DISK INSIDE!

START

#1 GUIDE TO THE ATARI ST

Volume 3, Number 10 May 1989 USA $14.95 • Canada $19.95

ST: ONLINE (AND OFF)

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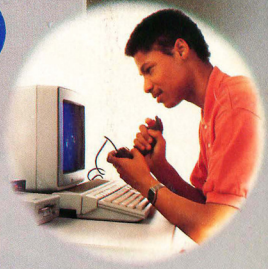
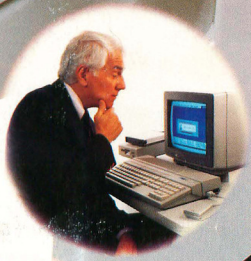


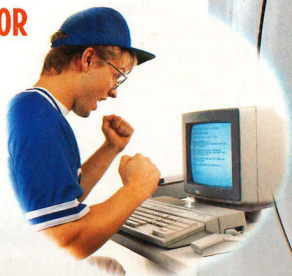


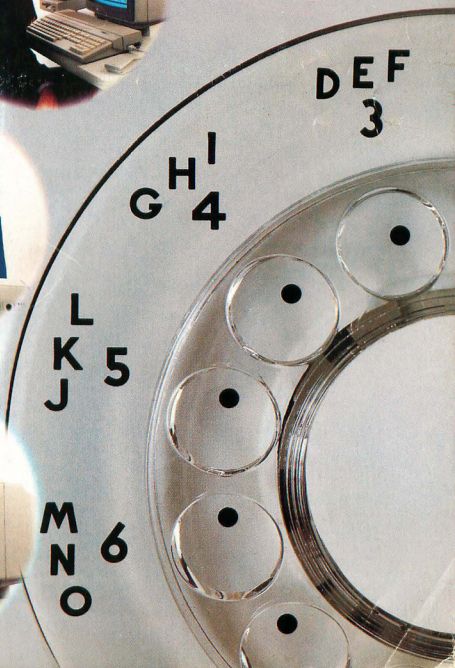
REVIEWED:

AUSSIE JOKER POKER
CALAMUS DTP
TUNESMITH

ON DISK:

SPACE WARS ONLINE GAME
SIFT FILE TRANSLATOR
TAX TEMPLATES
GFA OBJECT





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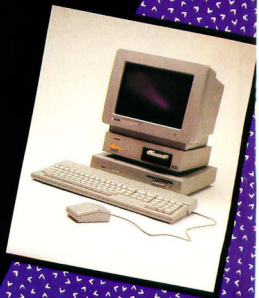

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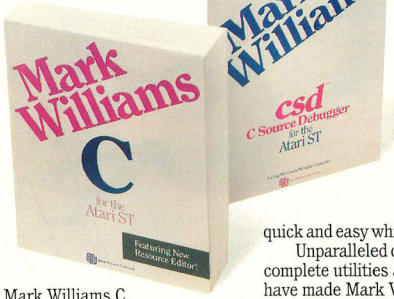
Mark Williams Raises C Programming To A New Level.

New source level debugger, *csd*, cuts development time in half!



Now, on top of the world's best C compiler, Mark Williams brings you *csd*, the world's only source level debugger for the Atari ST!

With *csd*, you actually debug in C. Forget about trying to find bugs in clunky assembler and struggling with long dumps. *csd* gives you the interactive advantages of an interpreter plus the speed of a compiler. An indispensable companion for Mark Williams C.

Reviewers have been raving about the IBM version of *csd* for years:

*"*csd *is close to the ideal debugging environment…a definite aid to learning C and an indispensable tool for program development."*

–William G. Wong, *BYTE*

"This is a powerful and sophisticated debugger built on a well-designed, 'serious' compiler."

–Jonathan Sachs, *Micro/Systems Journal*

FEATURES

NEW VERSION 3.0!

Mark Williams C For the Atari ST

- ★ New! Resource Editor includes compiler/decompiler for direct access to resource text
- ★ New! Peephole optimization–faster compile times and faster code
- Full access to AES/VDI libraries with complete documentation and examples
- Source and object code for RAM disk cuts compile time in half
- Integrated edit/compile cycle: editor automatically points to errors.
- MicroEMACS full-screen editor with commented source code
- Full K & R plus ANSI extensions
- Microshell Command Processor, a powerful UNIX style shell
- Complete symbolic debugger and assembler
- Powerful utilities: make, linker, archiver, egrep, sort, diff and more
- Over 600 pages of documentation with more than 100 sample programs

New! *csd* C SOURCE DEBUGGER:

- Cuts development time in half!
- Debug in C source code not assembler
- Provides separate source, evaluation, program and history windows
- Ability to set trace points and monitor variables
- Can interactively evaluate any C expression
- Can execute any C function in your program
- Trace back function
- On-line help screens

MARK WILLIAMS C FOR THE ATARI ST: $179.95
***csd* C SOURCE DEBUGGER: $69.95**
60 DAY MONEY BACK GUARANTEE

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Our new **Resource Editor** makes creating window driven interfaces with icons, alerts, pull down menus and dialogue boxes a snap. And its exclusive compiler/decompiler lets you directly access resources, making changes quick and easy while simplifying project management.

