't actually confirmed the existence of any of them).

• Atari's long-awaited LLP805 Laptop Laser Printer was displayed for the first time at a private soiree in the home of a high-ranking Atari official. The new LLP805 operates with any ST or Mega computer with at least a megabyte of memory. Resolution is an outstanding 300 dots per inch and power consumption is a modest 650 watts. Due out in June, 1989, the price is tentatively set at an amazing $999.95; the 242-pound power pack, however, will list at $1,399.95.

If you're waiting for the laptop ST, you'll love the idea of Atari's new $2,000 Laptop Laser printer. It fits comfortably on almost any (large) lap.

• Atari's new Cray Supercomputer Simulator (CraSS) lets you turn your 520ST into a working replica of one of the computer industry's most impressive beasts. The CraSS will be shown at the May 1989 PUXFUT Show. The CraSS is reasonably priced at $129.95, but before ordering, you should make prior arrangements for installation of the required air-conditioning units (approximately nine tons, $62,999) and 27 two-inch tape drives ($3,999 each). The interface cable will be available at $9.98, as soon as Atari receives some more connectors.

The new Expondoble Memory Storoge Unit (EMSU) is Atari's lotest breokthrough. Now you con see your doto, too.

• In another amazing breakthrough, one that could completely revolutionize the computer industry, Atari's Expandable Memory Storage Unit (EMSU) lets you see your data as you save it. No more "Disk Full" error messages—just peek through the EMSU's custom translucent Data Housing to see if there's still space for your file. The only shortcoming of the EMSU has been sudden decompression data loss, but Atari's engineers are working on the problem. Due out "in six weeks," the price still has not been determined for the EMSU.

The Worst of Times

Just released, *A Tale of Two Cities* is the third in LitWare's "Extremely Minor Characters in Major Classics" graphics adventure series. *Tale* puts you in the dainty, high-button shoes of Miss Pross, companion to Lucy Manette, as you try to throw a monkey wrench into the French Revolution. Written for literature buffs, LitWare's newest game lets you enjoy Dickens' turgid prose, while your character does virtually nothing to advance the plot. In LitWare's earlier releases, you took the role of the royal busybody, Osric, in *Hamlet*, and the role of Cupcake the policeman in *Compromising Positions*. Comes on 52 single-sided or 26 double-sided disks.

Tale of Two Cities, $49.95. LitWare, a division of Oedisoft, Inc., 1 Schplimper Way, Fetid Brook, TX 78901-7878, (800) 391-3855. ■

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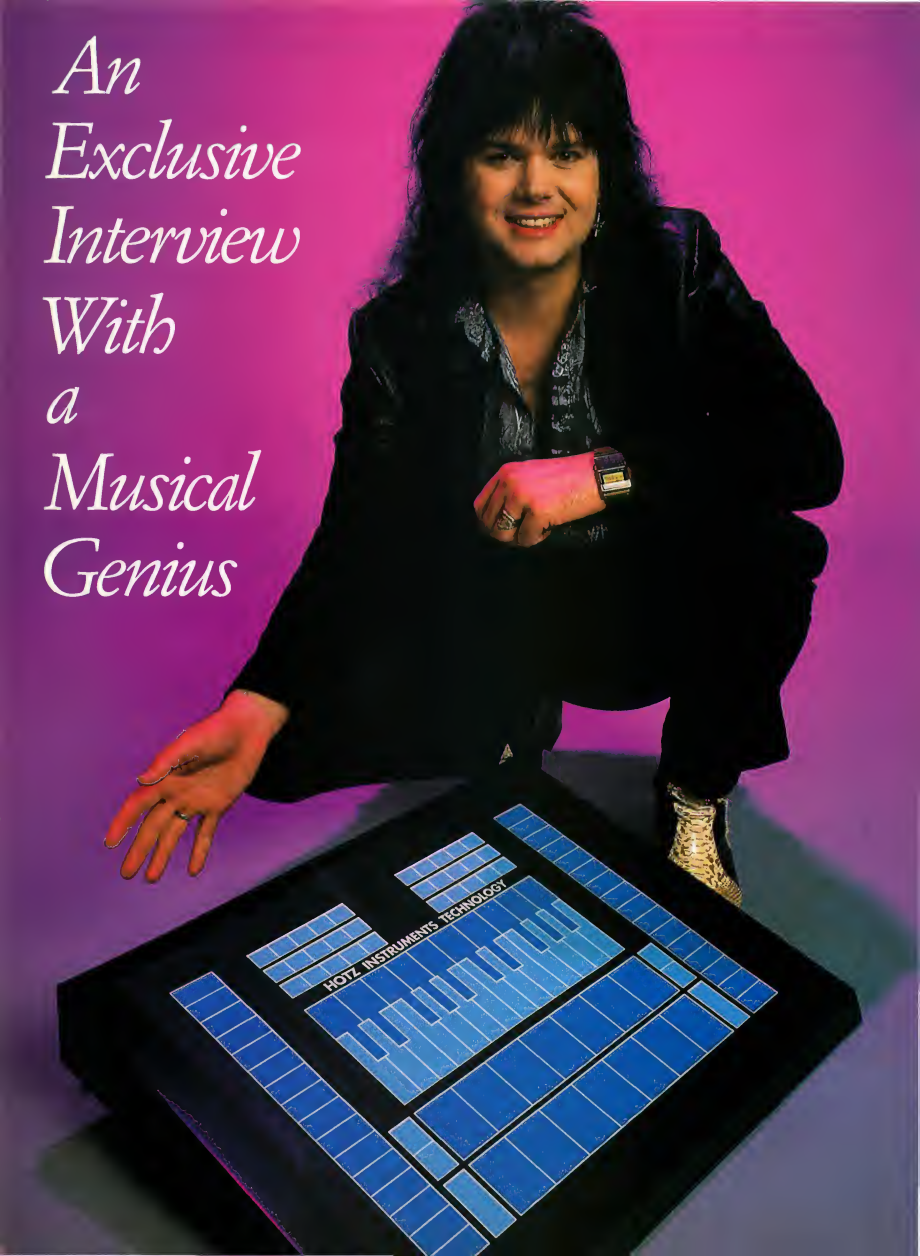
An Exclusive Interview With a Musical Genius



JIMMY HOTZ'S MIDI Magic

by Mard Naman
START Contributing Editor

Jimmy Hotz has made quite a reputation for himself as a record producer and MIDI expert. But that's nothing compared to what he's doing now: he's invented a new way to make music, one that will not only make everyone a musician, but expand the musical horizons of the profession. In this exclusive START interview, Jimmy tells how the Hotz Instrument came to be and why it's the hottest thing in music since MIDI.

In an ordinary suburban house in an ordinary Southern California neighborhood, something quite remarkable is going on. It's December, 1988 and record producer Jimmy Hotz is putting the finishing touches on his new invention: a musical instrument that may revolutionize the way we compose and play music in the 1990s and beyond.

Claims Hotz, "Anyone who can tap his foot or play drums on the table can make incredible music. Anyone who wants to be a musician *can* be." What is he talking about? Is this a joke? A pipe dream? Pure hype? No, what he has is real: an instrument that is almost idiot-proof for the non-musician, yet one that opens up new worlds of possibilities for the accomplished musician. He has created an instrument that is far ahead of anything else around.

And the computer Hotz built his instrument to play with? The Atari 1040ST, of course.

A Musical Revolution

Very few people have even seen this instrument yet. One of the lucky few is Frank Foster, Atari's national director of specialty markets and a man who knows the music industry very well. He is unequivocal in his praise. "I think this is going to revolutionize music – not just education, but the way professionals perform, the way composers compose and the way filmmakers make film."

"There are four things that really make this revolutionary," says Foster. "First, its incredible velocity sensitivity. I've never seen anything like it in any other controlling device. You can give expression to the music very easily. Second, the layout that accompanies that ease of use makes the dexterity of your ▶

fingers less important than with other instruments. It's easier to play than any other keyboard. Third, computerized translation through the ST means you don't have to have scales memorized or music theory memorized. Fourth, it's modular, which makes it real easy to mix and match. If you're a computer hobbyist, you might have one configuration; if you're a professional musician, you might have a complete surround system where you can play back entire orchestras at one time."

That Jimmy Holtz is the man to put this machine together should come as no great surprise. For years, he has been the pied piper of MIDI, leading superstars such as B.B. King and Fleetwood Mac into the wonderful world of MIDI on the Atari 1040ST. His special skill has been to make MIDI accessible to musicians who would not otherwise use it. But now he has taken it a step further, because he says he can turn anyone into a musician and elevate an existing musician's musical output to levels he or she never dreamed possible.

To prove his point, Hotz invited START Magazine to his Thousand Oaks, California home for an exclusive look at the very first prototype. It is the first interview ever given about his invention.

A Man With a Mission

Hotz is a family man who has been married for 16 years and has four children. But he doesn't look like your typical suburban husband. He looks more like a singer you might catch on MTV at two in the morning. Rod Stewart rooster hair, only jet black. Earring, dark eyes. The Glitter Rock look. So it seems a bit incongruous when he speaks to you in his down-home Texas accent, thick as 90-weight oil. Underneath all this, one is struck by two things: his enthusiasm and his sincerity. He's a man on a mission to bring better music to the world.

Hotz demonstrates his instrument by having me pound away on it while the Fleetwood Mac song "Seven Wonders" (from last year's Tango in the Night album) plays. As I listen to my contribution, I soon feel like another member of Fleetwood Mac, a studio musician backing up Stevie Nick's vocals. Miraculously for me, I am always in key, sounding pretty good and never making a mistake. The reason I am able to play so flawlessly is that Hotz has formatted the right tables (the chords and scales for this song at any given moment) into the instrument. He calls this the "Hotz code." I realize "Seven Wonders" is an appropriate demonstration song, since his invention may be the seventh wonder of the electronic musical world.

Anyone who can tap his foot or play drums on the table can make incredible music.

"With my invention, you may play along with a Hotz-coded song, while hearing it for the first time, simply on feel and emotion, without the restraint of mental musical arithmetic, yet still add your contribution, the same as if you hired some hot studio musician," says Hotz. "This is definitely not a chord organ. As long as you have loaded the proper tables that come with the recording, it can sound amazing. If the wrong tables are put in, instead of providing wonderful life-giving results, it could sound terrible." (This will help prevent illegal duplication of recordings in the future.)

Bon Jovi Does Jupiter

Hotz envisions many things. "You know those shows where people used to lip-sync along with the songs? Well, we could have people get up and play this instrument along with the latest hit record, without any prior experience." The possibility of spontaneous reaction is limited only by the imagination. "You might even have something come out in the future like Bon Jovi recording Jupiter by Holst, only it sounds like the London Symphony Orchestra—something you never really expected," he says.

One of Hotz's biggest fans is Mick Fleetwood, drummer and leader of the phenomenally successful rock band Fleetwood Mac. Says Fleetwood, "Jimmy is such an electronic musical wizard with far-out ideas, that sometimes people don't believe what he says. But I've known him long enough to know that when he says he can do something, he can do it. He has real vision, so far beyond most people that they think he can't be for real. But he is. He comes through every time."

For Fleetwood Mac's new album, scheduled to be released in 1989, the plan is to have the Hotz code formatted into the CDs, meaning that anyone who bought Hotz's instrument could play along with the record as another member of the band. Playing along interactively is great fun, and the possibility is there for every CD released in the future to be an interactive recording that incorporates the Hotz code.

Notes Hotz, "It hardly uses any memory; compared to putting out conventional MIDI scale and chord where you duplicate the recorded parts, it is so efficient that I could put the tables and changes for an entire album in less than 100K. Conventional MIDI data duplication could require several megabytes to do this sort of manipulation, but with Hotz code, 64K of RAM and a cheap microprocessor will suffice. These won't bring up the price of an average CD player beyond the reach of the masses."

Everyone Hotz works with, from B.B. King to the Scorpions, plans to imple-

ment this on future CD's or similar digital technology. "I envision a time when all releases will have this, or they won't be purchased," says Hotz. Imagine, every time you buy a CD, you could play along with your favorite band with little or no training and contribute musically.

The Hotz Instrument

The instrument is so new it doesn't really have a name yet. It's called variously the Hotz Musical Thought Translator, the Hotz Box or just the Hotz Instrument. The basic unit is a rectangular console, about two feet wide and 20 inches from front to back. The "keys" that you play are actually sensors that you touch. Hotz calls them pads. Depending on how elaborate you want to get, there will be from 16 to 240 pads. In addition, one large pad will serve as a built-in mouse.

The sensor pads will be two shades of blue, the rest of the instrument will be black with white lettering. In the standard configuration, the dark blue pads on the bottom rows are for chords; the lighter ones relate to scale. But, says Hotz, "they can be reconfigured any way you want." While Hotz won't reveal any technical parameters, he does say that the entire program with enough tables to play most of the music people are familiar with could fit in about 200K. The reason? "Nothing is cast in stone," he says. "Every time I go to a different program, every one of these pads can be something totally different. I can use data from one location to manipulate another. This could put out a whole string to set up a song," he says, touching one sensor; "this could be a chord, these could be scales."

"I could get 50 people together, who have never played together in their lives, have one person serve as conductor and they could do a spontaneous performance where no one makes a mistake, yet each person has creative input. One could be playing strings, another brass, etc. and no one's going to mess up because their changes will happen in absolute synch with one another automatically."

With his revolutionary new instrument in the foreground, Jimmy Hotz is shown in his home studio with two of his four children. The Holtz Instrument can read its song data from musical Compact Discs and keep anyone in tune—kids included—as they play along.

Anyone who wants to be a musician, can be.

How can he do this? "When I push a conductor pad, which transforms my musical window, not only does my window change, but I am sending out a code which transforms any unit that is looking to me as its conductor. This happens so fast that it seems transparent—no one has the feeling that computer manipulation is taking place. So only one person would ever have to do that maneuver or think about what chord it is. This is true even during original composition, by the way. For the first time ever you can have spontaneous composition among any number of musicians, where no one can hit a wrong note and disrupt the creative flow."

No More Dork Bands

The educational potential of the Hotz Instrument is awesome. "I feel every school in the world will eventually have one of these," says Hotz. "All the school bands that sounded like dork bands? They won't have to be dork bands anymore! Here's their chance to sound like the London Philharmonic Orchestra. ▸

There's not only the gratification of accomplishing something, but you eliminate that stifling of children's spirit that occurs because they feel they aren't up to par with everybody else, or they couldn't hit a chord without offending someone.

"You could buy one of these for your kid, take it home that evening, and before you went to work the next morning, the sound coming from the next room would be that of a reasonably accomplished musician. The first time I had my five year old play it, if you were to hear it from the next room, you'd ask, how many years has she been playing?

"What about handicapped people who have never been able to play musical instruments?" asks Hotz. "Now they can. Even if you only have one hand, or only have a pencil in your mouth and had no arms or legs, you could still make decent music." And he proceeds to prove his point. "This is with my elbow!" he exclaims, hitting the sensors with an elbow. "This is with a screwdriver in my mouth!" I have to admit, it doesn't sound bad at all.

"The whole point is," Hotz concludes, "it takes away all the fear, all the anxiety of trying to pursue something musically. All the pain and heartache of spending years just learning how to use something is bypassed."

"A lot of people will say, 'What about the classical training?' Well, I could sit a kid down and say I want you to understand all the possibilities of what a D major chord is. With the Hotz instrument, every idea you can conceive of in relationship to that chord is available, yet you may attack it with reckless abandon without the possibility of making a mistake. The type of chords and scales you can play are absolutely without limit. I will have tables for virtually every type of music imaginable, from Arabic to Japanese to whatever. I've already got over 36 different chord types in all 12 keys, not to mention the scales.

"You could sit your child down to practice his E minor scale. He'd be using a simple MIDI monitor where not only could he see what chord he just played, but there are many interactive notation programs that allow him to see, in convenient notation, what note was just played. He doesn't have to worry if in theory a D goes with an E sharp minor. He can hear it instantly."

"I think this is going to revolutionize music."
—Frank Foster

Hotz knows he will still encounter resistance from those who want little Johnny to have years of traditional piano practice. His response? "How many calligraphers do you know? There was a time when they had to study old English calligraphy to painstakingly make symbols. Now, if you have the right fonts loaded up, you hit a key and that symbol that used to take some guy half an hour to etch out is stamped out just as good as he could do it. This is the same thing. We can't look at the world musically any more as though everyone is going to be a calligrapher. When was the last time you can remember a new instrument that encompasses a whole new way of playing, a whole new terminology of where muscial values are? How many people do you know who have never played a piano who could sit down in less than an evening and sound relatively fluent on it?

"If you were to ask the best keyboard player in the world to play an E major seventh, and play every variation he could think of, he couldn't do it as fast as an amateur who'd spent one afternoon with the Hotz Instrument. The amateur would win because it's all there, he doesn't have to calculate his every move."

Too Easy?

But if it's so easy, where's the challenge? Says Hotz, "There's still learning and creativity because you ask, does it sound good to go from this chord to that one? And you learn. And if you want to learn the scale associated with a particular chord, we have certain regions of the instrument that are devoted to scale. And all the in-between notes and subtle sounds are there as well. Even somebody who's never played music in his life can ask, 'What's a G#M 7-3+5?' and play it perfectly, or 'What's an F#m 9-5?' and play *it* perfectly. And then he can say, hey that sounds good going from an A sharp major to A minor. Then he might try an F sharp augmented. He can go through every type of chord imaginable and find the worth of it."

Even very accomplished musicians will benefit greatly. "After people really spend time with this machine, I think the quality of the compositions being written will have a whole new dimension. Today, if I ask a composer to write a song using chords they're not familiar with, they'll probably shy away from it. Everybody can play an F, C or A minor with no problem. But if I said write something in a B flat minor sixth, most rock and roll bands wouldn't be able to. And I don't mean garage bands, but the guys who have been selling millions of records. But now, they can easily. Because with my instrument, the most complicated chord is no harder to play than a normal C chord."

Indeed, accomplished musicians can find a lot to like about the Hotz Instrument. "It will allow them to perform feats in a couple of days they have tried to do their whole lives and have not

been able to achieve," claims Hotz. In a few days, for example, Hotz says someone who plays the guitar but not the keyboard can become a very accomplished Hotz Box keyboardist.

Only a tiny handful of professional musicians have seen the Hotz Instrument. But those who have praise it to the skies. Take Herman Rarebell, drummer for the popular rock group, the Scorpions. He says, "This is the future of music. I want to be the first one on the planet to actually play and endorse it. I love it."

In live performance, the Hotz Instrument may end the complaint that sequenced music can make for a lifeless performance. Notes Hotz, "For a musician who wants to play impeccably and still be a great showman at the same time, now he's free to play his part without blowing it. He can dance on the thing, run all over the stage and be a maniac. He could do a tap dance on the keyboard and be playing a flamenco guitar."

Hotz says the instrument will help people reclaim their ethnic roots by easily bringing up ethnic sounds. For example, it's very difficult to play a Middle Eastern melody on most conventional instruments. But it would be no harder to play that on the Hotz Instrument than it is to play a three-chord blues song. Or Indian music. The Hotz Instrument can supply you with the right voicing to match a sound disk that's capable of putting out, say, the sound of a sitar. "We're going to have all styles of music," says Hotz. "Just put your disks in, load the thing up. Push a button and that will set up a chord table, whether it's a classical Moody Blues-type arrangement or a traditional Japanese melody."

The Physical Side

Hotz notes a big difference between his instrument and a normal keyboard. "With a conventional keyboard, you've got 25 percent efficiency on a three-note chord, but this gives 100 percent efficiency. For example, on a five-octave keyboard, you can play five proper C major chords. 25 percent of the keys are available for what you're trying to accomplish. But on the Hotz keyboard, out of any number of keys, all of them are usable. So you get that kind of efficiency ratio and you can have up to 240 keys that are usable at any given time, and each pad can put out anything on any MIDI channel independent of the others. You can have any number of different instruments playing from one set of pads at a time. So not only are all the right notes before you, but you can set it up like an orchestra—a string section here, a brass section here and drum section there, everything you can dream of, in real time, without having to switch synthesizers and patches.

The 1040, for musical functions, is not only just as good as the Mac, it's better.

"You can load an entire table in less than five seconds, that would have, for example, not only all the information for rock chords, but every note in every one of the tables, three levels deep. You can load that entire bank for doing all that information, off a regular disk or a hard disk, do your part, then move on. I can do in an afternoon what used to take me several weeks to do. That's no exaggeration."

Hotz is now making 300 metal prototypes. By February of 1989, he plans to have these units available to major studios and recording artists—"the elite of the music world," as he puts it—on a custom-order basis. Below these top-end custom units (which may sell for $2,500 to $10,000), there will be three other units that will vary in price from $2,000 to an amazingly low $200 or $300. The top-end model has two full wings that attach to the main board, having a total of 240 sensors. These, says Hotz, are the "ultimate studio instruments" and weigh around 30 pounds.

The $2,000 model will be the main console without wings, including five banks of 16 sensors. "It's the equivalent of having five keyboards around you that you could reach exactly where you wanted to and not ever mess up," says Hotz. That will hopefully be available this spring.

The $800 version will compete with the upper-end Casios. It will have 32 sensors to enable a person to play melody and chords together. Finally, the $200-$300 unit will be priced to compete with the cheapest Casios, and will have 16 sensor pads and could weigh no more than a pound or two. "If you walk into K-Mart and your little kid starts playing a normal cheap keyboard, he's not going to sound too polished," says Hotz. "Then he goes to the $200 Hotz Instrument and his random banging sounds great, with the same single chord reference. He's just dragging his fingers and it sounds pretty good. His joy of accomplishment is overwhelming. Which one do you think the parent will buy? Of course, you're not going to get the same fidelity or power out of these units you'll get out of the high-end stuff. But the beauty of this instrument is how modular it is. If you bought several of our small units, and plugged the interface together with it, functionally you'd have one of our more expensive units, but without the convenience of the layout."

The Hotz Instrument is powerful enough to function without the Atari ST. But, of course, without the MIDI inter- ▶

face, you won't be able to actually see what you're doing. Adds Hotz, "I recommend the ST to anyone on any level, because it makes the power of the system so much greater. The 1040, for musical functions, is not only just as good as the Mac, it's better. The ST is one of the most efficient machines you can buy for the money. When you're remanipulating someone else's stuff from another keyboard or editing, the ST is definitely the most efficient machine to do that. For the higher-end machines, they're made to work with a dedicated ST. To make it work most efficiently, we've got the software included to support the ST.