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–George Miller, *COMPUTE!'S Atari ST Disk and Magazine*

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–Douglas Weir, *Analog Computing*

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#1 GUIDE TO THE ATARI ST

START®

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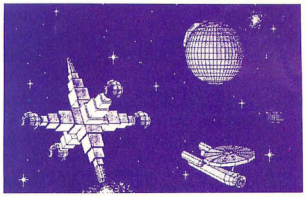

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Editorial

If you've been reading START for any length of time, then you know that we cover a wide variety of online activities every month in our Online with START column. The guiding hand for Online with START has been Assistant Editor Gregg Pearlman, so it's only appropriate to turn the rest of this page over to him. Gregg, the floor is yours.

GUEST EDITORIAL

It's about time we had a telecommunications issue. The ST community has always been active online and sometimes our Online with START column just can't cover all we want to cover. Yet even avid modem users don't go online all the time. Hence START's first "ST: Online (and Off)" issue.

When the ST was first designed, Shiraz Shivji and his talented crew were careful to build in facilities that would simplify **online communications**. They included not only an industry-standard serial port to make hooking up a modem easy, but they also bundled a simple VT-52-like telecom program with each ST shipped.

That VT-52 emulator, while serviceable, was hardly sophisticated enough for most telecommunications buffs. A flock of telecom programs soon hit the market. Out of the group, one—Flash! from Antic Software—soon became the standard against which all others are judged.

In the years since that first version of Flash! was released, other programs have matched, and in some cases exceeded, the standard it set. We asked Jerry McBride to compare the four top telecom programs. His **Buyer's Guide to Telecommunications Programs** in this issue gives you an in-depth analysis of their features and usability.

Cyber Paint author **Jim Kent** took a rare moment away from designing superb graphics programs to write Space Wars, a nice single-computer game. We asked David Ramsden, author of Cyber Texture, to convert Space Wars into a game with built-in telecom features so that it could be played over the phone lines. The result is **Space Wars 2400**. If you want to see how to manage telecommunications in your own programs, take a look at the source code on the START disk.

Of course, you can't spend *all* your time online, so we've included a good sampling of off-line activities in this issue. Procrastinators, take heed: it's time to do your **Federal income taxes**. We've tried to make it easier by including a spreadsheet overlay written by Tom Chandler. It's on your START disk; for instructions, see **Time for Taxes!** in this issue.

We've finally had the chance to put **Calamus**, ISD Marketing's landmark desktop publishing program, through its paces and, not surprisingly, it excelled. Check out our review by Dan Fruchey.

Remember GFA BASIC 2.0 on your January disk? Well, the response was so good that now you'll find **GFA Object**, a commercial 3D modeling tool, on your START disk this month.

That's not all there is in this issue, of course. You'll find the latest news about the **ATW**, the **Hotz Instrument** and **pc-ditto II**. It's another issue that's full-to-bulging with the features you've asked for most. ■

Gregg Pearlman
Assistant Editor

LASER C

Zero to Sieve in 5 seconds!

Because LaserC is fast. Really fast. Infact, so fast it can compile and link the popular sieve benchmark in 5 seconds! Spend more time programming and less time waiting on the compiler.

Whether you're an amateur or a professional, LaserC is the right C language development system for you. LaserC has everything you need to develop commercial grade applications or desk accessories for the ST.

LaserC is the *only* integrated C environment available for the ST. Program entry is a snap with the multi-window mouse and keyboard editor. Compile and execute your programs directly from the editor with a single keystroke!

Perform disk operations such as file copy, or run any program with just a few clicks of the mouse—there's no need to leave the editor.

In addition to the large compliment of UNIX™ compatible library routines, LaserC allows complete access to the ST ROM routines —all documented in the 650 page manual.

Introducing LaserDB—the powerful *source level debugger!* Now you can view your source code while it runs. Monitor C variables, set breakpoints with the mouse, and evaluate C expressions interactively. Multiple windows and easy command structure make debugging fast and efficient.

Get LaserC and LaserDB—the ultimate C development system for your ST.

"We converted Dungeon Master to Laser C and doubled or tripled our productivity. We now use Laser C exclusively for our ST Development."

—Wayne Holder,
President, FTL Games

	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^{-16}	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.

COMPILER:

One-pass generating relocatable code. Absolute addressing of globals allows program's code and data to be as large as memory allows. Ultrafast linker accepts both Laser C and DRI format object files.

EDITOR/SHELL:

Integrated editor and development shell. Cut,copy, and paste between files. Pull-down menus and dialog boxes to control editor and run complier. Fast scrolling and text entry—supports large files. Special window can be used as a command line interpreter. Built-in dynamic disk cache and facilities for RAM resident compiler and other Laser utilities.

UTILITIES:

Resource Construction Program, full-featured Make utility, linker, dissassembler, archiver/librarian accept Laser C and DRI objects files.

LASER DB:

Source and assembly level debugger. Evaluate any C expression to print or set variables. Source and assembly mode allows interaction with complier output. Disassemble or dump memory. Set breakpoints with the mouse on C lines or machine instructions. Watch C variables or machine registers. Multi-window user interface. Simple command structure.