Hotz is making the prototypes with financial backing from Mick Fleetwood of Fleetwood Mac. For mass production and marketing of his invention, Hotz is currently negotiating with Atari. (Editor's note: *As soon as we learn Atari's plans for the Hotz Instrument, we'll let you know.*)

Inspirations and Risks

One wonders what inspired Jimmy Hotz to create this instrument. "I've been dreaming about these things all my life," he says. "About four years ago, I saw Leon Russell play some chord run with a speed that fried my brain. Right then I said there's got to be a way to let an average person do that without spending 30 years of his life studying and practicing. And there is! Today if I asked Leon to play a D sharp minor seventh all the way up the scale, as quick as he could, I don't think he could beat me; I've been around the best in the world, and he's hands-down the most talented musician I've ever known."

Hotz had other reasons for making his instrument. He was upset by the limits on pop songwriting. "How do you uplift the level of how three-chord songs are being written so that it might include something you could hear in an orchestra?" he asks. "Look at 'Nights in White Satin' by the Moody Blues. That had a little of the character I'm talking about. I was frustrated by an inability to do that. There was a good reason: those chords are very difficult to play on the guitar and unless your keyboard player studied classically, he has no inkling how to do that. And even if he did, how do you take the voicing of that and optimize it to rock?

Even if you go back to Kansas, you still remember there's an Oz.

"It was in the back of my mind until I decided if I didn't stop everything else and believe in this enough, I would never do it. Of course, everyone said 'How can you be so ridiculous as to stop everything else to try and make an instrument anyone can play?' Even my friends thought it was an overwhelming task. When you first tell your dreams to others, sometimes they just don't see the vision you do. But you have to have faith in your ability and step out at some point. If you don't believe in yourself enough to go that first step, how can you expect other people to believe in you?

"I said, 'If I really believe this, I'm going to live my life like it's true,' so I jumped off the deep end. I had a family to support, a new baby coming. I didn't know how long it would take. But it only took me three months from the time I said I'm going to stop doing anything else. It's been a tremendous gift. I've been a technician, engineer, record producer and musician. I've built studios and done more beta-testing than I care to remember. But if I didn't have the background in each of those areas, this might never have happened. I would have only seen part of the puzzle."

And now that his instrument is out, Hotz is ready to change the world of pop music. "Most pop songs today include major, minor, a few major sevenths, a few minor sevenths, a handful of odd-and-end chords. Other than that, musicians don't know how to play them—I mean fluently—where they could whip it out in a flawless fashion every time. Now everybody's going to be able to execute any type of chord in any type of voicing with the same expertise. That will make the window of chords used in normal writing much greater than it ever has been.

All he has to do now is get his instrument into the hands of the masses. "All of a sudden we could have half the population contending for who's going to be the latest rock star," he enthuses. The sheer number of samples you can pick from means the quality of the specimens will go up. All those musicians who could get away with running at two-thirds of their potential had better start running full speed or they'll be out of the race. It'll make everybody better.

"There's going to be a kid in some garage somewhere tinkering with this thing. And he'll come up with some composition using all these complex chords that hits a nerve ending in the populace. Suddenly, the whole idea of what good music is will be lifted another notch. I've been playing guitar since I was seven, but I don't know how much guitar I'll be playing from now on. The way we make music has changed. We're in Oz now. You can never say you didn't go. Even if you go back to Kansas, you still remember there's an Oz. We're forever changed." ■

Mard Naman is a freelance magazine and television writer and a Contributing Editor of START.

ON DISK!

ST WRITER ELITE 3.0

ELLEN SASAKI

by Bruce D. Noonan, M.D.

Dr. Noonan is at it again: ST Writer Elite Version 3.0 is here! This new GEM-based version of the classic word processor allows true ASCII file-saving and direct conversion of Atari Writer files, among other things. You said you wanted more updates—START hears and responds. ST Writer 3.0 is on your START disk in three flavors: English, Spanish and German.

For all your writing chores, it's ST Writer Elite. Files STWRITE3.ARC, GERMSTW.ARC, SPANSTW.ARC and STWMAN.ARC on your START disk.

Hello again, ST Writer fans! It's been some time since START last published an update of ST Writer Elite (Version 2.3 was in the Winter 1987 issue), but the waiting is over—Version 3.0 is here. I'm very excited about the enhancements (and bug corrections) in this newest version. Plus, if you've needed a German- or Spanish-language word processor, *both* are here. ▶

You'll find ST Writer Elite Version 3.0 on this month's START disk. Just copy the files STWRITE3.ARC and ARCX.TTP onto a blank, formatted disk. Un-ARC STWRITE3.ARC following the Disk Instructions elsewhere in this issue. Double-click on STWRITER.PRG to run ST Writer Elite. If you want to use the German or Spanish versions, follow this same procedure for GERMSTW.ARC or SPANSTW.ARC. Each of these archive files contain help and quick reference files with the filename extension TXT; to read one of these files you must first run ST Writer, press L and then type in the file name.

The complete documentation for ST Writer Elite, including everything you'll need to know to get started with the program, is in the file STWMAN.ARC. If you have a double-sided drive you can un-ARC the ST Writer manual onto the same double-sided disk you used for STWRITE3.ARC. If you have a single-sided drive, copy STWMAN.ARC and ARCX.TTP onto another disk and un-ARC STWMAN.ARC. The manual (STWMAN.ASC) is in ASCII format and you can view or print it by double-clicking on it from the Desktop.

Alternately, you can read the file STWMAN.ASC by double-clicking on TYPE.PRG (also in STWMAN.ARC). This program to display a file was written by Sterling K. Webb and originally appeared in the March 1989 issue of START. Select STWMAN.ASC from the file selector box. TYPE.PRG will load the file into memory. Use the up and down arrow keys to move through the document a page at a time; the right and left arrow keys move a line at a time. Pressing Clr/Home jumps to the end of the document; Insert moves to the beginning of the document. Press Undo to return to the Desktop.

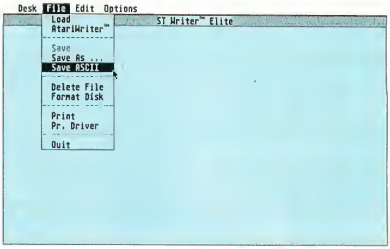
The Story Thus Far

As you recall, ST Writer first appeared in 1985 with the then-new 520ST, when little or no software existed except for some semi-colorful but boring (by today's standards) low resolution pictures ported from the 8-bit Ataris. Since 1986, when I talked Atari into giving me the source code to fix bugs, ST Writer has been updated constantly. Version 2.3 was the first GEM version and was called ST Writer Elite. Since it's in the public domain, it's probably owned in one version or another by every ST owner in the United States. And because it's available in Spanish and German versions, it has also been distributed in Europe, Mexico and South America.

The widespread use of ST Writer and ST Writer Elite has been a mixed blessing. On the positive side, a large user base has resulted in many bug reports. I truly believe that ST Writer Elite is one of the least buggy software products available. Of course, when Version 1.04 came out I thought *all* the bugs were gone. Dream on, Noonan! As one of my friends so aptly remarked, "The number of bugs in a program is n+1, where n represents the number of bugs already discovered."

I'm still finding bugs, but they're much less frequent and most of them would never be encountered by the casual user. (For example, with versions prior to 3.0, try loading in a non-ST Writer file containing less than 24 bytes and you'll see what I mean about bugs).

In Version 2.3 there was a problem with the Remove Tab function in GEM mode (now fixed). Also, when saving a program in GEM mode, the file sometimes went into a different folder than was intended. This sometimes occurred if the user first loaded a file, then accessed the directory of another folder. Now with Version 3.0, you can't save a file without first executing a "Save As. . .," then choosing the path from a File Selector Box. This ensures that you're aware of the directory into which the file is going.



ST Writer Elite now has a true Save ASCII feature that gives you pure text files, and without all those annoying carriage returns at the end.

The new Save ASCII feature sets all the margins for you automatically.

ST Writer Elite: The Latest Features

Version 3.0 of ST Writer Elite does have several new features. For example, now you can put all 256 characters in the ST character set directly in a disk file. The new function uses Control-X to bracket characters with ASCII values less than 32 (decimal). This is useful to send

printer codes at specific points in your text file. For example, suppose you wanted to sound the printer bell at a certain point in the file to alert you to change paper color. You would place Control-X, Control-G and Control-X at the appropriate place in the file along with a Control-W page-wait command. By executing the commands in this order, ST Writer will not recognize Control-G as a font change, as it usually does. Instead it would send Control-G as a character (ASCII 7) to the printer. You can now also print these special characters to the screen in print preview.

In order to produce these control characters, you will usually use the control key combined with an alphabet character key. There *are* some exceptions, however. For example between two Control-X's:

To get:	Press:
ASCII 0 (null)	Return
Control-A	Control-U
Control-X	\Control-X
Control-Z	Control-:
Escape	Control-[or Control-;
ASCII $1C	Control-< or Control-\
ASCII $1D	Control-= or Control-]
ASCII $1E	Control-> or Control-^
ASCII $1F	Control-? or Control-_

Note: Some of these combinations require you to press the Shift key. For example, pressing Control-Colon (:) is the same as pressing Control-Shift-Semicolon (;).

Do you need a Spanish-language word processor? This is the Spanish-language version of ST Writer Elite 3.0.

ASCII Conversion

Being able to send control codes is also useful with yet another new feature in ST Writer Elite 3.0: Save ASCII. Of course, you always had the ability to *print* an ASCII file to disk, but you had to change top, bottom and left margins, and the files always had trailing carriage returns representing unused lines on the last page output. This new Save ASCII feature does all the margin setting for you automatically. You may now, for instance, manipulate the DESKTOP.INF file and save it in ASCII format.

The use of Control-X to send control codes is necessary in some cases involving hard disk drives. Just remember to bracket all control codes in such files on both sides with Control-X before saving them in ASCII format. Also, files from text processors such as Micro Emacs can now be loaded, manipulated and resaved. The routine to read an ASCII file is also much faster in this version.

If you want to convert a non-ST Writer file to ST Writer format, an alert box will appear asking if you would rather *not* have all embedded tab characters converted to five spaces (the default). If you choose not to convert the tabs, your converted text will be dotted with Control-I characters wherever a tab character occurred in the non-ST Writer file. If you wish to preserve these tabs, say, to keep source code text size to a minimum, use global search and replace to bracket each Control-I with Control-X's on either side before saving the file in ASCII format. ▶

ST Writer Elite's disk-formatting routine has been updated to reflect changes in the new TOS ROMs.

For German-speaking ST owners, here's the menu screen in the German-language version of ST Writer Elite 3.0

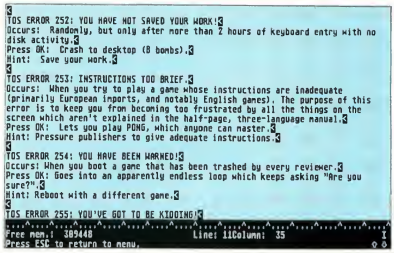
Printer Driver and Disk Formatting

In the File drop-down menu, you'll now see an item called Pr. Driver. This new feature lets you load a different printer driver without restarting ST Writer. Some users own several printers and may even have a serial and parallel printer connected at the same time. Click on Pr. Driver to switch from one printer to another. (Note: Do not, I repeat, *not* connect or disconnect a printer while either it or your computer is on—you may end up frying your circuits!)

ST Writer Elite's disk-formatting routine has also been improved. MS-DOS machines can now directly read files on disks that have been formatted by ST Writer. Also, if you have the new "Mega" ROMs the disk format will be skewed, increasing disk access speed.

Atari Writer Conversion

A final major enhancement to ST Writer Elite will be welcomed by Atari users group newsletter editors who use the program. Often they receive reviews from 8-bit Atari users via modem. The Atari Writer feature now lets you load Atari Writer files from disk into ST Writer and convert them automatically. Previously, you had to transfer files via a null-modem cable directly from the 8-bit Atari Writer program to ST Writer. You can still do this if you want, but the new feature will make it much easier to convert Atari Writer files.



The ST Writer Elite editor. While it may not be "WYSIWYG," it's the fastest ST word processor around and the commands are familiar to virtually all 8-bit Atarians.

Until Next Time

As long as there's an ST, there will be updates to ST Writer—watch for them in START. Also coming soon in START is my File Translator program which will convert WordPerfect, 1st Word and Word Writer files directly to ST Writer format and vice versa. ■

Bruce Noonan is an opthamologist in Washington State. He is the acknowledged godfather of Atari's ST Writer word processor.

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Turbo ST vs The Blitter (% speed increase)

	Monochrome		Color	
	Blitter	Turbo ST	Blitter	Turbo ST
dBMan 5.0	10%	59%	8%	60%
Data Manager 1.1	83	94	85	88
1ST Word 1.0	37	35	34	41
GFA BASIC 2.0	22	69	13	65
Interlink 1.8	53	63	46	71
ST BASIC 1.0	221	517	219	567
ST Writer 3.0	18	116	17	127
Word Writer 2.0	34	31	35	37

Results obtained while paging through an appropriate data file.

Ask for Turbo ST at your local dealer or send $49.95 plus $2.00 shipping and handling to SofTrek, P.O. Box 5257, Winter Park, FL 32793. Florida residents add 6% sales tax. Visa and MasterCard phone orders accepted. Call (407) 657-4611. Upgrades to version 1.4 are available for $5.00 U.S. plus your original disk. Offer expires 60 days from the date of this publication.

Turbo ST does not speed up programs that use GDOS fonts or that bypass the GEM operating system, such as PC Ditto, but is compatible with them. TOS, ST BASIC, ST Writer, 520 ST, 1040 ST, and Mega ST are trademarks or registered trademarks of Atari Corp.

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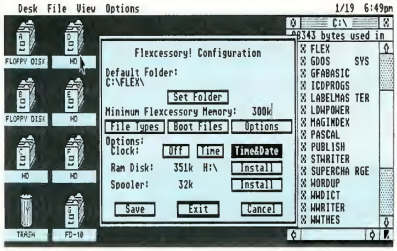
Making A Good Thing Better

Utilities for Your ST

by David Plotkin
START Contributing Editor

I've used a lot of computers over the years, but my favorite is still my ST. If you're aware of its advantages and the power it offers, you probably feel the same about your own ST. But once you've used your machine for awhile, you begin running into its limitations. Slowly you realize the things it doesn't do well and the things it doesn't seem to be able to do at all.

As software support for the ST matures, programmers are finding more and more ways to help you overcome what were once thought to be insurmountable limitations in the ST. Take a look at some of these creative solutions in the pages that follow.



E. Arthur Brown developed Flexcessory specifically to overcome the ST's dreaded six-accessory limit.

Universal Item Selector II

As you may have noticed, the file selector built into the ST's operating system is pretty clumsy. For a computer that prides itself on the "point-and-click" method of file selection, you end up doing a lot of typing to select a file! If you need to change to a different drive, you must type in the complete path name. And any needed file maintenance requires that you quit a program you're running and exit to the desktop.

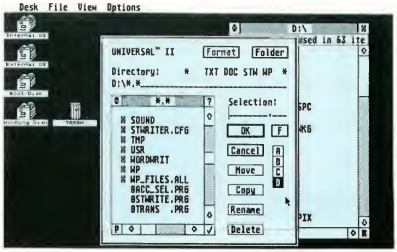
Various utilities have been offered as solutions to this clumsiness, but easily the most elegant is the Universal Item Selector II (UIS II) from Application and Design Software. UIS II is a small file that you install in your AUTO folder. Then, whenever you call up a program from your Desktop, you'll see UIS II's file selector box instead of the ST's built-in file selector. By copying the included UIS II desk-accessory file into the root directory of your boot disk, you can even access the file-selector box from the desktop or any GEM menu bar.

UIS II offers an incredible wealth of new features. You can change the drive by clicking on the drive-letter button, and move, copy, rename and delete files and groups of files. A group of files can be chosen by selecting multiple files in the file-window area of the file selector, and the files will remain selected even if you scroll the window to look at other files. You can also select groups of files by typing in a template that the files must match (for example, "*.BAK").

The file-window area can be scrolled horizontally as well to reveal the date, time and size of the files. Other information about the files, such as attributes (READ/WRITE/HIDDEN/etc.) *can also* be exmined from UIS II. You can even change the time and date a file was created to the current time and date with a single mouse click (no more copying from one place to another to accomplish this—which won't work with the new ROMS anyway). You can format disks, print a directory, print the contents of a file and a whole load of things I don't ▸

have space to mention here.

Universal Item Selector II is one of those programs that you won't give up once you've tried it. And at $19.95, there's no reason *not* to try it. (Editor's Note: *There have been a few bugs reported especially where UIS II's memory demands conflict with programs that take over memory, such as ST Writer Elite. Just be aware of these bugs and avoid them. Application and Design Software is working on a way to solve these conflicts.*)

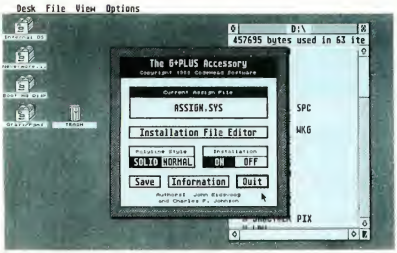


Universal Item Selector II, from Application and Design Software, offers a creative solution to the inadequacy of the ST's file selector.

The Six-Accessory Limit

A desk accessory gives you access to a "mini-application" while you're using another program. Literally hundreds of desk accessories have been written for the ST, and many are available in the public domain for the price of a phone call or a disk.

There are two limitations to desk accessories on the ST, however. The first is that you may have no more than six early Control Panel) require *two* of the six slots, although the most recent versions of the ST have fixed this "slot gluttony." Several commercial packages now on the market combine the functions of many desk accessories into a single, large accessory. The disadvantage is that you usually don't want all the items built into the accessory, but have to pay the memory price anyway.



One of the disadvantages of GDOS has been its tendency to slow the ST down. G+PLUS, from CodeHead, was written in assembly language, and does everything GDOS does only faster.

installed at any one time, and the second is that to change which desk accessories you have installed, you have to reboot your computer (after renaming or moving some files). With the increasing availability of STs equipped with lots of memory and hard drives, these two limits have become annoying to frequent users.

Compounding the problem of a six-accessory limit is the fact that some of Atari's own desk accessories (such as the

Two Solutions

Two packages have been introduced that attempt to address these disadvantages of ST desk accessories. The first is Flexcessory from E. Arthur Brown. This package installs as an accessory; when you click on it under the Desktop menu, Flexcessory opens a window that shows the installed accessories. From here you select the one you want to run. A slate of accessories can be loaded at bootup, and you can configure Flexcessory to reserve a certain amount of memory. Within the constraints of this reserved space, you can remove accessories from memory and install new ones. Thus, Flexcessory not only bypasses the six-accessory limit, but lets you choose the accessories you want to run and to change them whenever you want. Further, Flexcessory comes with a configurable RAM disk and print spooler.

Flexcessory is by no means a cure-all. The "accessories," for instance, are not really accessories at all, but standard applications. While this would first seem like an advantage (applications are easier to program than true accessories) it is in fact a hindrance: there are far more desk accessories available than small applications that would fit within the confines of Flexcessory.

These applications must also follow stringent rules. For one thing, they may not use drop-down menus. Accessories can't use drop-down menus either, but this limitation is well known to programmers, so they develop the accessory with this in mind. Most GEM applications *do* use menus, and thus are unsuitable for use with Flexcessory. The package comes with 20 useful applications to get you started, but after that you may have a hard time finding what you need.

A second solution to the ST's six-accessory limit is found in an incredible piece of programming from CodeHead software called Multidesk. Installed as an

accessory, you select it from the Desk menu and it presents you with a window to select the accessory you want to run. You can have it load a list of accessories at boot-up and can reserve memory just as with Flexcessory. But Multidesk uses real accessories (which are plentiful), and can remove and install them at any time within the constraints of the amount of memory reserved. Since you can change the amount of memory reserved from the desktop anytime, even this constraint has been overcome.

Multidesk is tremendously configurable and can find accessories in folders, so they don't have to clutter up your root directory. You can even run Multidesk as a regular program by changing its extender to .PRG, which enables you to run accessories directly from the Desktop, then clear them from memory when you're finished—just like regular programs. Multidesk is one program that falls in the "must have" category.

Multi-Desk from Codehead Software is another creative solution to the six-accessory limit. It's almost infinitely configurable—and best of all, *it works.*

G+PLUS Fixes GDOS

GDOS is an add-on utility for the ST's operating system that permits high-quality printing with multiple fonts and the highest resolution your printer can handle. Many computer-aided drafting programs use GDOS to do their output, as do such popular programs as Migraph's Easy Draw, NEOCEPT's WordUp, Atari's Microsoft Write, Electronic Arts' DEGAS Elite and Timeworks' Desktop Publisher ST.

However, despite its power, GDOS is not a flexible system. It must be installed at boot-up and significantly slows down the ST, even when you're not using a GDOS program. The file that sets up the font definitions and defines the printer drivers (ASSIGN.SYS) must also be read at boot-up and cannot be changed without rebooting. Further, this file is different for each GDOS program so that you must generally reboot to change from one GDOS application to another.

G+PLUS, from CodeHead Software, does a very nice job of taking care of all the disadvantages of GDOS. It, too, must be installed at boot-up, but since it's written in assembly language, it doesn't slow the ST down at all. (One of its modes actually increases redrawing speed!) The font definition file doesn't need to be installed at boot-up, but can be installed at any time, and it doesn't even need to be in the root directory. It can be also changed at any time.

With G+PLUS, you can define a special text file which will automatically load the specified font definition file when a GDOS program is run. Run a different GDOS program, and a different font definition file will be installed. If you use GDOS, get G+PLUS.

Incidentally. . .

The Hewlett Packard DeskJet printer is an inkjet printer with the same print quality as the much more expensive LaserJet. It has become very popular with ST owners because of its small size, quiet operation and a street price of under $700.

Though most GDOS programs now have printer drivers for the DeskJet, Neocept, the publishers of WordUp, is marketing their own driver. It comes with a set of fonts and supports advanced features such as page sizing. It works with every GDOS program I've tested, and results in faster printing speed than any other driver I've tried. Installation is easy: just copy the file into the appropriate folder, copy the fonts and adjust your ASSIGN.SYS file to access the driver. Sample ASSIGN.SYS files are provided with the driver, so you may not need to modify your own.

Making a Switch

There are many more utilities available that deal with the ST's limitations in a creative and efficient way. In a future issue, I'll look at some "switchers," which let you have more than one program in memory at once and switch between them instantly. ■

David Plotkin is chemical engineer for Chevron USA and a Contributing Editor for START.

PRODUCTS MENTIONED

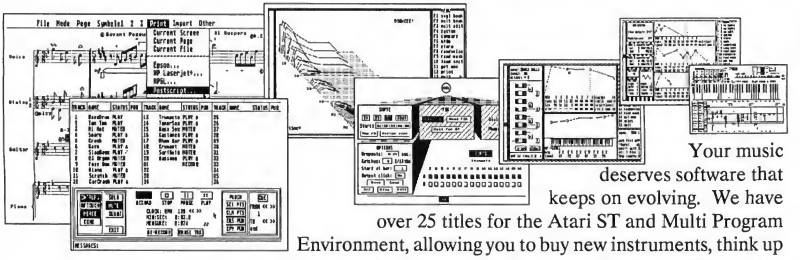
Universal Item Selector II, $19.95. Application and Design Software, 226 N.W. F Street, Grants Pass, OR 97526, (503) 476-0071.

Flexcessory, $29.95. E. Arthur Brown, 3404 Pownee Drive, Alexandria, MN 56308, (612) 762-8847.

Multidesk, $29.95; **G+PLUS**, $34.95. CodeHead Software, P.O. Box 4336, North Hollywood, CA 91607, (213) 466-1868.

Printer Driver for Hewlett-Packard DeskJet, $49.95. Neocept, 547 Constitution Ave., Unit A, Camarillo, CA 93010, (805) 482-4446.

And The Beat Goes On



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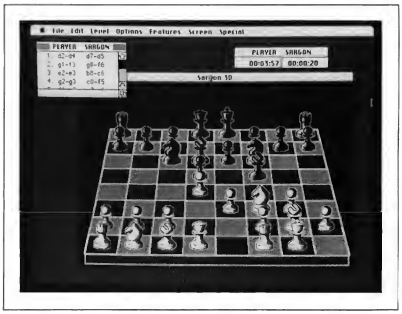
Sargon IV and Printer Interface III

by David Plotkin

This month, we'll get back to the Mac side of the column. David Small's Spectre 128 has taken the Atari world by storm. In fact, it has become so popular that the 128K Macintosh ROMs have become quite scarce (and expensive). I wonder if Apple has figured out what's going on yet. (Editor's Note: *Given the attention the Smalls were attracting from Apple personnel at COMDEX last fall, we're sure that they're aware.*)

Spectre Version 1.75 has just been sent to registered owners as of press time. It fixes some obscure bugs which most users have never seen, but the quick revision shows that Gadgets by Small really cares.



Sargon IV may be the best chess game you can run on an ST—but only if you use a Mac emulator like Magic Sac or Spectre 128. It has a multitude of options and features, including a Piece Sculpture program to design your own chess sets.

Sargon IV

Some really good software has been published for the Mac in the time it's been on the market. While there are good chess games for the ST, it is a fact that Sargon IV for the Mac has no match in the ST world.

Sargon IV is a remarkably able chess-playing program with a multitude of options, making it suitable for the novice and the tournament player. Sargon IV supports all chess moves, including *en passant*, castling, and queen promotion.

Two types of boards are available, the standard flat 2D board (viewed from above), and a three-quarter view 3D board. Alternate sets of chess pieces can be used; four sets are included or you can design your own. You can turn the board around to see the board from your opponent's viewpoint anytime it is your turn, and you can even switch sides as the mood strikes you.

In Sargon IV, you play against the computer or another human. If you play a human opponent, Sargon IV can referee to prevent any illegal moves. If you play against the computer, you can set the degree of difficulty by limiting the time Sargon IV has to search for moves. Obviously, the more time you give it, the better its game. You can limit Sargon IV to as little as five seconds per move or let it think until you tell it to make its move. Sargon IV will make the best move it has located when its time runs out. Interestingly, these time limits are not absolute—Sargon IV keeps a time budget, and may use more time than allowed on some moves, less on others. Several clock options are available—you ▶

can limit the time for each move and the total time for a game.

Sargon includes an impressive library of opening moves or you can turn them off and make Sargon "think" from the beginning. If you need help, you can ask Sargon IV for recommendations for your move. If you've made a serious blunder, you can even take back one or more moves. Sargon IV will use the time you are thinking about *your* move to think about its *next* move, unless you disable this mode. A variety of options lets you see Sargon's "reasoning" for selecting a move (you watch the tree search for the best move), print a move list, save and load games and set up a game position or chess problem. Sargon can solve chess problems, such as to find out if mate is possible in a specified number of moves. You can even have Sargon play itself, while you sit and watch.

For the Novice or Master

How good a game of chess does Sargon play? I am only a casual chess player, so the fact that it beat me consistently at every level above novice is not too surprising. However, reports are that at its upper levels, Sargon IV is a very good chess player indeed. It even beats its primary computer competition seven games out of eight.

For beginners, however, at its easiest play level Sargon IV really gives you a chance. Because it doesn't have time to look ahead many moves, it makes the same mistakes that novices often do, thus providing challenging play without being overwhelming. You will need to move to higher levels, though, if you wish to become more proficient.

In addition to playing a mean game of chess, Sargon is packaged with five opening problems, 10 tactics problems, 10 strategy problems, 15 checkmate problems, five endgame problems and 107 of the world's best games. These can be loaded from disk and played through and you can learn an enormous amount by studying what occurs. Chess Master Boris Baczynskyi comments on each of these problems and games in the manual.

Design Your Own Pieces

The Piece Sculpture program is a separate utility which lets you design your own pieces. A small window appears in which you can draw the piece using one of several simple tools. The actual drawing is done in an enlarged view with a normal size view also shown on the same screen. You can create a mask to keep other pieces from showing through the clear spaces in the piece. A particularly useful option lets you invert all the bits in a piece. Thus you need create a piece in only one color and then use the invert option to create the other!

Sargon IV beats its primary computer competition seven games out of eight.

Printer Output Made Easy

One big problem Magic Sac and Spectre 128 users have is getting their output to a printer. After all, how many Atari owners have Apple ImageWriters, and know how to hook them up? Replacement drivers for printing to an Epson-compatible printer have been available for some time, but what if you want better quality? One alternative might be the Hewlett-Packard DeskJet, which has taken the Atari world by storm. The DeskJet has 300 dots-per-inch resolution, silent operation and low price (street price about $700).

Now DataPak Software Inc. has introduced Printer Interface III. It provides a printer driver for the HP DeskJet and is extremely easy to install: all you have to do is copy it to your boot disk. Then, when you use the CHOOSER accessory under the Apple menu, HP DESKJET will be available as an option. Although the manual speaks in terms of the serial port (and configuring the DeskJet's parameters), ST owners running Magic Sac or Spectre can just skip all this, since in both emulators the printer output has been rerouted to the parallel port (the DeskJet has both).

Does it work? Most certainly. Graphics are handled beautifully (at 72, 150 and 300 dpi), and fonts which are either built into the DeskJet or supplied on HP's font cartridges print out at full 300-dpi resolution. If you try to use a font that is not in the DeskJet, it will still work, provided your system file defines the font at four times the desired size. Thus, you would need a 48-point font definition to use that font at a 12-point size. This is due to the difference in resolution between the Mac's screen (72 dpi) and the DeskJet printer (300 dpi).

As with the LaserWriter, any font which is not installed in the printer (or available at four times the size) still prints, but it prints the screen font—which is considerably lower resolution and somewhat blocky. Even so, the results are fast, quiet and very much worth the money. ■

David Plotkin is an engineer for Chevron U.S.A. and a START Contributing Editor.

PRODUCTS MENTIONED

Sargon IV, $49.95. Spinnaker Software, 1 Kendall Square, Cambridge, MA 01239, (617) 494-1220.

Printer Interface III, $125. DataPak Software, Inc., 14011 Ventura Blvd. #507, Sherman Oaks, CA 91423, (818) 905-6419.

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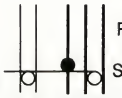

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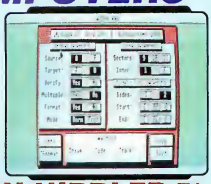

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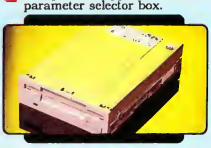

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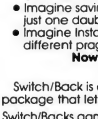

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The Software included with the book provides many powerful features like the AUTOMATIC PROGRAM PROTECTOR. This easy to use Utility allows you to protect just about any ST program. You can choose a combination of protection methods like encryption, checking custom disk formats, password protection or a limited use option that makes the program self-destruct after running a preset number of times.

The book includes topics such as Phreaking, Logic Bombs, Hardware data keys, the legal aspects of piracy and software protection, Custom disk formats, Pirate Bulletin boards and much more.

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ON DISK!

Partcopy: An Ultra-Fast Partition Copier

by Dave Small and Dan Moore

Move a meg in four seconds with PARTCOPY.ARC on your START disk!

This month put all you've been learning from Hard Disk Lore and First Aid to use with Partcopy, a high-speed hard disk partition copier. This is an extremely powerful tool for moving big blocks of data around on your hard disk, or from one hard disk to another.

Like any powerful tool, Partcopy has the potential for misuse. We don't put limits on what you can do with it because that would limit its power. Treat it like you would treat a bandsaw—with caution. In particular, *do not* use it until you understand partitions and hard disks (which you do if you've been following this column, right?).

Partcopy lets you move a block of sectors of any size from any hard drive to any other hard drive, at the very high speed of one megabyte every four seconds.

Let's take a typical example of how I use Partcopy. When I'm about to start a day's development work on Spectre 128, I want to completely back up my Spectre development area, 10 megabytes long, in case I wipe it out.

I plug a second drive in (as per my article "Megabytes, not Megabucks" from the Winter 1987 issue of START) and run Partcopy. I instruct Partcopy to move the 10 megabytes that constitute my Spectre partition to the first partition of the backup drive, also 10 megabytes long. Forty seconds later, it's done. I park the backup drive, put it on the shelf, and I'm ready for anything. (At that point, not even a power spike can take out the Spectre development).

Many, many times I've wiped out the Spectre area, either by accident or by a built-in ST feature (40 folder limit), and these backups have saved me. One night I lost 140 megabytes worth of hard disks to a power surge, and the only things left were the backups on the shelf.

You can also move one partition to another very quickly with Partcopy. Let's say I wanted to copy the C partition to the D partition. I could just drag all the files from one to the other and fall asleep watching it go (TOS takes a *long* time to copy all these files), or I could turn loose Partcopy and have it done in 40 seconds.

Your Lucky Numbers

To run Partcopy, copy PARTCOPY.ARC and ARCX.TTP onto a blank, formatted disk and un-ARC PARTCOPY.ARC, following the Disk Instructions elsewhere in this issue. You need to feed Partcopy several numbers, all in decimal:

1. The source drive's SCSI ID and Logical Unit Number (LUN). If you don't know what you're doing, these are usually 0 and 0, but if you don't know what you're doing, for heaven's sakes don't run this program.

2. The destination drive's SCSI ID and LUN. Again, this will depend on how your system is set up. You can of course have these be the same as your source, and copy within the same drive; I do it all the time.

3. The starting sector number on the source drive where you want the copy to come from.

4. The destination sector number on the destination drive where you want the copy to begin. ▸

5. And, finally, the number of sectors to copy.

Where do you find these numbers? If you have the January 1989 issue of START you can run our Partlook program, which will give you a partition map of your hard disk—where each and every partition begins and ends. Supra's SUPEDIT utility provides these numbers as well.

Proceed with Caution

Let's do a quick run-through, since this is best taught by example.

We have a 20 megabyte drive, consisting of four 5 megabyte partitions: C, D, E and F. We want to completely copy, say, C to F to make a morning backup.

We run Partlook and discover the disk looks like this:

C: Sectors 1-10001
D: Sectors 10002-20002
E: Sectors 20003-30003
F: Sectors 30004-40004

The hard disk is our sole hard disk, so as usual it's wired as SCSI 0, LUN 0.

We tell Partcopy to copy from SCSI 0, LUN 0 to SCSI 0, LUN 0, starting at sector 1, to sector 30004, length 10000 sectors. (To think of the operation in megabytes, divide the number of sectors by 2,000—2,000 sectors is 1 megabyte.)

Then, before you can recite the Pledge of Allegiance, the copy will be finished—five megabytes will be copied from drive C's partition area to drive F's area. Note that this will complete *wipe out* whatever was stored on drive F. Don't do this unless you want to use that partition for backup only.

Warning: Know exactly what you're doing before you do this. Back up your drive first. It is easy to mistype a number, and then you're doomed. Partcopy does print back your numbers to you before doing the copy, for a final check. Common mistakes are to start at sector 0, or (in the E example) sector 20,000 instead of sector 20,003, or to copy a partition that's a little too big to fit into the destination, and have it "slop over" into the partition following.

After you do the copy, you *must reboot* the system. GEM has, in system memory, a copy of what the old partitions looked like, that can't be easily updated. You must reboot to get the new copy read in, or GEM will horribly trash the new partition based on its old, incorrect data. I know from experience. Partcopy will *not* automatically reboot for you; you must do it manually.

To use Partcopy again just type "yes" at the appropriate prompt. Control C will exit anytime if you type in something wrong. You are given a chance to escape before the copy starts.

Error Intolerance

Partcopy is not very tolerant of errors; it just stops if you get one. Why, you ask? Well, hard disk controllers are supposed to "map out" errors at format time so you never see them. (The controller replaces the bad sector with a known good one.) If you're getting hard disk hits, it's time to reformat or get a new hard disk anyway; you're riding a thin edge of disaster. (Just one little hit in the directory, and poof, you're gone.) Thus we felt that giving you an imperfect copy, especially during a backup, wasn't a good idea. Depending on how far you are into the copy operation when an error occurs the destination partition may be garbled because it has half new information and half old. You may want to reformat the destination partition and then do a file-by-file backup to it to determine the bad file.

Partcopy can also be very useful when debugging a marginal disk drive. Just use Partcopy to copy a drive onto itself; that'll exercise the living heck out of the read/write circuitry, and read/write every sector on the disk. (Two tools in one! – the ultimate hard disk exerciser). This helped me debug a partially broken SCSI cable—I ran Partcopy, and started wiggling cables. When I wiggled the right place, Partcopy stopped.

Cloning an Entire Drive

To completely clone a hard disk onto another is simple with Partcopy. Plug them both in, and use Partcopy starting from sector 0 to the length of the hard disk. For instance, a common length for the whole drive on a 20 meg unit is 40,006 sectors (see table above: 40,005 sectors, plus the zeroth (partition) sector, is 40,006 sectors). So copy from your source disk, starting at sector 0 for 40,006 sectors and you've cloned the drive—and darn fast, too. Twenty megabytes will take you 80 seconds.

This is the absolutely most-used tool Dan and I have written. When you can afford multiple hard drives it's worth it to back up hard disk to hard disk just in terms of time. Also, the cost of using floppies to back up big drives gets old after awhile, and a 20 megabyte mechanism can be had for under $200. I use Partcopy all the time for backups, and many are the times it's saved me. An 80 second backup, I'll do—a 20 minute backup, I tend to put off.

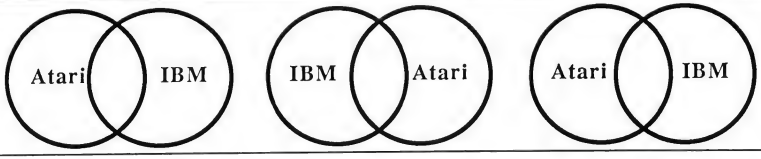
Conclusion

I hope you find Partcopy as useful a tool as I have! Again, never use it if you're not absolutely sure what you're copying, and be careful with it. ■

Dave Small's zest for fast and easy backups is the result of hard disk crashes encountered during his low-level work developing Macintosh emulators for the ST. Dan Moore is the author of Paper Clip for the 8-bit Atari and the never-released Paper Clip Elite for the ST.

PRODUCTS MENTIONED

Hard Disk Utilities, $24.95. Supra Corp., 1133 Commercial Way, Albany, OR 97321, (503) 967-9075.



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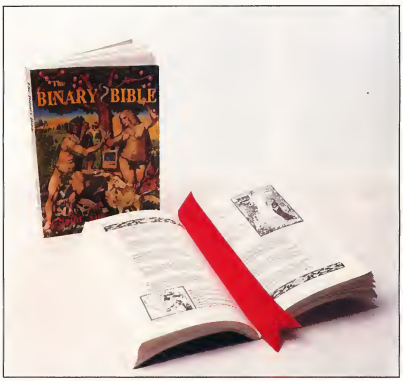
The Binary Bible

by Marta Deike
START Editorial Assistant

$aint Silicon has emerged from Silicon Valley to bring divine answers to questions that computer enthusiasts have probably never thought to ask—questions like "What is the meaning of our hard drives?" And, "Why must we suffer inevitable bugs?"

The answers to these and other questions are found not on a scroll, nor even on a scrolling screen. Instead, they're contained in *The Binary Bible* by Jeffrey Armstrong, a.k.a. $aint Silicon. Based on the title, this would seem to be the be-all and end-all of computer humor. That's a pretty tall order, but any book with "Bible" in the name is bound to raise my expectations. Lightning (or Disk I/O) will surely strike me dead for saying this, but I just didn't find it consistently funny.



The Binary Bible is just a bit too tedious for straight-through reading, but it does have occasional moments of real satiric humor. It's at its best in a parody of contemporary evangelists.

In the Beginning

The Binary Bible begins with a parody of Genesis: "And the Giver of Data said, Let there be Electricity: and there was Electricity." In "Sysgen," G.O.D. is a Graphics Omniscient Device with Oddem and Even skipping across the Griden of Readin. (Read that one aloud.) The devil is a glitch who tempted Even with the Apple and that's why, to this day, our programs are never entirely bug-free.

And there you have it. For the most part, all of the mysteries of the ancient computer world—and the entire premise of the book—are contained in these first three chapters. What happens in the remaining 150 pages? Oh, that you should ask.

After Sysgen, the Binary Bible appears headed as a satire of the real Bible, which is what I'd had high hopes for. But except for a few occasional parables like the "Sermon on the Monitor," Sysgen and Revelation are the only two portions that maintain the Biblical parallel. And Revelation seems out of place in the book.

Revelations

Revelation does, in fact, resemble the Revelation of St. John of the Cross in its focus on the future. Armstrong's version ▶

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is a pious sermon on love that encourages us to interact with human beings, not just with our terminals. Actually, Armstrong is rather endearing here, but the sudden sincerity is totally incongruous with the tongue-in-cheek tone of the rest of the book.

Much of the rest of the Binary Bible consists of hymns, prayers and poems, all in computerese. Indeed, and this is my complaint, most of the book seems to be merely a vehicle for strained puns based on computer jargon. Eventually, the Biblical theme is foresaken altogether and all kinds of little spoofs pop up in its place. Armstrong shifts to Nursery Rhymes ("Mother Gauss") and Astrology with signs like "Arrays," "Virtual" and, my personal favorite, "PCs."

Have You Been D-Based?

This is not to say that the Binary Bible doesn't have some redeeming qualities. There are moments of real satiric humor. My favorite section is halfway into the book, where Armstrong launches into a parody of contemporary evangelists. As $aint Silicon, he promotes C.H.I.P. (the Church of Heuristic Information Processing), complete with its own Byte University. "Have you been D-Based and D-filed?" he asks. "Do you suffer from Information indigestion? Then you need C.H.I.P.," the world's first "user-friendly" religion. There's even a list of handy catch-phrases in case you want to become a true DOSciple. It is here that the book is at its best.

Unfortunately, the Binary Bible is merely a compilation of puns, rather than an incisive satire. It is definitely not a book to be read straight through. Taken in small doses, however, it might be good for a smile (like just after your hard drive crashes). But for $14.95, I'd recommend waiting for the movie. ■

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by Jim Pierson-Perry

THE DOCTOR IS IN

Dr. T: The Man Behind The MPE

Emile Tobenfeld, Ph.D.—Dr. T—is one of that rare breed of people who have left their first careers to pursue their dreams. Dr. T's first career was in physics, but his dream led him to create the world's biggest MIDI software empire. In a rare interview with START Contributing Editor Jim Pierson-Perry, Dr. T reveals the unusual path he followed from the lab to the studio.

Emile Tobenfeld, the famous Dr. T: A non-musician in the normal sense of the word.

Not many of us have the opportunity to turn our hobbies into careers, much less successful companies. A few years ago, Emile Tobenfeld, alias Dr. T, took that risk, turning away from a Ph.D. in physics to follow his musical aspirations. The result was Dr. T's Music Software and it has been an overwhelming success. Over the past four years Dr. T's has grown from a one-man operation to the largest MIDI software developer and distributor in the world.

"I defined myself as an artist even though I wasn't working as an artist for a long time," recalls Tobenfeld. He accepted a low-key programming job at a science laboratory in order to have the time for his music and photography interests.

Having few formal music skills, Tobenfeld seized on an ARP Odyssey in 1976. "Here was something I could make music on without needing to be a trained keyboard player, having a trained ear or needing much of anything except an imagination." The ubiquity of synthesizer tone controls fit well with his interest in exploring musical processes and structure.

The turning point came in 1984. After viewing sequencer programs based on the recently created MIDI standard, he decided to write his own, since "nothing available then could do the types of things that would be useful to me." Once committed, he reasoned "If I'm going to write software, I'll do it all out and see if I can make some money at it." His initial expectations, at

best, were "to sell enough to quit my job and work on some new programs, with maybe one person helping with shipping. Even if it didn't get that far, it would be fun to have a couple of programs and make some extra money for awhile. It would at least give my resume a kick in the pants!"

Tobenfeld's first programs were for the C-64. "Having blown all my money on a [Yamahal DX7 synthesizer," he said, "I found that the Commodore was the cheapest computer around with a MIDI interface. My customers and I could afford it." From there, he expanded to the Apple II and then to the Atari ST in 1986. Currently, the vast majority of his products are for the ST. "We have a whole group of people who understand the ST really well and want to develop software for it," he explains.

No other company matches the breadth of Dr. T's product line, which has expanded into all aspects of music software. There are four work groups for ST products: sequencers and algorithmic composing programs, patch editor/librarians, scoring programs and sample editors. Efforts are in progress to port the programs over to the Amiga and to test the Macintosh market on a limited basis.