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©Megamax, Inc. 1988, LaserC and LaserDB sold separately. If you currently own Megamax C for the ST, update to LaserC for $20. Call for details. (214) 699-7400. Now available through distributers. UNIX™ is a trademark of AT&T.

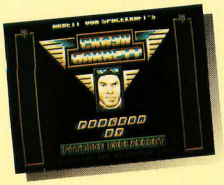
TERRIFIC SOFTWARE PRESENTS

TWO NEW, SENSUOUS GAME TITLES

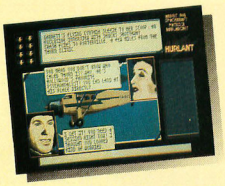
Look out, Indiana Jones! Step aside, Bogie! *Crash Garrett's* in town!

Don't wait 'till Sunday to catch-up on your favorite action comic — play ***CRASH GARRETT*** instead!

No other adventure game is quite like this...



Let ace flyer ***CRASH GARRETT*** escort you through Hollywood in the '30s to rescue sultry, sexy gossip columnist, Cynthia Sleeze, from the sinister Nazi mastermind Baron von Engel Krul and his cronies. Help CRASH stop this perverse Nazi spy-ring from kid-napping glamor-ous, American beauties to use as breeding stock for an Aryan race of superhumans. Be the voice in CRASH's head as he encounters ad-venture after adventure with a whole group of wacky, depraved characters including Caleb Thorn, psychoanalyst to the stars, and Lotta Linebacker, a female wrestler who knows what she wants from a man!



CRASH GARRETT is style and pizzazz—an animated comic book with a slick, continential look. It's about as much terror, intrigue and suspense you'll want from any game!

Play *Stir Crazy With Bobo*—

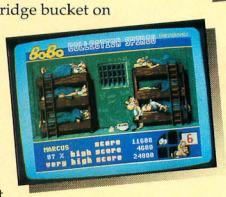
Your idea of "doing time" will definitely change!

Had a little too much violence lately? Still want fun and action? Well, grab your joystick and join poor Bobo in six of the most graphically amusing adventure games ever on disk.

Bobo's in prison—INZEESLAM-MER—where he spends most of his time performing menial chores and planning his escape. Bobo's *no penal pushover!*

Bobo starts his day feeding porridge to hungry, irritable prisoners. Don't let him get too befuddled, or else he'll end up with the porridge bucket on his head.

K.P.'s next. Speed is the key here. Don't let Bobo get buried underneath a pile of spuds!



An exhausted Bobo tries to catch up on his beauty sleep, but is constantly interrupted by the relent-less snoring of his cell mates.

Finally Bobo makes his escape and hurtles off into the sunset, right onto electric train cables. Bobo needs some pretty fancy footwork to avoid the pulsating current!

Available for Atari ST* and Amiga® Computers at your favorite store. To order by phone, call 800-234-7001.

CRASH GARRETT— $39.95

STIR CRAZY with Bobo— $34.95

TERRIFIC SOFTWARE

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CIRCLE 005 ON READER SERVICE CARD

Dialog Box

Letters From Our Readers

Ten Springs Short of a Load?

Please be aware that the Megatouch kit for the ST does not provide enough springs to upgrade the entire keyboard. It is about 10 springs short. For some reason, they decided for the customer that several keys and all the function keys did not need stiffening, and so did not include the springs. How much can 10 extra springs cost? Ten cents, maybe?

Rod Bonser
Los Gatos, CA

The Megatouch Package explains this: "Due to the infrequency of use and difficulty of removal, we do not recommend that you remove the darkened keys shown in Figure 1." The "darkened" keys are the spacebar, Left Shift, Return and Function keys. While we disagree with the assertion that the first three keys are used infrequently, we do agree that they're difficult to remove, especially the spacebar, which requires two *springs.*—**START Editor.**

Any Suggestions?

I have just renewed my subscription and thought I'd write a few lines to let you know how you are doing and to also make a few suggestions.

First, I am very pleased that START now appears every month. However, I noticed that the programs were not of the same quality as compared to those in the quarterly issues. But, with programs like ST Sciplot and Pro Calendar in the November 1988 issue, I see that you are back on the right track.

The magazine is very well laid out and informative. I especially like your reviews. They seem to be thorough, to the point and, more importantly, unbiased. I also particularly like the columns "Mac and PC on the ST" and "Small Tools." Articles about floppy and hard drives are also what I like to see in START.

"For the Fun of It" and "Programming in BASIC" are welcomed sections of the magazine, but how about "Programming in C" for the intermediate C programmer? I am learning C and I find the C programs in START a bit too complex for me to chew on.

I noticed that there is often space left on the START disks. Maybe you could put little tutorials about C with some code in that space. Or how about filling it with little programs, pictures, clip art or other goodies from the public domain? You could also put some gossip in there or the latest news flash about the blitter and the new TOS in ROM, or even a mini BBS with questions and answers from readers. I hate to see perfectly good sectors go to waste.