Commenting on the MIDI software market, Dr. T holds mixed opinions. "With desktop publishing [another software niche market], there is a job to get done," he says, "and a guy can weigh the economic equation and see if there is going to be a payoff. You don't have the option *not* to do the job. For music, the nitty gritty market is all the people out there without an economic driver who aren't even active musicians. There are a hell of a lot more non-musicians who would enjoy playing music if they could than there are actual musicians. Whether these people will get bitten by the bug enough to want to make the commitment—that's my fear about this market."

A criticism leveled at Dr. T's sequencer programs is that they are not very user-friendly; GEM is not used and the workscreens are full of dizzying amounts of data. GEM's speed limitations are the main reason for avoiding it; sequencer programs that appear to use GEM features have usually gutted the GEM code and replaced it with high-speed proprietary routines.

With release of the MPE, Dr. T has provided the first fully integrated desktop computer music workstation.

As to the user interface, Dr. T feels that if you're going to make computer music, you have to deal with the computer. The ability to access and interact with virtually every byte of MIDI data is a hallmark of his programs (or tools, as Tobenfeld calls them). "The tools are there for anybody who has an imagination concerning sound and really wants to make music. Why did the rules of music develop the way they did? It comes down to a question of what works—not only what sounds good but what can be executed. A lot of things that *can* sound interesting haven't been done because they are too damned hard to play."

With release of the MPE (Multi-Program Environment), Dr. T has provided the first fully integrated desktop computer music workstation. Far more than memory partitioning, the MPE offers interactive data switching among whatever modules you have installed. "They're not merely multiple, independent programs," Tobenfeld says. "Rather, they're modules sharing a central data pool. The programs in memory act together as one big program." The MPE is still evolving to greater degrees of interaction. Planned modifications include increasing the number of program modules that can be installed to make it more GEM-like.

What's Next?

For future projects, several concepts have caught Tobenfeld's attention. Long a proponent of improvisation, he's looking at ways to merge traditional sequencers with algorithmic composing for real-time interaction. Another interest is software to interpret your music and play along with you, possibly requiring some form of artificial intelligence.

Carrying the interactive ideal a step further is development of computer music instruments that respond to gestures. "I'm looking at how to make more tools like Fingers, and simpler ones like Music Mouse [for the Macintosh]," says Tobenfeld. "Simple and cute makes it appealing to the end user, the guy who's just coming in." In the (somewhat) long run, he has been looking at ways to combine interactive graphics, video and MIDI into an interactive, performance-oriented multimedia workstation.

Not bad for someone with no formal microcomputer training and a self-described "non-musician in any normal sense of the word"! ■

Jim Pierson-Perry is a semi-professional musician and a Contributing Editor for START. He lives in Elkton, Maryland.

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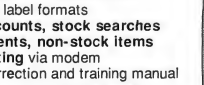

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Clipboard

Tips and Tricks for the ST Owner

Compiled by Heidi Brumbaugh,
START Programs Editor

To Backslash or not to Backslash

Often you must type in filenames rather than use a selector box, and you've probably seen filenames such as A:\FRED.TXT. What is that backslash in the filename and why is it important? Essentially, the backslash tells the computer to look for the file in the root directory of that drive. If there is no backslash, the computer will look for the file in the last directory accessed in that drive. If you are using a command line interpreter (CLI) it can be useful to access files quickly in the subdirectory of another drive, but generally it's a good habit to use the backslash when you know that the file is in the root directory.

Security Flash

Flash!'s translation table feature comes in handy if you want to secure your online account password. If you select your equivalents carefully enough (for example, by exchanging the positions of the vowels) you can create a password whose translated equivalent is also a real word. That way anyone peeking at your macro file wouldn't realize that the code was encrypted.

J*kers are Wild

Ever heard the term "wildcard" used in connection with computers and wondered what deuces and one-eyed jacks had to do with silicon chips? Wildcards are usually used in search operations, a common computer application. They give you the option of searching for words or groups of words that have the same general characteristics.

There are two standard wildcards used on most computer systems: a question mark (?) and an asterisk or "star" (*). When the computer sees a question mark in a wildcard search it will replace the question mark with any single character. An asterisk is replaced with any number of characters. For example, if you search for S?T the computer might return SIT, SAT or SET. If you search for S*T the computer could return anything from SIT to SALIENT. Wildcards are supported on many word processors and database managers. On the ST you've most certainly seen them used in the GEM item selector; the path specification line "A:*.*" simply tells the computer to list all the files on the A drive.

Take over the World

Empire, a strategy wargame from Interstel (distributed by Electronic Arts), encourages you to take over the world battling either a computerized or human opponent. You build armies, ships and fighter planes and give orders each round to each unit in turn. This game can be a lot of fun, but a problem crops up when a troop transport ship's turn occurs *after* the turns of the army troops it is carrying. The computer will skip the troops' turns while you are en route, so that once you're in position to attack a city you have to wait until the next round to strike your fatal blow. If the city is hostile, this could leave your transport a sitting duck. You can avoid this problem if your transport is traveling along a land mass by giving the troops orders to unload a round *before* you reach the target city. When the troops' turns come up simply tell them to wait until you move the transport into position.

Editing Resource files

Software designers try to anticipate the user's most likely choice when they design default parameters, but sometimes your most likely choice is not what they had in mind. (For example, when I quit Word Writer a dialog box asks if I'm sure I want to quit; usually I am, but the default choice is No.) If the program uses a resource file, you can often modify the choice yourself using a resource construction set such as K-Resource. This works particularly well if you want to change the default exit button in a dialog box so that you only have to press Return to select the option you want, rather than clicking on it. Unfortunately, most two- or three-button short alert boxes are internal to the program and can't be modified this way. Work from a backup copy of the resource file and be sure not to add or delete any objects or trees.

Got an ST trick or tip to share? We're interested in tips for the rank beginner or expert programmer, for exploring the Desktop or for getting the most out of any popular ST program. Send it to the Clipboard, START Magazine, 544 Second St., San Francisco, CA 94107. ■

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ON DISK!

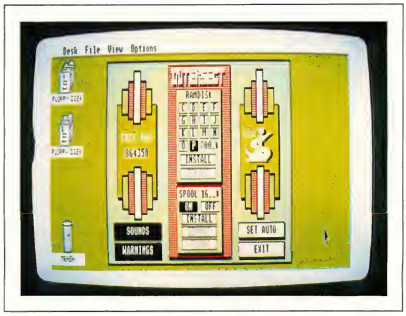
Using a RAM Disk

by Gregg Pearlman, START Assistant Editor
and Heidi Brumbaugh, START Programs Editor

START presents Intersect's RAM Baby RAM Disk—file RAMBABY.ARC on your START Disk.

If your ST has only one disk drive, you've probably grown very tired of the repeated disk swaps needed to copy files between disks. There are alternatives, such as a second floppy or even a hard disk drive, but those alternatives are just not cheap. Your best bet is a RAM disk.

A RAM disk is neither a disk nor a drive. When you install a RAM disk, your ST reserves a portion of its available memory and treats it as if it were an actual disk drive. Since it's not an actual physical disk drive, there are no moving parts, resulting in greatly increased disk access speed.



Intersect's RAM Boby RAM disk ond print spooler. At top center are the drive icon selector buttons, the size of the RAM disk and the RAM disk INSTALL/REMOVE buttons. At bottom center are the print spooler ON/OFF buttons, spooler size ond INSTALL/REMOVE/FLUSH buttons. Clicking on the SET AUTO button ensures thot the RAM disk is present every time you boot.

Copying with a RAM Disk

On a single-drive system, you must drag files from the A Drive window to the B Drive icon or window to copy files from one floppy disk to another. This becomes tedious when you try to copy more than a single file to another disk. Your ST will tell you to "Insert Disk A into Drive A," then to "Insert Disk B into Drive A," then to "Insert Disk A into Drive A," then to. . . . Worse, you might accidentally insert Disk B when you should insert Disk A, or vice versa.

With a RAM disk, you may treat it as if it's a physical second floppy disk drive. To copy files from one disk to another, drag the filenames or icons from Disk A to the RAM disk icon or window. When this copy is completed, insert a second disk into your drive and copy the files from the RAM disk to the second floppy. Not only is this much, much faster, but you only have to swap disks once.

Programs load almost instantly from a RAM disk. For example, let's say you're reviewing a fabulous animation program. You can load the program from the RAM disk, check out a few features, exit, load your word processor, write a few words about what you've just seen, exit the word processor, load the animation program, etc.—without having to wait around for tedious disk access.

Some RAM disk programs will automatically copy files into the RAM disk at boot time. This way your favorite word processor or other application is ▶

always in the RAM disk, ready to run.

Baby, It's You

RAM Baby from Intersect Software is a public domain RAM disk and print spooler by Randy Mears. You can install RAM Baby as any drive from C through P. Both the print spooler and RAM disk can be set for any size (up to the limit of your computer's memory). You can also remove and reinstall them in different sizes and save startup settings so that the RAM disk, print spooler or both will be installed automatically at bootup.

To use RAM Baby, first copy the files ARCX.TTP and RAMBABY.ARC from your START Disk to a blank, formatted disk and un-ARC RAMBABY.ARC following the Disk Instructions elsewhere in this issue. You must then copy RAMBABY.ACC to the root directory of your boot disk and reboot your computer to install it automatically. Full documentation for the RAM disk and print spooler is also in the file RAMBABY.ARC.

(Editor's note: *There are many different RAM disks—commercial, public domain and shareware. We chose RAM Baby because it's powerful and easy to use. RAM Baby is not "reset-proof," which means that if you press the reset button on the back of the computer you will lose the contents of the RAM disk.*)

Using RAM Baby

To use RAM Baby, just click on "INTERSECT Rambaby" in the Desk menu. RAM Baby will then open a dialog box containing the selector buttons for the RAM disk and print spooler. To install the RAM disk, simply enter the desired size in kilobytes, click on the drive letter you want it to be and then click on INSTALL. You can remove the RAM disk by clicking on REMOVE. (Be sure to remove the RAM disk and print spooler before changing screen resolutions.) Keep in mind that if you remove the RAM disk or print spooler, any data in them will be lost forever.

Installing a RAM Disk Icon

To access a RAM disk from the Desktop, you must create a new drive icon. From the Desktop, *single*-click on any existing drive icon. Then go to the OPTIONS menu and click on Install Disk Drive. On the Drive Identifier line, replace the letter that's there already with the drive letter you've chosen for RAM Baby. (Whatever you do, don't use a lowercase "c" – that stands for "cartridge.")

To access a RAM disk from the Desktop, you must create a new drive icon.

Now move down to the Icon Label line, press the Escape key and enter any name you want for the new drive icon. ("RAM Disk" seems to work fine.) Click on INSTALL, and the new icon will appear on the Desktop. Since RAM Baby is already installed, your new disk icon—and RAM disk—are ready to go.

Be sure to save your Desktop to your boot disk, or the RAM disk icon won't be present the next time you boot your computer.

Beat the START Disk Blues

Using a RAM disk to un-ARC the contents of your START disk can save you time and frustration. First make a backup copy of your START disk as usual. Then open the RAM disk's drive window and copy ARCX.TTP into it. (This is the only file you will need to copy to the RAM disk.)

Now, in the RAM disk window, double-click on ARCX.TTP. In the box that comes up on screen, type in the name of the file that you want to un-ARC. Because ARCX.TTP and the file you want to un-ARC are in different drives, you will need to preface the file name with A:\ to indicate that the file is on drive A.

For example, to un-ARC ST Writer 3.0 on this issue's disk, you would type in A:\STWRITE3.ARC and then press Return. ARCX will show you which files are being un-ARCd as usual, but they will un-ARC directly onto the RAM disk at greatly increased speed. When you return to the Desktop, all the files associated with ST Writer will be in the RAM disk. Just insert a new disk into your floppy disk drive (drive A) and copy the files from the RAM disk to the floppy disk.

What's a Print Spooler?

Your ST can send data to your printer much faster than the printer can take it and while the printer prints, you can't use your computer. Therefore, if you're printing a sizable document, about all you can do is twiddle your thumbs until the printer's finished printing.

A print spooler, however, intercepts printer output before it's sent to your printer, stores it in a pre-determined portion of memory and then sends it to the printer as fast as the printer can accept it. The print spooler acts like a funnel: it receives information as fast as the ST can send it, fooling the ST into thinking that it's sending data to a printer that can keep pace with it—and thus freeing up your computer quickly so you can work with it while the spooler sends the data to the printer itself.

There are software and hardware print spoolers. RAM Baby includes a software print spooler that you can install when you install the RAM disk. Just set the spooler at any size you want, provided you have enough memory to handle it, and from now on, whenever you print a document with RAM Baby installed, you won't have to wait for your printer to finish printing. ■

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THE ST

by Michael Perry

Sound editing in Hollywood will never be the same—that is, if Bob Moore has his way. His DM-1 system, driven by a Mega 4, promises to revolutionize the process of movie sound recording. Whether it's a gunshot or a cow's moo, the DM-1 can add it to any film, anywhere, and far more efficiently than the time-honored Foley process.

Screech! The bad guy's car speeds away. Crack! Crunch! Shatter! The cop car careens into it. Ka-Pow! Rat-A-Tat! A shootout. Mmpph! Thud! The bad guy moans and falls to the ground. The members of the audience teeter on the edges of their seats.

Every thrilling sound effect in the motion picture "Cannonball Run III" was added using a Mega controlling a revolutionary new digital sound-editing system called the DM-1, developed by Bob Moore and his associates.

Traditionally, once a film has been edited, it goes to a sound-editing company where craftsmen painstakingly cut and splice sound effects, one by one, into bulky reels of magnetic film. A 30-second chase scene can have more than 500 individual sound effects, from gunshots and sirens to footsteps.

For the last 60 years, this has meant physically cutting magnetic film and splicing in each effect. (Magnetic film is 35mm motion picture film coated with the same magnetic oxide found on an ordinary music cassette. It runs parallel with the picture. For each "track" of sound, there is a reel of magnetic film.)

To create 24 sound-effect tracks (a common number), the sound editors splice together 24 separate reels of magnetic film which all run at the same time when the picture's sound is mixed. It's cumbersome, slow and subject to failure—when one track breaks, two dozen machines must be stopped while the reel is repaired. This method has been used throughout the history of sound film.

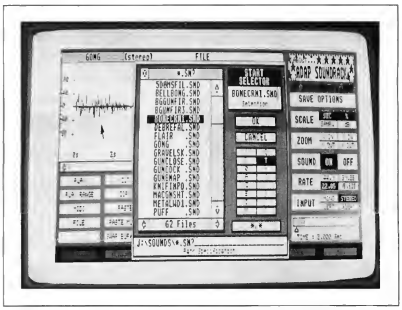
But what would happen if someone invented a system that stored the sounds *digitally*, with CD quality? And, rather than cutting reels of film manually and splicing in effects one by one, a sound editor could simply play the picture on a video deck, stop it where he or she wants to add an effect, choose the sound, click a mouse and lay it in? Well, someone did, and the Atari Mega is the heart of this versatile professional sound-editing system that's winning rave reviews in Hollywood.

Behind the DM-1

The DM-1's inventor, Bob Moore, has four of the systems at BLC sound, located on the 20th Century-Fox studio lot in Los Angeles. Each system consists of an off-the-shelf Mega 4 with a color monitor and Astra 120-megabyte hard drive, a multi-track tape recorder with amplifier and speakers, a standard VHS video recorder and Hybrid Arts' ADAP Soundtrack and SMPTE-Mate boxes, which read SMPTE time code from the video recorder and send that information to the computer and a multitrack recorder.

SMPTE code is to video what ASCII is to computers: an agreed-upon standard that editors, broadcasters and others use as a common frame of reference, no matter what equipment they're using. (SMPTE stands for Society of Motion Picture and Television Engineers.) SMPTE code assigns a unique number to every picture frame of a videotape, 30 frames a second. The DM-1 uses the SMPTE code to keep the three different elements—the Mega 4, the multi-track recorder and the videotape—in sync.

Building soundtracks with the DM-1 is extremely intuitive. To demonstrate, Moore loaded a videotape showing an action scene from the trailer of a "com- ▶



File selector box showing sound effects files names. Each file contains one sound effect. Highlighted is the "bone crunch" sound.

ing soon" cops-and-robbers movie. On the videotape, the picture had been edited, but there were no sounds yet, so the car chase, gunshots and explosions played silently.

"First, we go through a picture and mark where we want to add sound effects," Moore explained. A screen on the ST showed four columns: Sound Start, Sound End, a blank column and a column for description.

The videotape showed a man popping out of a car window and firing a gun. Moore paused the VCR and typed into the description column "Gunshot/Car". The ST added the starting and stopping times automatically by reading the SMPTE code off of the videotape.

Similarly, he paused at many other spots in the two-minute video, making notes such as "Body falling", "Skidding" and "Machine gun". Soon, he had a detailed cueing sheet with SMPTE code start and stop times and descriptions of the sounds he wanted. What was missing were the sounds themselves.

Then, the really amazing part began. On the ST screen, Moore opened a START Selector box, labeled A to Z. He chose the C: folder and within that opened the CARS folder. Inside were standard ST files with names such as CARSTRT.SND, CHARGER.SND and CARSKID.SND. He selected one of the sounds and then clicked on the PLAY box onscreen. Over speakers came the unmistakable *screech* of a car speeding by, reproduced with CD quality.

After a mouse click, the cue sheet appeared again. Moore clicked next to "Gunshot/Car" and the ST copied the filename CARSKID.SND into the blank column. Then he played the video. The screech was perfectly synchronized with the picture on the screen.

Going back and forth between the cue sheet screen and the sound selection/modification screen, Moore chose appropriate sounds for every action in the videotape. The once-empty column on his cue sheet filled quickly with sound filenames and within an hour he had accomplished what normally takes two days—selection and positioning of 60 to 80 sound effects.

Now came the real test: How would it all look and sound together? Moore put up the cue sheet screen on the ST and simply pressed Play on his video deck. The DM-1 read the time code from the video and, amazingly, every sound effect he had chosen played back, one after the other, and sometimes two simultaneously, filling the previously silent videotape with thrilling action sounds, exactly synchronized to the picture.

Bob Moore, inventor of the DM-1 sound editing system, in his studio. SMPTE time code from an ordinary VHS video deck drives the ST-controlled sound editing system and the multitrack recorder.

The Computer of Choice

Bob Moore looked at several computers before choosing the ST, largely for its sheer computational muscle. "We considered several other popular computers, but none had the raw power and speed we needed to drive our system. The ST's low price was a major factor. We also needed a machine that would be around for years to come. If we had developed this fantastic sound-editing system and the computer that drove it had been discontinued, it would have been very frustrating." Moore's faith in the ST has been rewarded—it's still here, when some other systems have disappeared.

Larry Smith and Dale Jergenson of Candlewick studios in Hollywood bought the ST when it first came out and claim that "it paid for itself on our first job." Smith explained that most similar systems cost over $100,000 and many are less versatile. Jergenson gave an example of the efficiency of cutting soundtracks using the DM-1: "A couple of years ago we had a scene where we had to add the 'click and whir' of a photographer's camera. Back then it took us seven hours. Using the ST system, I can do the same scene now in 10 minutes."

Smith feels that the machine addresses a real need in the film industry by allowing him to create better soundtracks faster and for less money. "Put in the hands of a good sound artist, it's a jewel," Smith says, but he cautions that the DM-1 is only a tool and only as good as the artisan and craftsperson using it. "It's a wonderful piece of equipment," he says, "but just as a good word processor does not make a person a

good writer, this equipment won't turn a hack into a great sound editor."

The old method of sound-editing has many serious limitations. A walk down the hall at 20th Century-Fox reveals how sounds were stored in the past: a gigantic sound vault, filled with thousands of boxes of magnetic film and indexed on filing cards, like a public library. Harry Snodgrass, a film sound editor who has switched to the DM-1, explained what an editor ordinarily had to do to get a sound effect.

"You would go to a vault like this and look in the index to find the sound you wanted. If there were several options, you'd have to get the actual tapes and play them on a player. Once you'd found a sound you liked, you couldn't just put it into your soundtrack—these were master tapes. You'd send it out to a sound facility to be copied and you'd get it back the next day to splice into your film."

"If you found a gunshot sound you liked and wanted to use it 50 times, you have to get it transferred 50 times onto 50 different pieces of magnetic film."

The procedure is much simpler with an ST. All of the sounds that you may need can be sampled and stored on a hard drive. Once there, they can be previewed and copied instantly, using the appropriate software.

Care for a Sample?

Sampling is as simple as playing the tape on an ordinary tape player and sending the audio signal into the ADAP soundtrack, which converts the sound into digital information. Then a file name is chosen and the sound is captured in the hard drive. The only limits are the quality of your original sound recording and the capacity of your hard drive.

Moore plans to expand the sound storage capacity of the system in two ways. First, he plans to sample each sound effect in the cavernous 20th Century-Fox library and save it onto a set of about 100 CD ROM disks that can be played back on Atari's CD ROM player. He chose CD ROM over ordinary CD's because of its ability to use a file organization system that lets an editor locate a particular sound effect instantly. The sound library that once filled three large rooms should soon fit snugly into an amazingly small space.

The second storage expansion Moore is developing is a proprietary 1.6 gigabyte—that's 1,600 meg!—hard drive that will be introduced next year. He envisions that the drive's capacity will allow the storage of several hours of digital sound and the ability to build multiple tracks completely digitally rather than downloading two at a time to magnetic tape.

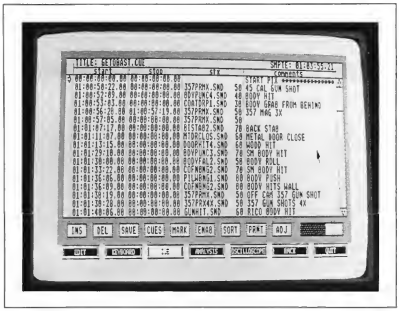
For 60 years, sound editors have had to physically cut magnetic film and splice in each sound effect.

Zap! Tpweeeng!

As the demonstration progressed, the power of the system to handle routine sound-editing situations was proven handily. I decided to throw Moore a curve and asked him to put a Martian death-ray-type sound over the gunshot in the videotape.

In the old days, that would mean going to a specialty sound facility, creating the sound on synthesizers, transferring it to magnetic film and splicing it in. On the DM-1, it's a lot faster.