A few words about games. I like simple games; they are often the most fun and relaxing to play. So how about a simple pinball game, a Pac-Man-like game, or even a primitive classic like Pong in a future issue?

Finally, have you ever seen a thesaurus program to which you can add entries of your own? I think I have asked this question to every ST dealer in Southern Ontario and so far the answer has been "no." Any programmers at START interested in writing such a program? This (yet to be found) program is one big reason why I am learning C. Can anyone help? I have considered replacing the entries in a commercial thesaurus program with my own, but since it seems that these thesauruses are compressed to save space, my plan could prove too difficult to implement. I would appreciate any kind of information you or fellow readers of START can give me on this subject.

Daniel Leger
Hamilton, Ontario

We like to think that we are producing a uniformly high-quality disk every month, but sometimes we hit the bull's-eye for one person, sometimes for another. For example, we've received a number of letters praising SciPlot and others complaining because it wouldn't run on a color monitor. We'll keep trying to present the best software available—there's still no better software bargain than a START Disk.

We strive for impartiality in our reviews. We do not review every product we receive at START; some are poor or derivative in design, while others do have some merit. We will not spend scarce editorial space on the bombs. As to the good products, there are so many out there that we have to make some hard editorial choices as to which products we will review. Often, we will collect a number of "small" products of note and review them together. Watch for more of this in the future. And, readers, if you disagree with any of our reviews, please feel free to write and express your views.

We began our "Programming in BASIC" ▶

Dialog Box

column last summer, aiming at the predominance of BASIC ST programmers. We've decided to rotate the column among a number of languages. Since BASIC is the most common ST programming language, we will continue to emphasize it, but in order to serve the varied interests of our readers, we will be rotating our programming column.

We've considered filling all available bytes on our START disks with public domain programs, clip art or demos, but so far, the problems of testing, documenting and obtaining rights have outweighed the benefits. As an example of the potential problems we (and you) face, we like to examine any program before we allow it to be published on a START disk to insure that there aren't any potential viruses or other destructive code lurking in an otherwise helpful program. Also, START readers have come to expect adequate documentation with any program on a START Disk. We just don't think our readers are ready to trade off an empty few kbytes here and there for the potential problems of undocumented software.

Another aspect of including PD software on our disks is that no one likes to pay for something that can be obtained for free from a BBS or user's group. We are certain readers would complain that we were "padding" our disks. Any readers out there with views on this subject?

As to your question about games, we're working on a wide variety of games for 1989 and will take your opinion into consideration in making our decisions.

We know of no editable Thesaurus program, but would welcome a quality submission of such a program. Anyone out there working on one? Let us know. – **START Editor**

BASIC Bias?

First, congratulations for a good magazine. Although I am more interested in systems issues (for me, Charles Johnson's START Selector has been the most useful program on your monthly disk) and would certainly like to see more of these, I eagerly await the arrival of START every month.

One complaint I have is your bias toward GFA BASIC in your programs. Your January 1989 disk gave me a chance to try out GFA BASIC 2.0, and I don't think it compares to True BASIC, which is closer to ANSI BASIC, has more number-crunching ability and has an excellent screen editor. It also has the advantage of portability to the IBM and Mac, which GFA BASIC does not.

Now to my problem: I have learned that some good European software exists which would be very useful for my work. I am specifically interested in a good DEC VT-100 and Tektronix 4014 terminal emulation package and the TeX/LaTeX word processing package. Is there any painless way for me to get hold of this and other interesting European software? I am sure that many of your readers will be interested in your answer.

Steven M. Moore
Chelmsford, MA

The languages used for START disk programs naturally reflect the languages of choice of our contributors. The number of GFA BASIC program submissions we receive is higher than that of any other ST programming language. Because the programs we publish come from this pool, they reflect this percentage. This high number of GFA submissions also indicates that GFA is a language our readers are interested in learning about, so our Programming in BASIC column provides much more support for it.

This is certainly not to say we ignore other BASICs. For example, when Delmar Searls demonstrated his proficiency in True BASIC in his See Sorts program (December 1988), we asked him to begin writing True BASIC tutorials for our Programming in BASIC column. His second installment appears in this issue. START welcomes program submissions in various languages to give our readers a sample of what's available.

As it happens, the TeX/LaTeX word processor you mentioned is now available in the United States; see this issue's News, Notes & Quotes for details.

Atari Corp. sells a VT-100 terminal emulator; you can order it from them directly for $39.95. Atari's address is 1196 Borregas Ave., Sunnyvale, CA 94088, (408) 745-2000. We will ask our European Report columnist Andre Willey to try and track down the Tektronix 4014 emulator you mentioned and to address the issue of the availability of European software in general.–START Editor. ■

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SUBMISSION INFORMATION

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

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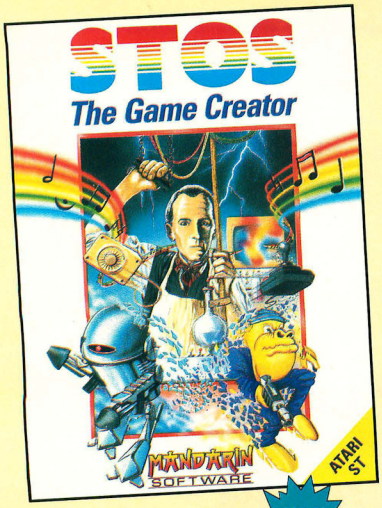

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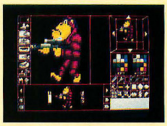

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News, Notes & Quotes

What's Happening in the Atari World

Atari and Hotz Team Up!

Last month, START featured an exclusive interview with record producer Jimmy Hotz about his revolutionary MIDI musical instrument. At that time, we reported that he was negotiating with Atari for the Hotz Instrument to be produced by them. Negotiations have now borne fruit: Sam Tramiel, president of Atari, has confirmed that they will produce the Hotz Instrument.

Atari featured the Hotz Instrument in their booth at the Winter NAMM (National Association of Music Merchants) Show in Anaheim, California in January. Hotz was on hand to demonstrate his creation throughout the show and was joined at various times by such rock luminaries as Mick Fleetwood and Mike Lawler, keyboardist for Steve Winwood.

The odd couple? Sam Tramiel, President of Atari, and Jimmy Hotz, creator of the Hotz Instrument, together at the NAMM Show. Atari featured the Hotz Instrument in its well-attended booth.

The Atari booth was jammed during the demonstrations by music professionals eager to see where the good sounds were coming from. They heard Fleetwood describe the Hotz Instrument as ". . .an answer to [his] dreams" and saw surprising performances by people new to the Instrument. Other musicians were more careful in their opinions, most wanting to spend a few hours playing it before making up their minds.

Tramiel confirmed that Atari would be selling the entire line of Hotz Instruments in a projected price range from $400 to $10,000. Atari already claims a 30 percent share of the music market and Tramiel confirmed that they were not going to let that slip. Said Tramiel, "We intend to pursue this market in a big way."

Next month, START will present a full report from the NAMM Show.–ANDREW REESE

Atari's Plans For 1989

"My goal is to sell 25,000 computers a month in 1989."

So said Sam Tramiel, president of Atari, in an exclusive interview at the NAMM Show in Anaheim, California in January. And how is Atari going to achieve this?

"We're going to begin an aggressive advertising and marketing campaign in the third quarter and on into the fourth quarter. We'll be competing aggressively on price, as well."

Tramiel also reported on the state of the newest Atari's. "Tooling for the Laptop should be finished in March and it will be shipping in April. The TT [the 68030 machine] is running about a month behind, but it should be shipping in the second quarter."

START will report on these new machines as soon as they're available. Watch for complete reviews in the summertime issues.–ANDREW REESE

Emulator Updated

Atari's Diablo 630 Emulator is being updated to fix bugs and address other complaints. WordPerfect currently does not fully support the Atari Laser printer because of problems they cite in the emulator. The German Laser Brain Epson emulator works perfectly with WordPerfect and the Laser. It may be available in the United States very soon.–STEPHEN MORTIMER ▶

News, Notes & Quotes

UNIX Derivative

Prentice-Hall has released a version of MINIX for the Atari ST. MINIX is almost completely call-compatible with UNIX V7 and lets the ST operate in a multitasking UNIX environment. Included with the MINIX operating system is a Kernighan-and-Ritchie-compatible C compiler, system shell, screen editor, over 90 utilities, over 100 libraries of procedures and full source code for the operating system and utilities. MINIX can read and write TOS-compatible disk formats and will work with certain hard disk drives. An extensive user support system exists on Usenet.

Although MINIX is copy-protected, a limited number of copies may be made in educational and research environments. The MINIX program does not include documentation, but complete manuals will be made available directly from Prentice-Hall. The ISBN number for the Atari version of MINIX is 0-13-584392-8 and it retails for $89.95. For more information, contact Prentice-Hall at Englewood Cliffs, NJ 07632, (201) 767-5937.–STEPHEN MORTIMER

Antic Software Obtains Rights to GFA

Antic Software, a leading developer of 3D graphics animation software for the ST, has just signed a major agreement with GFA Systemtechnik of Dusseldorf, West Germany. Antic will now be the exclusive distributor of GFA products in the United States and Canada and will conduct all marketing, production and product support there. Antic will also distribute GFA products in Australia.

GFA, formerly marketed in the United States by MichTron, is one of the best known publishers of languages, graphics and utility software for the ST and Amiga computers. For more information, contact Antic Software, 544 Second Street, San Francisco, CA 94107, (800) 234-7001.–TOM BYRON

At the NAMM Show, the Hotz Instrument took center-stage in the Atari booth. This is the top-of-the-line set-up, which is projected to sell for around $10,000 and will bear both the Atari and Hotz names.

Turbo C Nears Release

Turbo C is in the final stages of beta-testing in West Germany. The software is in English but the documentation and help files are in German. It was used to compile the new desktop publishing program Calamus, giving users more room for documents since Turbo C compiles very tightly. The package follows the ANSI-standard protocol and includes GEM and UNIX-style calls. The product supports the MEGA 68881 math co-processor board. Turbo C publisher Borland has no plans to release its powerful programming language in the United States at this time.–STEPHEN MORTIMER

Dot Dot Dot. . .