Moore put up the sound selection/modification screen. Using the mouse, he drew an irregular sound wave by hand, then repeated it several dozen times, by clicking on a few selection boxes. Then he loaded in an existing gunshot sound on top of his hand-drawn sound wave and drew an envelope around the sound. ("Envelope" is a term that describes the way the sound starts from nothing, ramps up to its full volume and fades down. Using the ST, creating a unique envelope is as easy as moving the mouse.) Then Moore played the videotape again. When the bad guy drew his gun, instead of "Bang!" we ▸



Screen from DM-1 showing cue sheet function. At top right is SMPTE code, as read from videotape. Columns from left to right show start and stop times, sound effect file name and editor's notes.

heard the "Woo-Woo-Woo!" that was unmistakably a Martian death ray.

The real advantage of the ST-based system is in its flexibility. The difficult (but not uncommon) sound problem of the death ray that once would have required the talents of several different people and machines (and a delay of a couple days) could be solved by one craftsman, without his having to leave his sound-editing station.

Foley-Equipped Sound

As fast as the DM-1 is at creating and adding sound effects, there's an even faster method for putting in certain *kinds of* effects. This is called the Foley method and it's used for adding footsteps, clothes rustling or any long series of repeated sounds.

Traditionally, Foleying is done in a room where the floor is covered with the different types of surfaces: gravel, wood, asphalt, leaves, etc. Then, the picture is projected over the Foley artists' heads and they try to copy the actions on screen as accurately as possible, while their sounds are recorded.

The new way to Foley a film, with the DM-1, requires that a single sound, say a footstep, be sampled and fed into the ST's memory. Then, the Foley artist hooks up an ordinary MIDI keyboard to the ST's MIDI port and assigns to each key a slightly different version of the same sound. The picture is played and the artist merely presses one key for each footstep while watching the picture. The computer makes sure that the video and his sounds stay exactly locked up.

Film industry reaction to the ST-based sound-editing system has been quite positive. Brian Kelly, sound engineer at Sprocket Systems, the post-production branch of Lucasfilm Ltd., wrote an article for a film-trade paper that described an imaginary sound-editing system of the year 2000. The article called for digital sound storage, a user-friendly interface and the ability to place effects with the push of a button. The day after the article appeared, Kelly was surprised to get a call telling him that most of his "imaginary" system already existed!

Kelly said, "When I wrote the article, I'd never spoken to [the inventors of the DM-1]. Apparently, they'd done the same research that we had and the system I saw was a beta version but seemed very promising. I wish them the best of luck! I was surprised to see most of the features I whined for included in their machine."

The End of Razor Blades

The DM-1 is rapidly gaining acceptance in Hollywood. More than a dozen feature films have had their soundtracks created on it, as well as many popular television shows and specials, including "Beauty and the Beast," "MacGyver," "The Cosby Show," "War of the Worlds" and ads for Coca Cola and "Beverly Hills Cop." Considering its high quality, ease of use and relatively low cost, the number of movies and TV shows that use the DM-1 system should grow exponentially in the next year.

The sound design for "Beauty and the Beast," CBS's hit TV series, is created with the DM-1 sound editing system. Photo Courtesy of CBS.

Is it still "sound cutting?" It will always be called that, just as the act of making a telephone call on a touch-tone phone is still called "dialing." But thanks to the phenomenal power of the ST and the programming wizardry of Bob Moore and his associates, razor blades and splicing tape seem to be rapidly headed for the cutting room floor. ■

Michael Perry is the head of CU Productions in Hollywood. He has produced over 100 music and industrial videos. When not on a film set or in front of his ST, he usually can be found at the latest horror movie.

by David Plotkin
START Contributing Editor

THE NEW TOS ROM ERRORS

Just what do the new TOS ROMs have that the old ones don't? Well, among other things, they eliminate the infamous "underline" crash and let you "move" files more quickly from one directory. But, most importantly, the new TOS ROMs have new explanations for new and horrible system crashes.

The new TOS ROMs have been widely heralded for increased speed and fixes of bugs which have existed in the operating system since it crawled up out of the swamps in Pacific Grove, California, home of DRI (inventors of GEM). What is not as well known is that a series of new error codes has been added as well. You've undoubtedly seen errors of this type before: an alert box pops up saying something like TOS ERROR 35. If you were really interested, you dug out a book and looked up what the error meant, but usually you didn't, because the only result produced by clicking on "OK" was that you crashed to the Desktop, losing all your work.

Crashes could manifest themselves in any number of ways, but the most common results were a frozen keyboard, a frozen mouse and perhaps a line of bombs marching across the screen (the most I've seen is 11). In the original ROMs, these were little mushroom clouds, but in the current ROMs they are the standard anarchist bombs. I wonder why they changed them to the "standard" (as used in the Macintosh). I also wonder why Apple didn't sue them for "look and feel" violations. Now that would be a hot one: can you just imagine the Apple attorney telling the judge that Apple was sore because the look and feel of an ST system failure was just like a Mac's?

Anyway, the new TOS error codes are poorly documented, but extensive observations by the author have ferreted out their meanings. Each TOS error code I've found is listed here with its number, the explanatory text, the conditions under which the error occurs, what happens when you click on OK and any hints on how to avoid the error conditions. Look out for these errors!

- **TOS ERROR 251**: IT WILL TAKE TOO LONG TO MOVE THE SPECIFIED DISTANCE.
  Occurs: Attempting to move more than 100 cells when using a slow-scrolling spreadsheet.
  Click on OK: Changes mouse to bee, then scrolls *200* cells.
  Hint: Get a faster spreadsheet. ▸

• **TOS ERROR 252**: YOU HAVE NOT SAVED YOUR WORK!
Occurs: Randomly, but only after more than two hours of keyboard entry with no disk activity.
Click on OK: Crash to desktop (eight bombs).
Hint: Save your work.

• **TOS ERROR 253**: INSTRUCTIONS TOO BRIEF.
Occurs: When you try to play a game whose instructions are inadequate (primarily European imports and notably English games). The purpose of this error is to keep you from becoming too frustrated by all the things on the screen which aren't explained in the half-page, three-language manual.
Click on OK: Lets you play Pong, which anyone can master.
Hint: Pressure publishers to give adequate instructions.

• **TOS ERROR 254**: YOU HAVE BEEN WARNED!
Occurs: When you boot a game that has been trashed by every reviewer.
Click on OK: Goes into an endless loop which keeps asking "Are you sure?"
Hint: Reboot with a different game.

• **TOS ERROR 255**: YOU'VE GOT TO BE KIDDING!
Occurs: Randomly, but only when you try to run ST BASIC.
Click on OK: Lets you run ST BASIC, but many of your old programs won't work. (No, wait, that's a *feature* of the new version of ST BASIC).
Hint: Buy a real programming language.

• **TOS ERROR 256**: GOOD FOR YOU!
Occurs: Randomly, but only when you try to boot a "structured" programming language, such as Pascal or Modula 2. The frequency of this error seems to be related to how recently you read one of David Small's tirades against structured programming techniques.
Click on OK: Shows a small graphic of the logo for "Gadgets by Small" being smashed by a giant rabbit, then runs your language.

• **TOS ERROR 257**: THERE'S SOMETHING GOOD ON TV!
Occurs: Randomly, but only after something you want to watch comes on the tube. Due to the ST's tremendous interference with nearby TVs and VCRs, this error will warn you that you really can't have the TV and the ST on at the same time.
Click on OK: Shuts off the TV (requires special attachment, available Real-Soon-Now).
Hint: Turn off ST before turning on TV. This works most of the time.

• **TOS ERROR 258**: GO DO SOMETHING ELSE!
Occurs: Many ST owners tend to sit at their computers to the exclusion of exercise, eating, household chores, interfacing (oops, I mean talking) with spouse and children. This TOS error occurs when urgent matters call (i.e. the dog wants out, the baby needs changing, the house is on fire, etc.)
Click on OK: Crash to Desktop.
Hint: Go do something else.

• **TOS ERROR 259**: SHAME, SHAME, SHAME!
Occurs: When booting pirated software.
Click on OK: Erases the disk, then smoke starts pouring out of the ST's vent ports. It's not damaged, but it scares the hell out of you. (I've only heard of this error, never actually seen it. . .).
Hint: Don't steal software.

• **TOS ERROR 260**: WARNING!
Occurs: When your spouse is approaching and you are using your ST for something he or she wouldn't approve of (i.e. betting on the ponies, playing Strip Poker. . .)
Click on OK: Puts a fake spreadsheet (titled Our Hawaiian Vacation) on the screen.
Hint: Lock the door.

• **TOS ERROR 261**: WHATTA WASTE
Occurs: When doing something totally worthless with your ST, like writing this article.
Click on OK: Crash to Desktop. ■

David Plotkin was born in a thermos just outside of Angmagssalik, Greenland, where he learned to speak fluent Beetle by the time he was seven minutes old. His webbed toes, all 14 of them, make him a curiosity at home and at work, but his major claim to fame, aside from being a START Contributing Editor, is his world-record for mucilage consumption.

R/C Aerochopper

One More Reason for Owning an ST

by Andrew Reese
START Editor

Do you fly radio-control model airplanes or helicopters? Or has your hobby budget been exhausted by too many crashes and expensive repairs? Well, there's finally a way around the high cost of learning to fly R/C. It's called R/C Aerochopper, made by Ambrosia Microcomputer Products, and it's a truly unique product: a realistic computer simulation of the R/C flight experience.

As you can see in *Figure 1*, Aerochopper is a hardware add-on for the ST. It consists of a plug-in cartridge with a 64K flight simulator in ROM. Plugged into the cartridge (and also attached to the ST chassis via a ground strap) is a modified Conquest four-channel transmitter. It looks and feels just like the real thing—that's because it's an actual transmitter shell without the RF or encoder sections. This portion of Aerochopper is made for Ambrosia by Futaba, one of the world leaders in R/C equipment.

Setting up Aerochopper is simple. You turn off your computer, plug in the cartridge and then carefully plug the transmitter cable into the cartridge. You need to have a color monitor to use Aerochopper, but since all of the software is "hard-wired" into the cartridge, there's no program to boot from disk. When you boot with the cartridge installed, you'll see a new icon on your Desktop: it's a disk icon identified with a lowercase "c" (for cartridge). You double-click on this icon to open a window and then on the R/C_AERO.PRG file inside. In a few seconds you're at the main menu of Aerochopper.

Figure 1: Aerochopper is a unique combination of hardware and ROM-based software that lets you experience the feel of R/C madeling at *your ST*. The "transmitter" is an authentic Futaba Conquest shell that plugs into a cartridge.

Trainer to Jet—Your Choice

There are a number of simulations built into Aerochopper. On the fixed-wing side, you can fly a trainer, glider, pattern ship or a ducted-fan F-18. On the rotating-wing side (that's helicopter talk, son), there's a Bell-like chopper. All of these craft are shown as three-dimensional structures with hidden lines removed. They're not perfectly detailed, but then again, this is no World Championship Scale contest, either. In addition to the variety of shapes, you can dial in a number of predefined patterns of flight characteristics (scenarios) from the most basic trainer to a fully aerobatic AMA-style pattern bird to a *very* hot jet. ▶

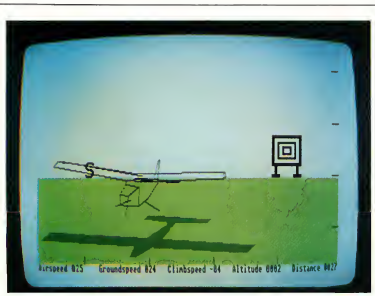


Figure 2: A static screen shot just can't capture the feel and authenticity of Aerachopper. While you can use Aerochapper like a game, its true value is in teaching R/C piloting—at almost any level of skill.

At the main menu, you can select a scenario or dive into the incredible range of variables built into this package. You have *four screens full* of aircraft or helicopter parameters to shape the flight envelope exactly to your liking, *plus* you can specify wind conditions, equipment glitches, sun direction, etc., etc., etc. The breadth of potential adjustment is truly astounding. David Stern, the mastermind behind Aerochopper, has done the near-impossible here.

But for all of this adjustability, does it work? Oh, yes, it does. I am amazed how a computer simulation is able to capture the feel of flying an R/C model plane and helicopter. I've been flying fixed-wing R/C craft for eight years and have flown ducted-fans, trainers, giant scale, gliders and hot sport ships of every description. The flight characteristics of each can be duplicated easily on the ST's screen. It's a ball!

And Even Helicopters!

I have always wanted to fly R/C model helicopters, but their price, fragility and steep learning curve always deterred me. I've read about them, watched them and talked to lots of R/C chopper pilots, so I'm familiar with their flight characteristics. But am I ever glad that my first flight experiences were on Aerochopper. I munched so many helicopters! (When you crash any of the aircraft in Aerochopper, you get a wonderfully destructive explosion as your computer model disassembles itself, followed shortly by a report on your ground speed and vertical speed when you hit the ground.) But not one of the crashes cost me a dime. Finally, thanks to Aerochopper, I think I've got the hang of it; it's time to go to the hobby shop.

At the main menu, you can select a scenario or dive into an incredible range of variables.

Of course, nothing can truly replace the experience of staring up into a cirrus-filled sky with a high sun and trying to keep track of your $1,000 airplane. A computer screen just can't capture the joy—and adrenaline. But this simulation was not meant to *replace* the R/C experience. It's a trainer and a very good one. I am absolutely convinced that a few hours of stick time on Aerochopper will shorten the learning curve at the flying field drastically.

For the more advanced pilot, it is now possible to work out the control inputs needed to produce those aerobatic maneuvers that are difficult and risky to practice in the sky with an expensive airplane. A good example is knife-edge flight (flying with the wings vertical and the fuselage horizontal). With Aerochopper, you can get that rudder thumb coordinated before you try it at the field.

Quibbles and Recommendations

Is it perfect? No, nothing is. The display is pretty simple (see *Figure 2*) and the planes are white against a white sky, making it necessary to keep the planes in pretty close to maintain effective control. The manual is extensive, but poorly organized and filled with typos (maybe this only bothers an editor). For example, the scenarios are not explained until Chapter 7; I would have liked to see a "quick start" section leading off the manual, so that the experienced pilot could choose an appropriate scenario quickly. Other manual problems include such proofing mistakes as a reference to a nonexistent Appendix B (it's actually Chapter 12).

But for all the quibbles I might have, this is still an excellent product. At $199.95, it's definitely not cheap, but there is nothing like it on *any* computer anywhere. If you're into R/C aircraft, you'll want Aerochopper, even if you have to buy an ST to use it. But then you'll discover the rest of the wonderful world of ST computing—not bad! If you already have an ST and fly R/C—or want to fly—Aerochopper is for you. ■

PRODUCTS MENTIONED

R/C Aerochopper, $199.95.
Ambrosia Microcomputer Products, 98 West 63rd Street, Suite 371, Willowbrook, IL 60514, (312) 655-0610.

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Disk Instructions

How to Get Our Programs Up and Running

Each article in this issue with a disk icon next to its title on the Table of Contents or "On Disk" on its first page has an accompanying file on your START disk. These files are *archive* files—they've been *compressed* with the Archive Utilities Set, or ARC, a public domain program available for many personal computers. We use the ARC utility to squeeze the many files that may go with a particular article into *one* compressed file, which may be only 40% of the total size of the original files.

In addition to the archive files, you'll find the program ARCX.TTP, which stands for ARChive eXtract, on your START disk. You'll use this program to *decompress*, or extract, the disk files we've shrunk down with ARC.

Getting Started

To use the files and programs on your START disk, please follow these simple instructions. You'll need two blank, formatted single- or double-sided disks to properly extract the files.

Your START disk is not copy-protected and you should make a copy of it *immediately* to the first blank disk. Make sure the write-protect window is *open* on the START disk at all times to insure that you don't accidentally erase the disk.

Note: If you are unsure how to format a disk, copy a disk or copy individual files, please refer to your original Atari ST or Mega manual and study these procedures carefully before going on.

After you've copied your original START disk, store it in a safe place and label the copy disk "START Backup."

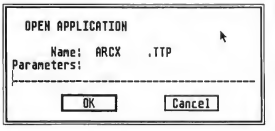
Now, put your START Backup disk in Drive A of your computer and double-click on the Drive A icon to see the disk's contents.

Un-ARCing the Files

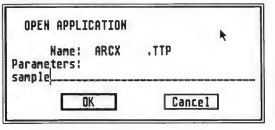
To use START's compressed disk files, please follow these steps:

1. Copy the ARCed file you wish to use and the program ARCX.TTP from your START Backup disk onto your second blank formatted disk. When you're finished, label it *Un-ARC disk.*

2. Now you'll extract the compressed files from the ARC file you just copied. Insert your Un-ARC disk into Drive A and press the Escape key on your ST to see the disk directory. Double-click on ARCX.TTP. The following dialog box will appear:

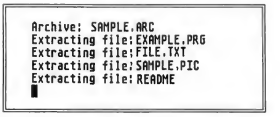


3. Type in the name of the ARC file you just copied over to your Un-ARC disk as shown in the example below and press Return. You do *not* have to type in the extender .ARC.



(Note: If ARCX.TTP can't find a file, it may be because you have misspelled the name of the ARC file. You must type the filename *exactly* as it appears in the directory.)

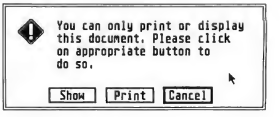
4. As the program runs, it will display the names of the individual files as it extracts them, similar to the example below.



When ARC has successfully extracted all the files, it will return to the Desktop and you will see the original files within the directory window, along with the archive file and the ARCX.TTP program. You may now use any of the START files as you wish; just follow the instructions in the appropriate article in this issue.

To use any other archive files on your START disk, simply repeat the above procedures.

In addition to the runnable programs, some ARC files may also contain source code listings or an ASCII text file (called BREAKDWN.TXT, for example) which describes the program's structure. You can examine this file from the ST Desktop by double-clicking on its icon and then clicking on Show (to see it on the monitor) or Print (to print it out) as shown in the example below.



ST Writer 3.0—No Foolin'!

This issue START is happy to feature **ST Writer Elite** version 3.0.

On your START disk in three languages—German, Spanish and English. Un-ARC either GERMSTW.ARC, SPANSTW.ARC or STWRITER.ARC for your fast-paced writing needs. The complete ST Writer manual (in English only) is in the file STWMAN.ARC in ASCII format so you won't have any trouble getting the program running. As with previous versions of ST Writer and ST Writer Elite, you may distribute this program freely.

Be sure to set some time aside this month to play **Poker Solitaire** by Carolyn Rogers. This is the first program START has ever published in Modula 2, so if you've been curious about this language be sure to take a look at the source code. File POKER.ARC; runs in medium resolution.

Dave Small beats his own speed record this month with **Partcopy**. Move a megabyte of hard drive data in just four seconds to another section of the drive or to a second hard drive for backup. This is an extremely powerful tool, so be sure to read the article thoroughly before running it. If you have *any* doubts as to how this program works or what it does then *don't* run it—you could lose important files on your hard drive. File PARTCOPY.ARC; runs in medium or high resolution.

If you have read this issue's Getting Started column and decided a RAM disk is just what you need, you're in luck! On disk is **RAM Baby**, a public domain desk accessory by Randy Mears of Intersect Software. RAM Baby is a combination RAM disk and print spooler. The complete documentation is also on your START disk; file RAMBABY.ARC. ■

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Every issue, START features great programs on disk. If you bought this issue of START without the disk, you're missing out!

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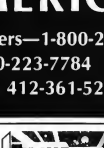

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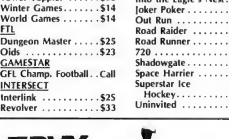

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Cyber Corner

Special Effects, Part II: Thunder, Lightning!

by Jon A. Bell

(Editor's Note: *As the title states, this is Part II of Jon Bell's guide to simulating motion picture optical effects with ST paint and animation software. Part I was published in the February 1989 issue. The image of the Narcissus shuttle craft that is the subject of this series was included on the February 1989 START Disk in the file CYBERCNR.ARC. It is also available as a compressed DEGAS low resolution image on the March Antic Software Shelf on Compuserve; the filename is NARCISUS.PC1.)*

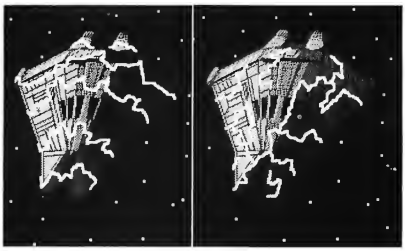

Figure 1. Two versions of the lightning effect. You can have the lightning travel across a range of frames after the torpedo impact or crackling randomly across the surface of the ship.

Okay. As our story has gone so far, the Narcissus shuttle craft (from the movies *Alien* and *Aliens*) has taken a direct hit from a photon torpedo, but is still intact. (A low-bidder torpedo?) But we can still use optical effects to show the aftermath of the photon torpedo. Rather than do a frame-by-frame description, I'll just toss out some ideas for you to add to the sequence.

• On the frame after the white frame (the one we inserted to create a "flash" effect), select Separate on the Frame menu and fill every shade of gray on the ship with white, making the entire ship seem to glow. Then, on a series of frames after that, separate one or more of the grays (alternating from dark to light) with white. The end result will be that portions of the ship will flash, an effect similar to color cycling. (You can also Clip the image of the whited-out ship and paste it on random frames, making it appear to sputter as the photon energy burns out.)

• Use white and the Fill command to fill random areas (such as panels and panel lines) on the ship on the frames after the hit. Note: if you have a newer color monitor, the right side of the ship may appear completely black. It's not—it's actually a very dark gray, with black panel lines running through it. You can pick out the detail by Filling with white in this area, or by temporarily altering the ship's colors on the Palette menu.

• Rotoscope it. After the "nuke," draw a progression of white lightning on the ship, radiating out from the point of impact. You can have it travel from the impact point, crawling in a wave of energy over the ship until it dissipates at the engine thrusters (see *Figure 1*). Or, you could have it flashing randomly over the ship. When you draw the lightning, try to follow along the angles and panel lines of the ship—it'll give the effect of more depth.

For Cyber Paint 2.0 Owners. . .

To me, Cyber Paint 2.0 has two incredible advantages over version 1.0: the ability to change the color palette from frame to frame and the Pixel F/X menu. We'll just cover the first feature this ▸

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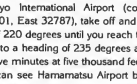
Flight notes

5C

Exploring Japan with Jet (Part 2)- SubLOGIC's Jet program now includes a free Japan Scenery Disk. Last month we took you on a guided F-16 tour of Tokyo.