Sources at Atari say that several new versions of the Mega 2 will be arriving in the United States in 1989. More on this story next month. . . . TeX is now available in the United States. The high-powered desktop publishing system arrived here through international networks. It has several megabytes of associated files and can be downloaded from software library 15 of CompuServe's Atari ST Productivity Forum. . . . Reports from Taiwan indicate that Atari has dramatically increased production of ST computers, by as much as four times. (Editor's note: *Word from Atari components suppliers supports these reports, also.*). . . . According to the public relations firm of Winston & Winston, Atari now commands 30 percent of the MIDI market. The ST's technical superiority and relatively low price are cited as the main reasons for Atari's success.–STEPHEN MORTIMER ■

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When we offered the GFA BASIC 2.0 manual in our January 1989 issue, we were overwhelmed by your response—we sold every manual we were able to lay our hands on. Now, through a similar arrangement with MichTron, Inc. we're able to offer you the original *GFA Object Manual* to go with the program on the May 1989 START disk.

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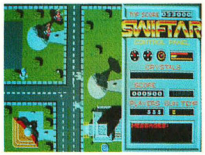

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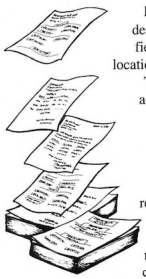

Report layouts are designed by placing fields at the desired locations on the screen. This can easily be accomplished with the built-in cut, paste, and copy functions. The finished screen-layout reflects the printed output. From simple personal reports like recipe cards, mailing list, and video tape libraries, to complex business reports such as inventory count sheets, packing lists, employee payroll reports and customer billing statements are easily created.

At the Program Development level, *dBMAN V* is the only database manager for the Atari ST that is compatible with the dBASE III Plus language. With this awesome programming power, you can develop and customize any programs to fill your home and business needs. For your home, create a check book program, with complete bank statement balancing to manage your personal finances. For your office, customize a complete accounting system to fit your business needs.

Also available for ***dBMAN V*** is the high performance Greased Lightning compiler. This compiler fully supports macros, and executes dBASE programs up to 16 times faster than dBASE III Plus.

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.

dBMAN V's features:

- ✓ dBASE II and dBASE III Plus compatibility
- ✓ Easy-to-use, pull-down menu interface to create, add, edit, and report database information
- ✓ 320 programmable commands and functions
- ✓ Password protection and data security at field level
- ✓ Easily transport your dBASE III data files and programs between Atari ST and PC's
- ✓ Extensive data validation including range checking
- ✓ Single command menus: vertical, horizontal, scrollable and pull down menus
- ✓ User defined pop-up windows
- ✓ Create a GEM pull down menu, mouse menu and file selector
- ✓ Run GEM application from dBMAN
- ✓ Program debugger/editor. And more...

Report Writer features:

- ✓ 9 group levels
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Specifications:

- ✓ Field types: Character, Numeric, Date, Logical, Memo
- ✓ Maximum characters per field: 254
- ✓ Maximum number of records per database: 2 billion
- ✓ Maximum number of index files: no limit
- ✓ Maximum record size: 4000 bytes
- ✓ Numeric precision: 17 digits

System Requirements:

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

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Products Update

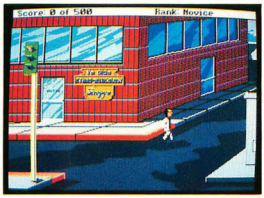
New ST Software and Hardware

Compiled by Tom Byron
START Assistant Editor

New Games from Microdeal, Sierra and Mindscape

In **Jug**, the latest arcade adventure from Microdeal, you're a shape-changing humanoid composed mainly of Titanium fleximetal. Within the living core of the planet Spiraeus is a deadly virus that causes its brain to malfunction and all the living organisms to die as the planet's life force is sucked dry. You *must* find and destroy the deadly tumor before the planet becomes an empty shell drifting in the lonely depths of space and time. Jug, $39.95. **Microdeal (MichTron), 576 S. Telegraph, Pontiac, MI 48053, (313) 334-8729.**

Jug, the latest creation from Microdeal.



Leisure Suit Larry II.

Who else but Leisure Suite Larry Laffer could win the Lottery, a dream date on "The Dating Connection" and a romantic cruise on "The Love Tub" – all in one day? In **Leisure Suit Larry II: Looking for Love (In Several Wrong Places)**, Sierra On-Line's sequel to the popular 3D animated adventure, it seems Larry gets lucky this time–but wait! Behind this beach blanket of fun and frivolity lies a ballyhoo of espionage and intrigue. With foreign agents, the Hairy Krishnas and Dr. Notoonyt and the Henchettes on his tail, Larry's good fortune could vanish quicker than his hairline. Leisure Suit Larry II, $49.95. **Sierra On-Line Inc., P.O. Box 485, Coarsegold, CA 93614 (209) 683-4468.**

In Sega's smash arcade hit **After Burner**, you pilot an F-14 Tom Cat through a variety of rescue missions. Feel the power and the rush of being airborne as you control air speed, flight direction and weapon selection. You're outnumbered but that's okay–your ability to maintain Mach 2 speeds and use your state-of-the-art battle computer, guided missiles and Vulcan cannon has already earned you the nickname of Ace. After Burner, $49.95. **Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062, (312) 480-7667.**

Alternative Desktops: NeoDesk 2.0, VDOS ProQueue

Gribnif Software announces the latest rendition of their ST "Desktop alternative." **NeoDesk, version 2.0** includes almost all the changes suggested from users of the original version.

Among the many upgrades, NeoDesk 2.0 lets your Desktop show files as text with multiple text sizes and columns, place a picture in the background and edit background patterns. It provides support for "twisted" formatting and the ability to move files or folders. NeoDesk 2.0 takes up as little as 24K of RAM. NeoDesk, version 2.0, $49.95. **Gribnif Software, P.O. Box 350, Hadley, MA 01035, (413) 584-7887.**

Another alternative to the ST's built-in Desktop is **VDOS ProQueue** from Marathon Computer Press. VDOS ProQueue will keep track of your ST's vitals, catalog and execute your programs and give you much of the utility of UNIX through its numerous resident and distributed disk utilities. You shouldn't confuse VDOS ProQueue with the classic command-line-interpreter style of shell that accomplishes assigned tasks in a non-graphical mode. ProQueue brings you the best of both worlds, and presents it in a graphics-based Desktop that is far more user-friendly that its ancient predecessors. VDOS ProQueue, $69.95. **Marathon Computer Press, P.O. Box 68503, Virginia Beach, VA 23455, (804) 460-5227.** ▶

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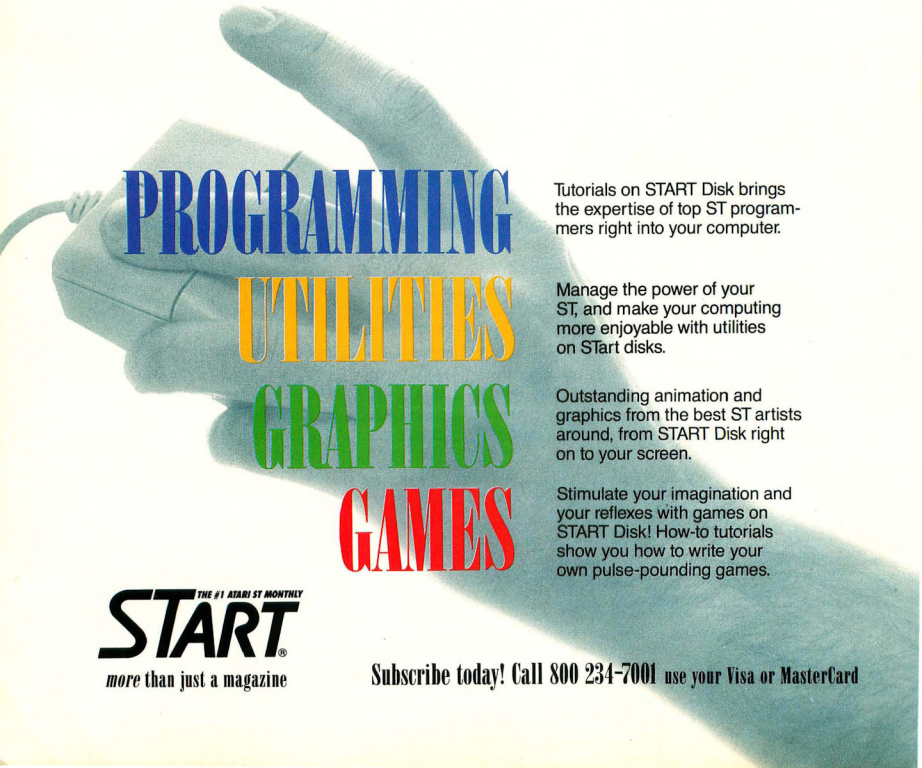

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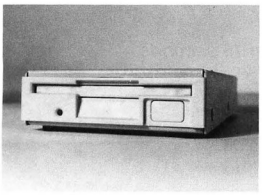

The new Professional FD-1 720K disk drive.

Professional FD-1

PCM Industries announces their new **Professional FD-1** 720K double-sided, double-density disk drive for the ST. The FD-1 is housed in a compact metal case with an extra-long cable that makes it easier to position the FD-1 along either side of your computer.

The Professional FD-1 will read up to 83 tracks, steps as fast as two milliseconds, has an Epson mechanism and is compatible with all ST software. Professional FD-1, $199.95. **PCM Industries, P.O. Box 5772, Arlington, TX 76050, (214) 660-4780.**

Scenarios from Rainbird

Rainbird Software's Universal Military Simulator brings to life the great battles of military history. Now, recreate the legendary struggles of the American Civil War on three-dimensional, contoured landscapes with **The American Civil War: Scenario Disk One**. With the Scenario disk, you can design your own maps or re-enact three of the most memorable battles of the War Between the States–Shiloh, Chattanooga and Antietam.