This month we'll follow the Japanese coastline on a cross-country flight from Tokyo to Osaka. Starting from Tokyo International Airport (coordinates North 18201, East 32787), take off and turn to a heading of 220 degrees until you reach the coast. Turn right to a heading of 235 degrees and fly for about twelve minutes at five thousand feet altitude until you can see Hamamatsu Airport below you (see Tokyo area chart). Turn right again to a heading of 305 degrees and fly to Nagoya, another highly detailed city. At Nagoya, turn left to a 240-degree heading that will take you straight to Osaka. When you find yourself flying over Osakajo Castle, begin your descent for a landing at Osaka International. This entire flight takes only twenty five minutes at Mach 1.4.



More on Scenery Disk # 9 - As announced in last month's column, this newest Scenery Disk covers the midwestern United States in incredible detail. The city of Chicago now has many more buildings, landmarks, and visual cues than before. St. Louis Missouri is also packed with scenery, bordering a super-realistic rendition of the Mississippi River that runs from La Crosse Wisconsin to Dyersburg Tennessee. The Cincinnati sectional area features a cluster of more than thirty mountains in the Allegheny region stretching from Tennessee to Pennsylvania. With over 150 detailed airports and numerous VOR and NDB transmitters, this disk covers hundreds of thousands of square miles with enough scenery surprises to keep you exploring for a long time.

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column and talk about pixel effects in our next installment.

The on-the-fly color changing is tremendously useful for Special Effects (SFX), especially our Narcissus nuke sequence. If you have a copy of 2.0, make sure you're in To Frame mode, with Tween turned off, and then try this: On the frame after the white-out, separate all the grays of the ship to white as described above. You'll be changing only colors 9-14 on the Palette menu, counting from left to right. Go to the frame after that, go up to the Color menu and select Palette. Here are the color values to set:

Frame 12—(with the entirely white ship)—leave palette normal.

Frame 13—Starting at color 9 on the Palette strip (counting from the left and working from left to right, to color 14, third from the right), set the RGB values at 740, 741, 742, 743, 744, 745.

Frame 14—Colors 9-14: 711, 722, 733, 744, 755, 766

Frame 15—Colors 9-14: 511, 522, 533, 544, 555, 566

Frame 16—Colors 9-14: 311, 322, 333, 344, 355, 366

Now play the sequence. You'll see a fascinating red glow effect that dissipates rapidly after the photon torpedo hits. Experiment with this effect on later frames—change different shades of gray to a shade of red, orange or yellow for a flashing energy effect.

The Persistence of Visionaries

Here's another unusual way to dress up the nuke effect (for Cyber Paint 2.0 owners only).

First, click twice on the Create Frame/Next icon in the Playback Bar on the frame immediately after the white-out frame. This will copy that frame twice to your sequence. Now, go to the (new) first frame immediately after the white-out frame, then select Palette from the Color Menu. Set the RGB values as follows: 000, 701, 702, 703, 704, 705, 726, 737, 711, 722, 733, 744, 755, 766, 757, 777. Go to the next frame (the second new frame you inserted) and set the RGB values to 000, 007, 107, 207, 307, 407, 507, 607, 017, 127, 237, 347, 457, 567, 057, 777, then play the sequence.

Notice the change? There's a subtle "swell" as the screen whites out, the colors fade and the ship glows red. This is an effect I copied from the film *Altered States*. The SFX there played upon a human physiological effect: when you're exposed suddenly to a bright light, you'll see a reddish-purple afterimage that fades away as your eyes recover. What they did, and what we've just done, is create that effect artificially. Next time you nuke something in Cyber Paint 2.0, remember this!

Until Next Column

One final note: always take into consideration the physical conditions present within your sequence. In our nuke sequence, the Narcissus is obviously being illuminated by a harsh single light source off to its right. What *should* happen to the ship as a (presumably) brilliant ball of light approaches and hits it? Shouldn't that side of the ship start to brighten as the photon torpedo approaches?

I'll leave this graphics problem for you to solve. Next column, we'll talk about miscellaneous lighting effects, Cyber Paint 2.0's Pixel FX menu and one of my favorite topics: traveling mattes and how to use them. ■

Jon Bell was formerly Associate Editor of START and is now the Managing Editor of Oracle Magazine.

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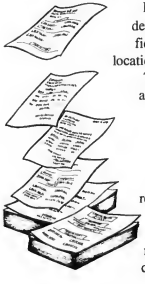

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dBMAN is also available on Novell Netware, IBM PCNET, PC DOS, SCO Xenix, UNIX on NCR Tower, NEC ASTRA XL, Motorola 8000, Altos, Microport 286 and 386, Apple Macintosh, and Commodore Amiga.

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- ✓ Maximum characters per field: 254
- ✓ Maximum number of records per database: 2 billion
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- ✓ Numeric precision: 17 digits

System Requirements:

- ✓ Atari 520, 1040, or MEGA ST with one floppy drive and 480K free RAM.

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Online With START

SYSLAW

What Every Sysop Should Know

by Andrew Reese
START Editor

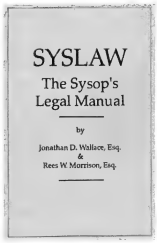
There are thousands of bulletin boards across the country. Some are one-person outfits and others are huge corporate services with large staffs. Running a BBS used to be as simple as hooking your modem up to the phone line and running appropriate software. A little word-of-mouth advertising on other systems and you were off and running, at least until you, your folks or your teenage kids (depending on your age) got tired of having the phone line tied up every night.

Now, there are dozens of commercial online services, available to meet every professional and personal need or interest. The anarchy of the early days is giving way to structure as the market—and the law—slowly adapt to this new technology.

And Now, the Lawyers

Now there's even a name for this area of law: SYSLAW. Two New York City lawyers, Jonathon D. Wallace and Rees W. Morrison, have written the first book for the layman on this subject, aptly titled, *SYSLAW* and subtitled, "The Sysop's Legal Manual". This issue, I'm sitting in for our regular columnist, Gregg Pearlman, because I was a lawyer myself for 12 years.

Wallace and Morrison have written an excellent guide for the person who is running a BBS (a Sysop) or is thinking of starting one. While written in legalese to some unavoidable extent, it is generally quite understandable. They approach this complex subject by first defining a Sysop's rights, then detailing possible liabilities in terms of specific situations.



SYSLAW, The Sysop's Legal Manual, by Jonathon D. Wallace and Rees W. Morrison.

For example, what if you are running a clean BBS and someone uploads a pirated program? Can you be held liable by the copyright owner? Can your equipment be seized? Can you be imprisoned? Wallace and Morrison analyze this situation and make specific recommendations that may help you avoid these dire consequences. Specifically, they recommend that a Sysop check uploaded messages and files *no less often than daily*, post a log-on notice warning against piracy and take immediate and public action to oust any offenders.

Wallace and Morrison are to be commended for including the actual text of recommended warnings and notices in their book. If you ever need to prove that you lacked criminal intent in your BBS operations, the fact that you religiously followed the recommendations of legal experts (like Wallace and Morrison) will help a great deal with the authorities.

Other Issues

Wallace and Morrison include an excellent discussion of a very complex subject, copyright law. Bulletin boards, by their nature, include a wide variety of materials which could be the subject of a copyright claim by the sysop, the BBS owner or by third parties. The authors wend their way well through this maze, again with specific recommendations.

One issue of particular interest to magazine editors is the fairly common practice of some Sysops to excerpt or reprint magazine articles on their boards. We at START Magazine do not mind if Sysops *excerpt* portions of articles from issues of START, *provided* that each excerpt is preceded by a proper copyright notice, such as "Copyright 1989 by Antic Publishing, Inc. Ex- ▶

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Quibbles

I can fault the authors in only two areas. First, I fear that they show their prejudices when they write:

> *Don't answer questions or volunteer any information until you have seen a lawyer. The police are not required to read you your rights unless they are about to arrest you, but any statements you make can still be used against you if you are arrested later. It is often said that the innocent are the ones most likely to get in trouble by volunteering statements to the police.*

Baloney! Not only are the authors in error about when (and if) your rights must be given, but their advice to the innocent not to cooperate with the police is misguided at best. I was a prosecutor for six years and in a private criminal law practice for another six and *never* saw a truly innocent person prosecuted because of statements volunteered to the police.

A Sysop's Lawyer

The other aspect in which I must differ somewhat with the authors is in their advice to Sysops looking for a lawyer. You probably should begin by talking to your own attorney if you have one, but because of the new and unusual nature of BBS law, you should look for a lawyer who handles either "high tech" law or copyright law. Ask your own attorney for a referral.

Alternatively, go to your local public law library (call your local courthouse if you don't know where it is) and ask for the Martindale-Hubbell Directory for your state. This is a listing of lawyers by community and specialty; if a lawyer lists copyright or intellectual property as a specialty, you can be more confident that he or she can handle your case.

However you locate a lawyer to assist you with any BBS-related problem, be sure that you take a copy of *SYSLAW* with you—and expect to loan it to your lawyer. You will be paying your lawyer by the hour and this book will definitely save you money by getting your lawyer up to speed more quickly. It's that good a book!

As a side note, if you are a computer professional, you may want to subscribe to Jonathon Wallace's Computer Law Letter, a newsletter focusing on legal issues in the computer industry. It's published six times per year. ■

PRODUCTS MENTIONED

SYSLAW, The Sysop's Legal Manual, by Jonathon D. Wallace, Esq. and Rees W. Morrison, Esq., $19.95 (plus $2 postage); **Jonathon Wallace's Computer Law Letter**, $30 per year. LLM Press, 150 Broadway (Suite 610), New York, NY 10038, (212) 766-3785.

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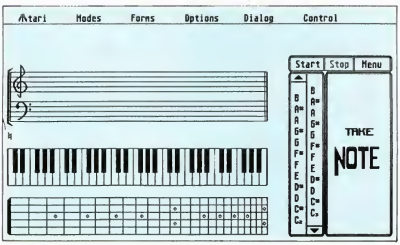
TAKE NOTE

Ear Training Made Easy

by Jamie Krutz

Okay, fans, Take Note software has come up with a real workout for your ears. Yep, you guessed it, we're talking about ear-training software. The program, also called Take Note, is an ear trainer that'll have you on your way to whistling those essential scales and intervals in nothing flat (or sharp, for that matter).



The main work screen for Take Note's ear-training software.

Warming Up

The big secret about music theory, as we in the West see it, is that *it's easy.* Don't let anyone tell you otherwise. We're talking 12 audio frequencies doubled about eight times into octaves. From those 12 notes comes most of the music you hear every day. That's right—the big stars in Rock, Country, Classical, New Age and yes, Bubblegumland, are taking those 12 pitches, throwing them together in scales, chords and intervals, and bingo, there it is. The tricky part is learning to hear what's going on.

Fortunately, the computer is a perfect tool for whipping your ears into shape.

Stretching Out

Take Note is not copy protected and its screen is uncluttered. Stacked on the left are a grand staff, a piano keyboard and a 24-fret guitar neck(!). Next to them is a Program Control box containing note letter names, a few command buttons and a big box with the Take Note logo in it. At the top is a long, blank box.

Clicking once on the Menu button gets rid of the empty box and reveals the GEM menu bar we know and love. The drop-down menus look pretty standard; they're not. Not completely. You'll need to go through the manual once to get a handle on how the program works. It's not that it's not easy, it's just a bit different. Once you get the feel of it, you'll do fine.

For one thing, you must turn on the menu bar whenever you want to change something from a menu. When you're actually running the program, the menu bar goes away.

Also, scrolling through the note letter name list works in the opposite direction from the kinds of scroll bars you'd normally see in everything from word processors to GEM itself.

Just clicking around on the screen can be baffling until you understand the program's three modes of operation: Sample, Study and Spell.

Calisthenics

Sample mode presents single pitches, intervals, chords, arpeggiated chords, or scales. Whatever you choose, Take Note will show it to you on the grand staff, the piano keyboard and the guitar neck, as well as labeling it for you in the dialog box (the long box at the top). The MIDI note number(s) of the note, interval, chord, arpeggiated chord, or scale are also shown in the dialog box, though they're ▶

not labeled. To know what they are, you'll have to read the manual.

To "sample" a single pitch, click the left mouse button on the grand staff, the piano keyboard, the guitar neck or the note-letter name display. Once you select a note, it will sound, and all the other display areas show that note.

Let's try sampling a scale. Left-clicking on the Clear command (or right-clicking anywhere) clears the screen. Now you can click on the menu button to call up the menu bar, go to the Forms menu and select Scales. Right-click to turn off the menu bar and return to the program. Now the Program Control box, which used to show the Take Note logo, shows a list of possible scales.

Click on any scale type in the list, such as Dorian, a type of modal scale. Now if you click on an A above middle C on the piano keyboard, an "A Dorian" scale will be shown on the piano, staff and guitar, and the dialog box will tell you that it's "A4 Dorian." The MIDI note numbers will also be displayed.

If you click on the high E guitar string when sampling scales, you will see the scale laid out on that one string. The guitar string is a great tool for understanding the intervals in a scale, since each half-step is clearly visible as a one-fret distance. The guitar string has no arbitrary black notes, as on the piano, and no flats or sharps, as in traditional music notation; just simple, honest frets.

If you click on a lower-guitar string, the program will display a typical one-position fingering pattern for the scale. The pattern can be restricted to the first position, or you can put it anywhere on the neck in either a four- or five-fret range. This is a nice touch.

Left-clicking to the *right* of the piano keyboard activates a mode which shows the note name over the entry area you click on. For the musical staff and piano keyboard, you'll see the note name and number. For the guitar neck, you'll see the string name and number, the fret number and the note name and number. (This hidden mode can also be used as a crutch in the study mode.)

Music for the guitar is written an octave higher than it sounds. To account for this, the program has another hidden mode. Left-click to the right of the guitar neck to toggle through three options. The first option transposes the notes on the piano and staff an octave higher while sounding the actual guitar note. The second also transposes the notes on the piano and staff, and sounds the transposed note. The third does not transpose from the guitar to the piano and staff. You will hear the actual guitar note, but it will be written an octave lower on the staff than normal. Guitar players, it's your choice.

You can use sample mode to your heart's content to find where notes, chords and scales are on the piano, guitar, and musical staff and see how they relate to each other. If you're learning to read notes on piano or guitar, sample mode can be a big help. Having the MIDI note numbers shown is an extra benefit for MIDI folk.

Drills

In Study mode, the program quizzes you on scales, chords, arpeggiated chords and intervals, and keeps track of your accuracy. This is where you will want to spend a lot of your time.

You can tell the program to quiz you randomly on any combination of intervals, chords, arpeggios and scales. This flexibility of choice lets you concentrate on the areas where you need the most work.

If you want, the program will start all scales and chords on whichever pitch you choose. More challenging is the Random Root option, which constantly changes the starting note of scales and chords. A Ranges option lets you limit the amount of variation.

If you feel like even more of a challenge, the Identify option requires you to give the letter name of the root of each scale or chord, as well as the scale or chord type. Otherwise you can give the type without having to know the letter name of the first note.

Wind Sprints

In Spell mode, the program will place a note on any of the entry areas. Your job is to find the same note on any of the other entry areas.

It wouldn't be "ear training" if you couldn't use your ears. Notes can sound through the computer's internal voices or through MIDI. you can also hook up any MIDI controller to enter notes.

Hit the Showers

This program fills a real gap in ST music software. It has some quirks in its user interface, the worst of which are the hidden commands: areas of the screen which are totally unmarked but where you can click to accomplish something. There ought to be visible buttons for these. It would also be nicer if the menu bar were always accessible.

But Take Note also shows a heck of a lot of thought. The inclusion of the guitar neck is wonderful. And the program is extremely flexible for setting up quizzes over just what you need to study.

So if you're a musician and you want to brush up on your theory, if you know the guitar neck, the piano keyboard, traditional notation or note letter names and you want to learn one or more of the others, *or* if you *aren't* a musician and you want to teach yourself to hear scales, intervals and chords, check out this program. It's easy to use and, like any good workout regimen, it works—if you use it. ■

Jamie Krutz is a producer/director and composer for film and video production. His 1040ST has been one of his favorite tools since 1986.

PRODUCTS MENTIONED

Take Note, $79.95. Take Note Software, 285 Divisadero #3, San Francisco, CA 94117, (415) 431-9495. Dealer Inquiries: Thinkware, 1134 Kirkham, San Francisco, CA 94122, (800) 248-0403.

MIDI Draw: Picture-Perfect Music

Painting Becomes a Performing Art

by Jim Pierson-Perry
START Contributing Editor

Through use of an electronic pencil and paper, MIDI Draw translates your drawings into music.

Pick up a pencil and start to doodle. Artistic ability aside, in no time at all you can easily produce several simple sketches. The pencil is so simple to use that it poses no barrier to your spontaneous creativity.

Now imagine sitting down with a music sequencer program driving a bank of synthesizers. Whoa! What are all these controls and numbers? Forget working on straight intuition, you need to pay some attention to how you use the sequencer. Too much attention, however, and the tool gets in the way of your inspiration.

MIDI Draw, from Intelligent Music, is a simple but powerful tool that lets you turn loose your musical creativity. It belongs to a new class of programs that use the computer as an interactive performing musical instrument. Through use of an electronic pencil and paper, it translates your drawings into music. Beneath this simple design are sophisticated control functions that you can tap to enhance your compositions. These functions let the program work on several levels, ideal for beginners yet still interesting to experienced MIDI jocks.

Basic Design

MIDI Draw is best described as a computer musical instrument. It's made up from four interrelated control modules: drawing pad, delay, recorder and interpreter. These modules act as independent monophonic voices and can drive four separate synthesizers or four voices on a multi-timbral synthesizer (the Casio CZ-101 or Yamaha TX81Z, for example). Each module has its own MIDI channel and volume, program (patch selection) and sustain settings. You can also set a range for note duration and note-on-velocity (loudness) for each module.

Editing numeric parameters is handled nicely. You can click on the parameter to increment or decrement the current value by one unit or click and drag up/down to quickly scroll through the parameter values. All parameters can be varied in real-time while running MIDI Draw to give interactive control of your performance.

The drawing pad is the heart of the program, providing the input to all control modules. The left/right axis defines note pitch while the up/down axis is for velocity. The pitch axis is not mapped directly to MIDI notes; instead, pitches are read from user-specified scales. The velocity axis ranges from zero (no sound) at the bottom to the upper limit, defined by a slider in the control module.

The program comes on a single-sided disk and runs on all models of ST and Mega computers with monochrome or color monitors. It uses a key disk-copy protection scheme that lets you load the ▶

program from a backup floppy or hard drive, providing the original is found in drive A. Send in your registration card to get a free backup master disk (a nice courtesy to the customers). The manual is well written, with plenty of illustrations, and includes both an index and glossary. Desk accessories can be resident in memory but can't be called from within MIDI Draw.

The Control Modules

The drawing-pad module is the primary control module. It's activated by selecting a pencil icon. You create your artwork by dragging the mouse through the drawing pad. Drawing left to right controls note pitch while moving up and down controls velocity, as described above. Color-monitor users can switch between two drawing colors (no affect on music), monochrome users get black and white. A toggle allows you to alternate between repeat and move modes. In repeat mode, the note corresponding to the current mouse position (pitch and velocity) will be repeated as long as either mouse button is held down. The repeat rate can be varied at will. In move mode, notes will be sounded only if you move the mouse while holding down a button.

The delay module takes the MIDI note and velocity data coming from the drawing pad and modifies it. Its primary use is to add a time-delay between sounding the note from the drawing pad voice and the delay voice. This can produce a chorus or echo effect if both voices are sent to the same synthesizer (must be capable of playing more than one note at a time). Alternatively, the two voices can track *each* other on different synthesizers. The delay setting can be varied from 20 to 2,000 milliseconds. A transposition function can be used to increase or decrease the delay voice by up to 12 half-steps (one octave) from the drawing-pad voice.

The recorder module stores the notes created by the drawing pad and can replay them at will. Screen buttons act as start, stop and play transport controls for a typical tape recorder. The playback can be an exact duplicate of the original notes and timing or the notes can be played at a constant velocity and fixed rhythm. The tempo can be changed from 20 to 220 beats per minute. Two controls let the computer add some random variation into what notes from the recorded sequence will be played and their order. You can also link the drawing pad to the recorder playback velocity control and add real-time control of loudness and softness.

A demo version of M, a high-end interactive composition/performance program, is included on the MIDI Draw disk.

The final module is the interpreter. This takes the current drawing and converts it, pixel by pixel, according to a fixed internal algorithm, into MIDI note data. You have control of the tempo and can introduce variation into what notes are played. The interpreter can be put into synchronization with the recorder so they start together and play at the same tempo. The interpreter is the only module that can produce multiple notes (up to four) at the same time, depending on the current drawing density.

Scaling the Heights

As mentioned, note-pitch values are taken from user-specified scales (called tonalities in the program), and a chromatic scale is a permanently fixed tenth option. You can switch between tonalities at any time while playing, either with the mouse or by pressing the tonality number on the ST numeric keypad.

There are two types of tonalities: octave and note based. Tonalities one through six are octave based. You select a number of desired pitches, from A to G sharp, to define a scale (for example, C major, B flat minor, pentatonic, etc.). Moving along the pitch axis runs up and down the selected pitches from one octave to another. A range control in the main screen sets the lower and upper octave bounds.

The remaining three tonalities are defined by absolute note. You specify the pitch and octave for as many notes as desired. Moving along the drawing-pad pitch axis selects notes from the set, ranked low to high. The octave-range master control is inoperative for these tonalities since you specify the octave when choosing the note set.

Making Movies

The current parameter and tonality settings can be saved at any time by taking a snapshot with the camera icon. Up to 15 snapshots can be saved in memory. This lets you quickly change between settings by clicking on the appropriate snapshot icon. Snapshot data can be saved to disk as a setup file for subsequent use or performance.

A movie option allows you to capture MIDI data generated by the program, up to your computer's memory limit. It acts as a toggle switch to turn the recording on or off. This data can be saved to disk in standard MIDI file format (Level 0) and imported into sequencer programs that accept MIDI files for subsequent editing or performance.

Conclusions

MIDI Draw is an excellent introduction to computer-assisted music making. The drawing metaphor is simple enough for MIDI novices to use and enjoy, without

raising their anxiety level. At the same time, more experienced users can experiment with the deeper control aspects. As an added bonus, a demo version of M, Intelligent Computer's algorithmic composition and real-time performance program, is included.

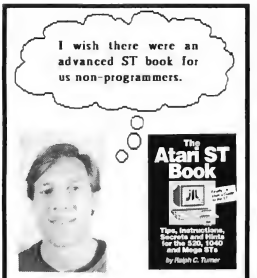
There are two features I would like to see added that would increase the utility and power of the MIDI Draw. First, allow the internal sound chip voices to be substituted for MIDI channels. This would extend the program to those users who don't (yet) have MIDI equipment. Second, let the drawing pad drive assignable MIDI controllers, such as pitch bend and modulation, while the recorder and/or interpreter modules take care of playing the notes. This would allow an added dimension of expression during the performance.

The programmers at Intelligent Music are also musicians who make extensive use of their programs when performing. What better testimonial could you ask for? Recordings of performances made using these programs, including MIDI Draw and M, are available on two cassettes from the company: "After Some Songs" by Joel Chadabe and "Disposition" by Antony Widoff. The music is a cross between New Age and improvisational jazz—and is also quite good. ■

Jim Pierson-Perry is a research chemist and semiprofessional musician. He is also a contributing editor for START.

PRODUCTS MENTIONED

MIDI Draw, $95. "After Some Songs," $7. "Disposition," $7. Intelligent Computer Music Systems, Inc., P.O. Box 8748, Albany, NY 12208, (518) 434-4110.



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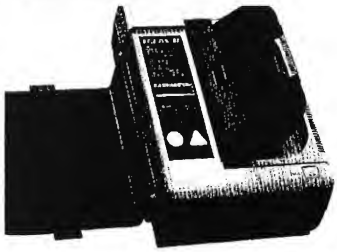

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Who Ya Gonna Call?

by Jim Pierson-Perry
START Contributing Editor

There's a lull in new product releases this month (December) while developers race between the Audio Engineering Society (West Coast) and MIDI EXPO (East Coast) shows; more on them next month. Coming up fast is the Winter NAMM show (National Association of Music Merchants), the major U.S. trade exposition for MIDI products. Following up their success with the Fleetwood Mac concert at COMDEX, Atari will host performances by Josef Zawinul (of Weather Report fame) and Thomas Dolby at NAMM. Blinded with science, indeed!

The topic this month is where to find help for things MIDI. Most of the questions I receive are pleas for sources of information ranging from how to connect MIDI cables to interpreting system-exclusive codes for programming applications. We'll look at several different ways to get help: books, magazines, organizations and bulletin board systems.

Mea Culpa (Somewhat)

But first, let me straighten up a few loose ends. In my review of Matrix 6 Tricks by Dr. T's Music Software (START, December 1988), I stated that the program could not be installed on a hard drive. It uses a key disk copy protection scheme which lets the program boot from a hard drive as long as the master disk is present in Drive A at startup. In fact, I run all my Dr. T software from a hard drive – after plugging all the master disks into Drive A one after another. Sorry for the confusion.

I had also reported that CZ Rider, the new CZ-1/101 patch editor from Dr. T, would be able to read patch files from Hybrid Arts' CZ-Android program. That is wrong; the translation program supplied will convert CZ Patch Librarian files (an earlier Dr. T program) to CZ Rider format.

Command Development has released the newest member of their Offspring program line. D-10 Offspring is a patch editor for the Roland D-10/110/20 synthesizers that features the offspring process for creating new patches from user-specified parent patches. The effect is likened to musical genetics. A demo disk is available for $5 from the developer and comes with a $5 rebate coupon that can be applied to purchase of the commercial version. The next in the series, M1 Offspring, is expected in first quarter 1989.

Looking For Mr. GoodMIDI

Merry Christmas! You took the plunge and bought a MIDI keyboard. What are those funny round holes on the side or back of your ST and how do they send music to your keyboard? Whether *you* are a spanking new MIDI initiate or a terminal MIDIot, at some time you are going to need help. This listing contains some of the best sources of help I have found to answer my questions about MIDI and stay abreast of current developments.

Let's start with books. The single best book for an overview of MIDI and its applications is *Music Through MIDI* by Michael Boom. This covers the MIDI language, common types of equipment and how MIDI is used for a variety of musical needs. Several case studies are presented of MIDI systems for particular applications: recording studio, home studio, live performance and education. The author is an excellent writer and the book is filled with numerous illustrations, program screen shots and equipment connection diagrams.

A more technical, but equally good book, is *The MIDI Book* by Steve De Furia. This gets into more detail on setting up MIDI systems of varying sizes ▸

and purposes. De Furia has authored several follow up books in this series: *MIDI Resource, MIDI Implementation Book, The MIDI System Exclusive Book* and *Secrets of Analog and Digital Synthesis*. The indefatigable De Furia has also co-authored *The Sampling Book* with Joe Scacciaferro, a guide to general principles with illustrative experiments that is applicable to all sampler instruments. For those interested in home recording, check out *Multi-Track Recording For Musicians* by Brent Hurtig. These books are all available through the MIX Bookshelf, as well as hundreds of others covering all aspects of music and MIDI. Get a copy of their catalogue and start building your library.

Several magazines are published that deal with MIDI. The most authoritative (other than START, of course) is *Keyboard* which regularly features application articles, current events, educational columns and comprehensive reviews of equipment and software. *Electronic Musician* is also very good, tending to give more focus on do-it-yourself programming and equipment projects. Other magazines worth checking regularly are *Music Technology, Home and Studio Recording* and *Modern Keyboard*. Publications aimed at specific MIDI-equipment manufacturer products include: *Aftertouch* for Yamaha, *Transoniq Hacker* for Ensoniq and the *Roland Users Group Magazine*.

For up-to-the-minute information or quick answers to problems, nothing beats the telecommunications grapevine. This is a great source of "hands on" experience to tap before investing in new equipment or software. The user base ranges from novices through professional MIDI programmers and musicians. Quite often users' software questions will be answered by the original programmers.

At the national level, CompuServe and GEnie have active MIDI forums. Common to both are large libraries of files containing patches, prerecorded music sequence files, reviews, demo programs and tutorials. PAN, the Performing Artist Network (described in depth in last month's column), is a professional musicians' telecommunication service. Its MIDI forum contains file libraries, hot lines to hardware/software developers and major trade publications, buy/sell/trade ads and a very active message base.

The best dedicated BBS is Midwest MIDI ((405) 733-3102), home of both MIDI-NET and the International Electronic Musicians User Group (IEMUG). MIDI-NET is an echo mail conference dedicated to MIDI that operates throughout the US and has branched out to Canada and Europe. Callers log on via local BBS nodes which all feed into a central message bank. The ST-specific main branch of IEMUG is the MIDI and ST Information Exchange BBS ((614) 848-5947); check in here for the telephone number of the node nearest to you. Besides the message base, there are many music and information files in the download library. Other good boards to try are East Coast MIDI ((516) 928-4986), MIDI World Network ((213) 826-4288, operated by Hybrid Arts, but open to all) and TACE ((817) 778-2506, large numbers of Music Studio and EZ-Track files).

A final source of help and support is through established user groups. Some of the better known national groups are the International MIDI Association, the International Electronic Musicians User Group (IEMUG) and Canadian MIDI User Group (CMUG). All feature regular newsletters, discount pricing on selected products and services and a large user base to draw on for help or advice. In particular, the IMA is in charge of the MIDI specifications (document version 4.0, just revised to include the new MIDI file standard). At the local level, many cities have MIDI user groups, typically centered around music equipment stores, that provide regular product demos and "how to" sessions. Now that Atari has aggressively committed itself to the MIDI market, you should start seeing a lot more of our favorite computers at these stores. ■

Contributing Editor Jim Pierson-Perry is a research chemist and semiprofessional musician. He lives in Elkton, Maryland.

PRODUCTS MENTIONED

Multi-Track Recording For Musicians by Brent Hurtig, $12.95. Alfred Publishing Company, Inc., 16380 Roscoe Blvd., Van Nuys, CA 91410, (818) 891-5999.

Aftertouch, P.O. Box 7938, Northridge, CA 91327.

Canadian MIDI Users Group (CMUG), c/o Eric Barager, Box 1043, Belleville, Ontario, Canada K8N 5B6.

D-10 Offspring, $160.00, M1 Offspring, Price not announced. Command Development, 11846 Balboo Blvd., Suite 135, Gronodo Hills, CA 91344, (818) 362-3550.

CZ Patch Librarian, $99; **CZ Rider**, $129; **Matrix 6 Tricks**, $129. Dr. T's Music Software, 220 Boylston Street, Suite 306, Chestnut Hill, MA 02167, (617) 244-6954.

The MIDI Book, $14.95, **MIDI Resource**, $17.95, **MIDI Implementation Book**, $19.95, **The MIDI System Exclusive Book**, $29.95, **Secrets of Analog and Digital Synthesis**, $14.95, all by Steve De Furia, **The Sampling Book**, $17.95, by Steve De Furia and Joe Scacciaferro. Hal Leonard Publishing Corporation, P.O. Box 13819, Milwaukee, WI 53213

Keyboard, call for latest issue and subscription prices. GPI Corporation, 20085 Stevens Creek, Cupertino, CA 95014, (408) 446-1105.

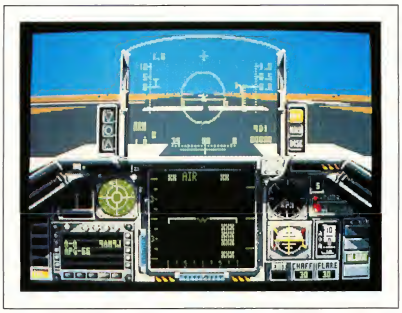
Modern Keyboard, call for latest issue and subscription prices. Harris Publications, Inc., 1115 Broadway, New York, NY 10010, (212) 807-7100.

CZ-Android, $99.95. Hybrid Arts, Inc., 11920 West Olympic Blvd., Los Angeles, CA 90064, (213) 826-3777.

International Electronic Musicians User Group (IEMUG), c/o Midwest MIDI Consultants, Inc., P. O. Box 30995, Midwest City, OK 73140, (405) 736-6676.

Combat Three Ways

If we were to choose a theme for this issue's game reviews, it would have to be "combat." In Falcon it's you and your F-16 in a sky battle against Soviet MiGs and other hazards. Heroes of the Lance pits you against unimaginable demons and Tetra Quest has you duke it out with bloodthirsty aliens.



At the end of the active runway with the engine at 60 percent and wheel-brakes set. It's too bad that we can't present the starling whine and subsequent roar of the engine in a magazine.

FALCON

Reviewed by Andrew Reese

Falcon. On the ST. Finally.

It seems 1988 was *the* year for ST flight simulators. We've seen Gunship, Jet, Spitfire 40, Dive Bomber and Skychase (not to mention R/C Aerochopper, reviewed elsewhere in this issue). But Falcon is at the top of this—or any other—list for authenticity, completeness, speed and sophistication.

Spectrum Holobyte captured almost every software award in the industry for their two previous versions of Falcon for the Mac and PC. Now, they've moved Falcon onto the ST and Amiga and provided it with sophisticated graphics, advanced F-16A avionics and realism that is unsurpassed.

In Your Flight Kit

Falcon comes on two single-sided disks with a 144-page manual, a keyboard and display command card, an addendum to the manual for head-to-head combat and a code wheel, used to decipher the copy-protection scheme. The program uses either one or two drives automatically—a nice touch.

About the copy protection: not only is one of the disks physically copy-protected, but you also have to align two symbols on the code wheel and type in a letter to fly your Falcon. If you don't enter the correct code twice in a row, Falcon will load, but you will suffer a catastrophic engine failure about one minute into the flight. It's just enough to give a pirate an enticing taste and send him to the software store for a legitimate copy.

You need to read the manual. It's not just there to give the box that weighty feel—you will need to know much of what is in the manual to fly combat successfully. It's also quite readable and the glossary at the back is wonderful, especially if you want to apply to Top Gun School.

The Sound and Feel of Flight

Falcon uses digitized sound for everything from engine start to guns to indecipherable (but authentic-sounding) radio messages. The sounds are good ▶

and you can select which, if any, you want to hear. There's also a voice that gives safety warnings like "Pull up! Pull up!" It sounds suspiciously like Luke Skywalker, but since you won't have R2D2 along, you need to do what it says—now! By the way, this voice warning system is authentic F-16A stuff.

I love the way Falcon feels. After choosing your pilot's identity, setting your rank and mission and configuring your weaponry for that mission, you begin your flight on the end of the active runway. You engage the engine start system and power up to 60 percent, then release the wheel brakes and start her rolling. If you're in a hurry, punch the afterburner, stage it up to five and pull back on the stick. If you top 300 knots with the wheels down, the warning voice says "Caution! Caution!" (On the upper levels, you can damage the gear this way.)

On full power, the Falcon climbs like the proverbial homesick angel. You can top her out at 70,000 feet within a few seconds. But you can also fly her on the edge of a stall with gear and flaps hanging out as you ease her down onto the runway. (When you touch down, you'll also hear the comforting chirp! of the tires.)

Features, Features, Features. . .

There are almost too many features to discuss—and praise. You can use the serial port and a null modem cable to connect an ST to a Mac, another ST or an Amiga and fly head-to-head or you can use modems to fly together from different locations. You have three levels of scenery sophistication, including details like strafeable trucks on the roads. They tumble convincingly when hit.

From the pilot's seat, you can look forward through the HUD, or Heads-Up Display, to the right, to the left and behind you. In each of these views, you can also look up to watch for bogeys. You also have available a track view, a tower view and a satellite view and all three are zoomable. The track view is even rotatable. And the 3D model of the Falcon you see in the outside modes is amazingly clean and well-done. Although you can't see the stores hanging under your bird, when you trigger off a missile, it leaves the plane trailing a nice yellow gout of flame. When you hit a MiG, ground target or suffer your own engine failure, there's a nice explosion. You even leave craters in the desert floor with your misses!

Like flying? You'll want Falcon. Period.

The HUD is authentic and complete and shows your airspeed, altitude, G-factor, heading, flight path ladder (for angle of climb), missile status and Mach number. The HUD is complemented by the COMED, a switchable Radar and Map Display. Plus, there's a full complement of warning lights and indicators to provide all the information you need. In some cases it's too much to absorb. In terms of complexity, flying this simulation must be almost like flying the real plane, an experience I doubt I'll ever have.

Fulfilling Its Mission

Combat is realistic. You have to use the radar and messages from your ground control to vector toward the bad guys. At the speed of modern jet combat, you just don't have time to wait until you can see that red-nosed MiG to make your move. (You can, in fact, occasionally see the MiGs in flight and they look "right," an amazing accomplishment.) It's much more a matter of planning, reading the instruments, high-speed maneuvers and toggling off missiles at enemies you can't even see. But when the ground advises you, "Bluebird, splash one MiG!" you feel good, real good.

Falcon also lets you attack ground targets with cannon, bombs or two kinds of missiles. This is an instance where you definitely need to read the manual to determine the mission profile in order to configure your weapons properly. You don't want to load up on Durandal runway-busters if your target is a fortified communications center.

Gripes? Very few and quibbles only: I think the ground control enemy target messages should remain on the screen longer. The copy-protection scheme is effective and probably necessary, but annoying. Also, there's nothing in the manual or addenda about the code wheel; it's just there in the box for you to figure out. The complexity of the controls also requires frequent referral to the command cards, but this is probably unfair to complain about, since I don't know how they would have included all of the controls without this level of control complexity. Perhaps a keyboard overlay similar to that in Gunship by Microprose would have been better.

Spectrum Holobyte takes you through a complete combat course in Falcon with the 1st Lieutenant level being a crashless training mode. At the opposite end of the spectrum, you can be a Colonel and tangle with Ace MiG pilots, but you had better be good or the only medal you'll win will be a posthumous Purple Heart.

Like flying? You'll want Falcon. Period.

FALCON: A FIGHTER PILOT'S PERSPECTIVE

by Wolf Griffey

All fighter pilots say the same thing about their ride: It's just a lot of pieces, costing millions of dollars, built by the lowest bidder, flying in close formation. Spectrum Holobyte's **Falcon** flight simu-

lation is no exception, yet it's *how* those major pieces come together in the front office that make this simulation great. This is because Falcon has an excellent front office: the cockpit.

I flew F-4J fighter jets in the Marine Corps for two and a half years. As a pilot I was told over and over that the eyes should be out of the cockpit 99 percent of the time—after all, that's where the action is. This means that quick, efficient scan patterns and habits are the only way to read instruments. Falcon's front office has good scanning habits written all over it.

In Falcon's Track mode, you can rotate the viewpaint around your bird as you fly. Sometimes it's just nice to take in a bit of scenery this way. Be sure to miss the mountains, however.

Everything Works

Strapped in and on an active runway, the real pilot usually does a final scan to see if everything works as advertised. I did this with Falcon. The checks were good, all lights in the green or yellow and stores in place; power-up and the run were smooth; AB at stage two, breaking ground at 150 knots, nosewheel light out, check left for the lights after gear retraction and eight-to-10 degree climb until 450 knots indicated; return to military power and continue climb and RPM required. It was like being back in the real thing.

Running through the COMED and HUD modes I cross-checked visually for tracking and delay. All of the indications appeared accurate as far as I could eyeball them. The updating is great—true real-time adjustment.

The full-size F-16 is a fly-by-wire bird, with control input converted to electrical impulses then converted back to mechanical control surface movement. Control in Falcon follows this form. The sensitivity switch sets your input for the level of response you want for the throw of the stick. Add a touch to the trim switch and smaller position changes take place for stick movement. This is a truism for high-performance aircraft, to use trim to control overshooting and reduce stick force. Falcon's trim isn't completely like this: you can't input gradual yaw or pitch control—it's either on or off. However, it's there when you really need it.

Putting Falcon through the paces, I found the outside view in any attitude, altitude and speed are right on the money. The world matches what the instruments tell you.

Falcon has an excellent front office: the cockpit.

Combat Simulation

The real test for Falcon comes in combat simulation. So, at 25,000 feet the time came to make an air-ground run. On the first pass I used the AGM-65 on two of the towers and then made a tight turn of 180 degrees to strafe the third on the way out. Crossover from ground mapping on the COMED to A-G MSLS was slick. Ship handling in trim after setup made those minor moves to target feel like old-home week. The final pass low and too fast was saved by some quick use of air brakes and got the rounds on target.

Finishing up with a little ACM before returning to base makes for a very happy jock. Acquiring MiGs in the tracking mode gives the pilot a little time to get set for the fight. I switched to boresight at 20 miles and closing, ARM/MSLS showing on the HUD and the target in a lock at four miles. The Falcon handled great and the info from both the radar and HUD were on time, clear and presented to make the best of the run.

Best of all in that run was the fact that once I had the target on visual and didn't need the radar I could move my seat up to get a higher view. That meant longer eye contact in a turn that you normally lose sight of in the lower position. That was a trick we all used on the new people and they weren't happy campers when the score came back "US: 5, THEM: 0." On this option alone, somebody at Spectrum Holobyte did it right.

The final final is going home, and ILS mode is complete as I ever saw in the real world. There is even a controller bugging you with reports after you have landed, SOP.

Shutdown and a bit of reflection tells me that I found out what I had guessed from the first page of the manual. All I ▸

may need now is something to pull me backwards on AB staging and a few hundred pounds on my chest as the G-meter climbs. Do I like Falcon? You bet I do!

One of Tetra Quest's many screens. On the surface, this game from Microdeal is just another arcade shoot'em up. But the variety of aliens and the different threats each possess takes the game to a higher level.

HEROES OF THE LANCE

Reviewed by Jim Kent

Heroes of the Lance is an action game based on Advanced Dungeons & Dragons. As the saga opens, eight Companions of the Lance set out for the Ruins of Xak Tsaroth in hope of finding (and escaping alive with) the Disks of Mishakal, whose True Healing shall surely restore faith in the Old Gods. Failure means that the Queen of Darkness will have complete power over the land of Krynn.

Playing Heroes

The eight Companions are all controlled by a single player. (I'm still looking for *any* multiplayer fantasy game on the ST.) You may arrange the Companions in any order you choose, but only the lead character fights, and only the first four can use magic. The top two-thirds of the screen show your lead character, parts of the dungeon and any creatures lurking nearby. (I've yet to meet a creature in Heroes who won't attack on sight. It's best to shoot first and ask questions later.) The lower third of the screen has pictures of all your characters and their hit-point (health) status.

The combat simulation is very well done. The characters normally move in the direction of the joystick. When the fire button is held down, the lead character discharges his "range weapon" (if available): a bow, sling or perhaps a throwing ax. When a dungeon creature is closer than a couple of paces, you revert to "close combat" – with swords, staffs and battle axes, depending on who is the lead character. In combat you may aim low, middle or high, depending on the joystick position. To run away, release the fire button – and *lean* on that joystick. The dungeon denizens usually don't pursue you past a doorway.

In Strategic Simulations' Heroes of the Lance eight "Companions of the Lance" set out for the Ruins of Xak Tsaroth in hopes of finding (and escaping alive with) the Disks of Mishakal, whose True Healing shall surely restore faith in the Old Gods.

Running Heroes

Heroes of the Lance comes on three specially formatted disks. The rule book urges you to back them up with a clunky but serviceable disk duplicating program called FORMAT. At the start of the game, you're asked to enter some number from the rule book (such as the answer to "What is the wisdom of the character Tanis?"). Loading the game does involve inserting all three disks, but is still fairly quick. During the game disk-swapping is infrequent, but no less annoying – especially on my Mega with two double-sided drives and a *hard* disk!

The user interface is a big improvement over the "guess the computer's vocabulary" approach of many adventure games. I particularly like the way it handles combat.

The drop-down menus are used to control game action other than Companion movement and combat. The menus, in the form of yellow, tattered scrolls, are graphically impressive. To access them, press the spacebar; move

the cursor to Exit Menu to return to the game. No time passes for the characters while the menus are up.

The Trick Is to Stay Alive

The dungeon in Heroes of the Lance is a hard one to stay alive in, so you'll probably save and restore often. Luckily, the Game Save and Restore features are very quick.

Heroes of the Lance is a very solid game that has kept me glued to my ST longer than anything since Dungeon Master. Once you've learned how to play, Heroes can be finished in about three hours. But if you're new to the game, plan to spend at least a day getting through it.

TETRA QUEST

Reviewed by Scot Tumlin

Tetra Quest, the latest game from Microdeal, takes you on a journey into the heart of the Tetra Dome. The Tetroids have stolen the six Phoenix Medallions. Each medallion has been split into 64 pieces and hidden in the Tetra Dome. It's up to you to recover all six medallions.

Each piece of a medallion is hidden in a quadrant. There are four screens to a quadrant. On each screen is a gold coin (numbered one to four) and you must collect the coins in the correct order. Once all four coins are collected, the medallion piece is displayed.

The Tetra Quest Screens

Each screen in Tetra-Quest is composed of a series of horizontal, vertical and diagonal tracks. One or more set of direction arrows connects you to the next screen. Each screen also contains a "spitter," gates, switches and teleport tubes.

Evil aliens appear from the spitter. There's no way to destroy it, but you can hose down aliens as they emerge from it.

Some sections of track are connected via gates. In one position a gate can connect two track sections, in another position it can disconnect those same track sections. The switches determine the position of a gate. Moving over a switch will rotate a gate. However, some switches affect gates on other screens. Trigger a switch and check all gates in the quadrant to locate the proper gate.

Teleport tubes jump your Tetra Runner to another screen. Move over a teleport tube to cause a "down the drain" effect. The screen changes and your Tetra runner appears on the new screen. Again, you'll have to try each tube to locate its destination.

A bar across the top of the screen displays the number of Tetra Runners you have left, the current quadrant number and your score. A Phoenix symbol lists the number of Phoenix lives you have left. A test tube located on the right side of the screen indicates how much Phoenix power you have left. Press zero on the numeric keypad to transform the Tetra Runner into the Phoenix.

With the trigger pressed down, move the joystick cursor to allow the Phoenix to move freely to another part of the screen. This trick comes in handy when you can't find a gate that connects to your destination. But remember, one of your lives is lost whenever you use the Phoenix. You also reduce the amount of Phoenix power remaining.

Tetra-Gameplay

Navigating the tracks takes some getting used to. If your joystick has a hard time with diagonal movement then try another joystick—there's nothing more frustrating than getting your Tetra Runner stuck while being pursued by a swarm of bloodthirsty aliens.

The first few quadrants contain aliens that are relatively easy to dispose of. But as the game progresses, more formidable aliens begin to appear.

Shooting aliens can cause all sorts of problems. One alien, for instance, spills an acid that causes sections of the track to dissolve. Another alien leaves an oil spot when shot. When your Tetra Runner passes over the spot, it will spin out of control. Still another alien drops a blob of glue on the track that freezes the Tetra Runner long enough to get tagged by an alien. And one alien even leaves paint on the track. When the Tetra Runner crosses the paint, it leaves a trail on the track that other aliens can follow.

Take my advice: leave the first-string aliens alone and move on to the next screen.

Tetra-Recommendation

On the surface, Tetra Quest is just another arcade shoot-em-up. But the variety of aliens and the different threats each possess raises the game to a higher level. Tetra Quest offers hours of arcade game action. The 90-plus levels and endless supply of bad guys will keep any arcade gamer busy.

Controlling the Tetra Runner takes some practice. I recommend you using a very sensitive joystick, one that can easily handle diagonal movements from the user. If you're looking for fast action and aren't afraid to use your brain, give Tetra Quest a try. ■

Andrew Reese is Editor of START Magazine. Wolf Griffey is a former Marine Corps fighter pilot and works in the Customer Service Department at Antic Software. Jim Kent is the author of Cyber Paint and Aegis Animator. Scot Tumlin is Direct Mail Sales and Support Supervisor for Antic Software.

PRODUCTS MENTIONED

Falcon, $49.95. Spectrum Holobyte, a division of Sphere, Inc., 2061 Chatsworth, CA 94501, (415) 522-1164.

Heroes of the Lance, $39.95. Strategic Simulations, Inc., 1046 North Rengtorff Avenue, Mountain View, CA 94043, (415) 964-1353.

Tetra Quest, $39.95. Microdeal, 576 S. Telegraph, Pontiac, MI 48053, (313) 334-8729.

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Other options, including a 2nd cartridge port, and the ability to use the Mac 128K ROMs inside with Spectre, are also available. Happy Computers does not sell the Mac ROMS or the Magic Sac or Spectre. These can be purchased separately.

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By Charles F. Johnson

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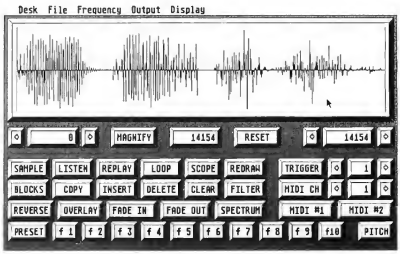
Breaking The Sound Barrier

The Replay 4 Sound Digitizing Package

by Jim Pierson-Perry
START Contributing Editor

From talking gas gauges and alarm clocks to berserker screams from computer games, there are hundreds of uses for digitized sound. Some of the most productive have been in the music industry with direct to disk recording and development of sampling keyboards. Macintosh users have long had the ability to digitize sounds and incorporate them into their programs. Now it is our turn.

Replay 4 (previously known as ST Replay) is a multifaceted package for sound digitization and playback. You can use it to turn your ST into a musical sampling instrument, add sounds to your own programs, create sound and picture shows or just have fun. It comes with a hardware cartridge for sound input and high-fidelity output. You also can play back sounds through the monitor speaker without using the cartridge at all.



Main operations screen from the Replay 4 program. The current sound sample is shown in the data window. Sound output (playback) can be directed either through the internal monitor speaker or to your home stereo system, via the Replay 4 cartridge.

Over the Waves

Before getting into the program, let's look at the basics of getting a sound from the real world into your ST. The most common picture description of a sound shows the amplitude (loudness) changing with time. To digitize sound, an analog to digital conversion device reads the amplitude of an input sound at set time periods. The resulting amplitude versus time data is called a sample. We can hear the digitized sound by putting the data through a digital to analog converter—for example, the ST sound chip.

Ideally, playback of the sample data would give a perfect reproduction of the input sound. Two factors that limit this are the resolution of the digitizing process and the sampling rate. Resolution refers to how finely the digitizer differentiates between incoming amplitude values. The greater the resolution, the better the sound quality—similar to using a 64-shade versus an eight-shade gray scale for monochrome graphics.

The sampling rate sets how often the digitizer takes data points. Sample rates are given in units of kHz (kilohertz). A 10 kHz rate digitizes 10,000 sample points per second. If there were no other considerations, you would use the highest sampling rate possible to best capture the input sound. Unfortunately, this requires a vast amount of memory for all but the shortest of samples (a two-second sound sampled at 50 kHz generates 100K data bytes).

The rule of thumb is to use a sampling rate at least twice that of the highest frequency in the input sound. As human ears typically can hear sounds over the range of 20 to 20,000 Hz, a sampling rate of 40 kHz should be sufficient. Going to a lower sampling rate could cause the digitizer to miss parts of the sound (aliasing) and give poor reproduction on play- ▶

back. How low the sampling rate can be set depends on the frequency content of the input sound and personal taste for the playback quality.

Revvin' Up Replay

Replay 4 comes on an unprotected program disk and can be installed on a hard drive. It is compatible with both color and monochrome monitors and runs on all ST and Mega computers. The maximum sample size is determined by available computer memory. The program runs under GEM and supports desk accessories. The manual provides a good explanation of the program as well as tips *on sampl*ing and suggestions on using sample files from user programs.

The accompanying cartridge has female RCA phono jacks for sound input and output. Sound digitization can be done only through the cartridge. Sample playback can be directed either to the internal monitor speaker or via the cartridge to an external speaker, except with sampling rates over 30 kHz which are only supported through the cartridge. Digitization is done at 8-bit resolution, the same as the popular Ensoniq Mirage sampler instrument. Hardware antialiasing filters are built into the cartridge input and output circuits. Typical input sound sources are the ear or headphone connectors on tape players and CDs. Electronic music instruments may need preamplification before going into the cartridge.

Two programs are provided on the disk: Replay 4, the sample editor, and Effects, a real-time sound processing application. A folder is also provided with the necessary hooks and examples to use Replay 4 with several ST programming languages (ST, Fast and GFA BASIC; HiSoft 68000 assembly). You are free to use digitized sounds created through Replay 4 in your own programming, commercial or public domain, without any legal restrictions or requirements from MichTron.

The Sample Editor

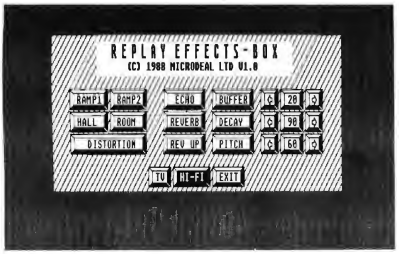
The heart of Replay 4 is its sample editor program. This controls the digitizing process, from initial sampling through final editing. Program operations are divided into three areas: sampling, editing and performance. All are done from a single workscreen where the main operations are selected by clicking on control buttons or using keyboard command equivalents. In a stroke of poor design, you must use the Esc key to quit these operations rather than just clicking on the buttons again.

A data display window takes up about half of the screen, graphically depicting the sample data and operations you do on it. Two cursors are within the window and mark the start and stop boundaries of the current working segment, out of the overall sample data buffer. The cursors initially are at the far ends of buffer, but may be moved so that only a specified piece of the buffer will be used. All sampling, editing and replay operations occur only within the cursor boundaries. This powerful concept lets you partition the buffer to store and work with multiple, independent samples.

Digitizing sound can be as simple as connecting the input cable to the cartridge and clicking on the SAMPLE button in the screen display. Sample data will be accumulated until all specified memory (between the buffer boundaries) is filled or input is stopped by pressing the Esc key. A variety of refinements can be used for improved or more efficient results. Default options are a sampling rate of 20 kHz and sound output going to the monitor speaker; both can be changed from the command menu. A trigger threshold can be set such that sampling will not begin until the input sound reaches a specified amplitude.

The most critical part of sampling is proper setting of the input sound volume. A LISTEN function passes digitized input sound directly through to output. This is useful for initial setting of the input volume. For best results you will need to fine-tune it with the SCOPE function, which acts as an oscilloscope. While monitoring input amplitude on the SCOPE screen display, adjust the sound volume so that the sample waveform just spans the full display range. This maximizes the signal to noise ratio. Too little volume gives quiet samples with more apparent noise; too much volume causes distortion. Frequency content of the input sound can be examined with the SPECTRUM function. This calls up a dynamic bar graph in the display window that tracks real-time changes in the input sound over a 100-to-5,000 Hz range.

After digitization, sample data can be edited to remove unwanted segments or create special effects. Operations supported are cut/paste, copy, insert, delete and clear. These work on user-specified



Audio effect selections available with the EFFECTS auxiliary program. This demo pragrom utilizes the Replay 4 cortridge/software to simulate some types of oudio signal pracessing: echo, reverb ond distartian.

blocks of the sample data buffer set through the display window cursors. A MAGNIFY option can be used to zoom in on user selected data segments for more accurate editing and display. Partitions of the sample data buffer can be assigned to the ST function keys F1 through F10 as PRESETS. Pressing an assigned function key restores the cursor boundaries for its associated sample data segment.

Five special sample manipulation functions are provided: reverse, fade in/out, filter and overlay. Reverse turns around the sample data, similar to playing a record backwards. Fade in/out superimposes a linear volume increase or decrease on the sample data. Filter puts the sample data through a software low-pass filter which may help with aliasing problems at low sampling rates. Overlay lets you combine data segments from a single sample (for chorusing or echoes) or between two different samples.

Sample data can be played back as a single shot or continuously looping. Only the data segment between the current start and stop boundaries will be played. Samples can also be replayed under MIDI control. Two different MIDI modes are supported. The first maps a particular MIDI note to trigger a sample preset; pressing the MIDI key plays that sample. The second mode changes the pitch of the replayed sample in accordance with the MIDI note pressed. Higher notes cause the pitch to go up, lower notes brings the pitch down. This is exactly the way a sampler keyboard works. Pitch shifting can also be done under MIDI control in real-time on the input sound, rather than on a sample data set.

Audio Magic

The Effects program incorporates Replay 4 in a software simulation of an audio effects box. Input sound is manipulated in real-time to add reverb, echo, pitch shift, fade-in or distortion. You must have the cartridge to use this program. Several of the effects parameters can be varied and output can be directed to either the monitor or external speaker. While not of commercial quality, the program is a good example of how Replay 4 can be integrated within an application.

Sounds for the Masses

Replay 4 has become the de facto standard for Atari ST digitized sound. This is due to the ability to playback samples without special hardware and MichTron's legal policy of free use for samples created with the program. As a result, sample data files for Replay 4 have proliferated on national online services, particularly GEnie. There are also public domain programs that can play back the samples and combine them with graphics for a slide/sound show. (Editor's note: *For a full-blown sound/animation editing system, START's Audio-Video Sequencer (AVS) from the November 1988 issue lets you combine tracks of sound samples and Cyber Paint animation sequences.*)

After digitization, sample data can be edited to remove unwanted segments or create special effects.

Several commercial MIDI sample editor programs make use of Replay 4 for auditing sounds. This is much faster and more convenient than having to transfer data between the ST and sampler to check each step of editing.

Going a step farther, MichTron now includes the program DrumBeat (formerly Digidrums) with Replay 4. DrumBeat acts as a software drum machine. You can program rhythm patterns which are played back using digitized drum sounds created through Replay 4. Additional drum samples, in Replay 4 format, can be substituted for the base set. This lets you go from straight rock and roll to latin or orchestral percussion at will.

Conclusions

Overall, I am impressed with the sound quality and potential of Replay 4. This is a great package that offers something for everyone from hobbyist to programmer to teacher. Its acceptance by both commercial and public domain sources ought to promote more digitized sound applications. The sample editor program, however, still needs improvement in its user interface. Having to press the Esc key instead of using the mouse to cancel operations is awkward and just lazy programming. The manual could also benefit from a face lift to add illustrations and a better layout. A table of contents and/or index would also be appreciated along with a summary of the keyboard command equivalents.

The only bug I ran into was a hold-over from earlier program versions. If you accidentally try to load a sample file from an empty drive, the standard GEM error box appears stating the drive is not responding. Clicking on the cancel option, the normal response, will bomb the program and hang the system. A way around this is to use the START Selector (from START Special Issue #3) in an AUTO folder on your startup disk. Going through this file selector, rather than the default GEM version, I had no problems. ■

START Contributing Editor Jim Pierson-Perry is a research chemist and semi-professional musician. He lives in Elkton, Maryland.

PRODUCTS MENTIONED

Replay 4, $99.95. MichTron, Inc., 576 South Telegraph, Pontiac, MI 48053, (313) 334-5700.

ON DISK!

POKER

by Carolyn Rogers

No betting or bluffing? File POKER.ARC on your START disk. Color monitor required.

It's Friday night, you're feeling lucky and you're in the mood for a good game of poker. But after you make a few calls you can't find anyone available to play. What are you going to do?

With Poker Solitaire you need never again worry about impromptu poker parties falling through, because all you need to play is you and your ST. It's a variation on a theme, giving you the relaxation of solitaire while losing none of the high-paced excitement of poker.

To run Poker Solitaire, copy the files POKER.ARC and ARCX.TTP onto a blank, formatted disk. Un-ARC POKER.ARC following the Disk Instructions elsewhere in this issue. Set the computer to medium resolution and double-click on POKER.PRG to start the game. Make sure that the files CARD.SC1, LOGO.SP1 and POKER.SC1 are in the same directory. Poker Solitaire will create the file HIGH.SCO which contains the name and the score of the top five players. The program was written in Modula-2 by TDI Software.

Gameplay

On the left side of the Poker Solitaire screen are 25 empty card slots. On the lower right-hand side of the screen is a face-up card; this is the top card in the draw deck. Point to one of the card slots and press the left mouse button (you may have to hold it down for a second). The card will move to the slot you selected and a new face-up card will appear on the top of the draw deck. You may play a card on any open slot, but once played a card cannot be moved.

Poker Solitaire calculates hands on two fronts: vertically and horizontally.

Poker Solitaire calculates hands on two fronts: vertically and horizontally. The object of the game is to make as many high-scoring poker hands as you can in both directions. For example, the same card can be used to make a Full House on the top row and a Straight Flush in the third column.

Poker Solitaire doesn't rank hands like the regular game; it ranks them according to how difficult they are to make within the limits of the program. See the sidebar for a quick course on the various poker hands used in Poker Solitaire.

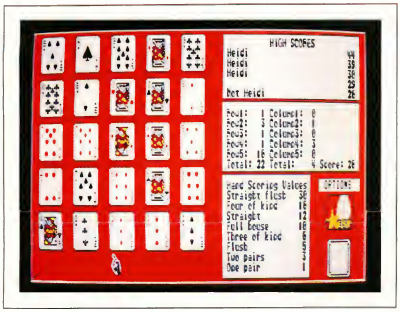
Each hand is scored as follows:

Straight Flush	30 Points
Four of Kind	16 Points
Straight	12 Points
Full House	10 Points
Three of a Kind	6 Points
Flush	5 Points
Two Pair	3 Points
One Pair	1 Point

When the last card has been played your score will be tallied and displayed under the Rows and Columns box on the right side of the screen. If it's one of

What card game can you play alone where Four of a Kind beats a Full House? Poker Solitaire, of course. This slick little program by Carolyn Rogers pits you against one of the greatest card-sharks of them all: yourself. It was written in Modula-2, a START first.

SOLITAIRE



In Poker Solitaire you try to make the best *twenty-five* hands by placing cards one at a time on this five-by-five grid. One strategy is to try to fill each row with a Full House or Three of a Kind while filling the columns with Flushes.

All you need to play is you and your ST.

the top five scores you'll be allowed to enter your name. High scores will be saved to disk automatically when you exit the program.

Just above the draw deck you'll see the Options menu. Click on New Game to play again, or click on Exit to return to the Desktop. Click on Help for quick instructions for gameplay. When you click on New Game the draw deck is automatically reshuffled.

Deal Me In!

So, when you're in the mood for some poker playing but worthy opponents are nowhere to be found, why not play against yourself? With Poker Solitaire and your ST, you'll have hours of poker-playing fun—and that's no bluff. ■

Carolyn Rogers lives in North Little Rock, Arkansas where she is a programmer for the Veterans Hospital. This is her first program for START.

PRODUCTS MENTIONED

Modula-2, $99.95. TDI Software, 10355 Brockwood Road, Dallas, TX 75238, (214) 340-5256.

Poker Solitaire, Hand-by-Hand

Those of you who might have forgotten how the various poker hands are determined will find the *following* hand-by-hand rundown helpful when playing Poker Solitaire. The list goes from highest to lowest hand. Unlike regular poker, the value of the cards doesn't matter. For instance, a hand that contains three twos is worth the same as one containing three tens. Because of this, the *game* treats a Royal Flush the same as a Straight Flush.

Straight Flush: Five cards of the same suit in sequence.

Four of Kind: Four cards with the same value (for example: four aces).

Straight: Five cards in sequence; suits can be mixed.

Full House: Three cards of one value; two of another.

Three of a Kind: Three cards with the same value.

Flush: Five cards of same suit, sequence doesn't matter.

Two Pairs: Two different pairs (for example: two queens and two threes).

One Pair: Two cards of same value.

S

MARIANNE DRESSER

Our research into the netherworld of Reduced Instruction Set Computers managed to unearth things both mundane and strange. Perhaps most intriguing was this unsigned document, a ''lead'' from an anonymous FAXer—obviously wary of giving a company name. We offer it to you here in its entirety—a sign of things to come?

I SISC

A recent trend in computer architecture, especially for microprocessor implementations, is the Reduced Instruction Set Computer (RISC). RISCs are characterized by a small number of simple instructions that typically execute in a single machine cycle. By combining this concept with a large, high-speed register file, RISC proponents have produced many machines that outperform their complex (CISC) brethren.

The SISC extends the concept of RISC architecture to the fullest degree. Basically, the SISC implements a single, yet extremely powerful, instruction. The result is a flexible, low-cost processor that outperforms many designs containing tens of thousands more transistors. Since there is only a single instruction, an order-of-magnitude reduction in processor complexity is achieved. The SISC operates with no instruction pipeline and no instruction cache. These elements, which add cost and complexity to other processors, are entirely unnecessary on the SISC: The "next" instruction is always the same as the previous one. There is no need to fetch an opcode, and no need to decode one. Every cycle is an execution cycle on the SISC. And with no opcodes to fetch, there is also no need for an instruction register or program counter, thus further simplifying the design.

The elegance of the SISC processor is embedded in its single multipurpose instruction: INC A. This instruction, the only one available on the SISC, adds one to the contents of the accumulator and stores the result in the accumulator. The value of this approach becomes apparent when one considers that both operands are implied by the instruction itself, as is the destination. Consequently, no memory cycle is required. Ever. This leads to the surprising result that the SISC can operate with no memory at all, a conclusion we have verified experimentally. The savings in memory management circuitry, RAM control, and memory devices themselves are substantial. It may be the second-biggest advantage SISC holds over other, more traditional designs.

INC A, INC A, INC A.
That's all there is to it.

By far the first advantage is the elimination of software. Most new processors suffer in the marketplace because of an initial lack of programming tools and utilities. But the SISC, with only one instruction, requires no software. INC A, INC A, INC A. That's all there is to it.

A traditionalist may question the value of a processor with no memory, no software, and only one instruction. But we have verified, at least statistically, that the SISC can produce any result that any other computer can produce. And usually it does it faster.

In one test of the SISC's capabilities, an array of SISC processors was used to drive a 1,024 X 1,024 raster graphics display. Each SISC was wired to a single pixel; the result held in each SISC's accumulator selected a pixel's color and luminance parameters. When the SISCs were fired up, the display produced a dazzling array of images: a frowning Mona Lisa, a picture of what Gorbachev is doing *right now*, and the complete set of blueprints for the Stealth bomber (along with several decoys). So in addition to possible applications in the arts, the SISC may have national security applications. Other, more mundane, applications include an odometer for automobiles, and tracking the national debt.

The current generation of SISC processors is fabricated of germanium PNP transistors in TO-5 cans. Samples are available, now, with volume shipments beginning April 1. ■

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	Laser C			Mark Williams C v3.0		
	Compile/ Link	Run	Error	Compile/ Link	Run	Error
Hello.c	2.43	—	—	15.98	—	—
Apskel.c	8.88	—	—	26.5	—	—
Sieve.c	4.59	2.45	—	23.9	2.77	—
AES	35.6	—	—	103	—	—
Savage	6.31	36.4	1.73×10^{-10}	30.82	83.0	1.18×10^{-7}

All times in seconds.
AES consists of nine source files totaling 1142 lines of code.
AES is built using Make.
Mark Williams C using RAM disk.

Megamax, Inc.
DEVELOPMENT SYSTEMS

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