Also available from Rainbird is **Vietnam: Scenario Disk Two**. Written by historian Edward Bever, author of Conflict in Vietnam and a number of strategy simulation programs, this Vietnam scenario brings to your screen the reality of this devastating war. Vietnam: Scenario Disk Two includes three significant fire fights from the battles of Dak To–Hill 823, Ngoh Kam Leat and Hill 875. The American Civil War and Vietnam scenario disks, $19.95 each. **Rainbird Software, P.O. Box 2227, Menlo Park, CA 94026, (415) 322-0412.**

Fonts from Magnetic Images

Magnetic Images has just released a major update to their font series, plus an entirely new series of fonts for GDOS programs.

The new GDOS fonts are compatible with programs such as Publisher ST, Easy-Draw, WordUp, DEGAS Elite and Fleet Street. The GDOS fonts are identical in style with the original series of Magnetic Images fonts. They come in various point sizes and include printer fonts for Epson-compatible printers.

The upgraded line fonts are now compatible with Page Stream as well as the original Publishing Partner. Each disk contains three fonts (scalable line fonts) with files for either program. Line Fonts, $34.95; GDOS Fonts, $34.95. **Magnetic Images Co., P.O. Box 17422, Phoenix, AZ 85011, (602) 265-7849.**

IEEE-488 Interface

The **IEEE-488 Interface** from Vivitro Systems plugs into the cartridge port of the ST and provides full talk/listen/control capability to the IEEE-488 bus through a standard 24-pin connector.

The Interface turns the ST into a low-cost programmable controller or data logger for IEEE-488 instruments in applications not requiring a hardware interrupt facility. Also, a standard clock/calendar circuit with battery backup has been incorporated into the module.

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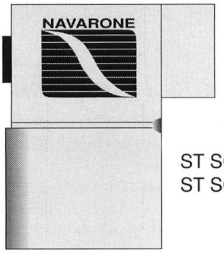

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The European Report

Atari U.K. Software On The Move—And The Latest Transputer News

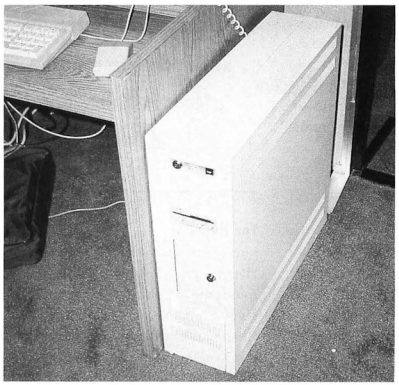
BY ANDRE WILLEY

Here in the U.K., Atari has always tended to maintain a fairly low profile, preferring simply to let their hardware sell itself. More recently they have been paying more and more attention to consumer computer shows and exhibitions, much the same as Atari U.S. has always done.

Back in the good old 8-bit days they also marketed a small range of software under the AtariSoft label, mostly in the form of game cartridges—but this has dwindled since the ST was released, and no new titles have been released for some time.

All that is now set to change as Atari finally makes a concerted effort to enter the software market with the announcement of five new ST labels. I spoke to Atari's software development manager, Robert Katz, who told me how he sees the market:

"There are two principle sources of software within the Atari Corporation: The U.S. is trying to support software, but because of the size of the market, they are tending to major on the 8-bit formats—they're doing a lot of work on XE, 7800 and 2600 software and they're anxious to get hold of whatever they can. The U.K. is trying to do the reverse—we're majoring on ST software, while still doing a lot of other 8-bit stuff as well. We are aiming to publish across five labels, the main one being Atari itself, which is really the one that has always been around as AtariSoft, but now we're just calling it Atari Action Games."



A prototype Atari Transputer Workstation (ATW), shown at the Fall COMDEX in Las Vegas. Don't expect to see this product in the United States much before Christmas.

Katz went to say that the new label will cover arcade and fast action shoot-em-up type products mostly, and any new submissions to the company will tend to be considered mainly for this range. Although ST versions will be the first to be released in all cases, most other major formats except Z80-based machines will be supported. These in- ▶

clude the Atari XL/XE, 7800 and 2600 consoles, the Commodore Amiga, PC-compatibles and, possibly, also the Commodore 64.

The first games include the re-release of the classic Star Raiders, followed by such titles as Grand Prix, Mario Brothers, Heartache, Tiger Attack, Speed Hawk, Super Soccer, Megapede and Star Flight—all priced at around £19.99 ($35.40 at current exchange rates).

Frames, Battlescapes and Mindgames

The second label, which is described by Katz as being "possibly the most innovative and exciting," is to be known as Frames. It has been set up by Steve Cain and Graham "Kenny" Everett—the team responsible for a whole multitude of excellent ST games including Star Trek, Black Lamp, Miami Vice and Platoon. They are under contract to Atari to produce six titles across six formats over the coming year. The first three, now about halfway to completion, are called Prince, Star Breaker and Hell Raider. All Frames titles will have their own logo and separate identity, but the Atari name will remain on the box. It is hoped that Frames will soon become a top arcade label in its own right.

The next range is Battlescapes—a new wave in war games. Battles are displayed in 3D-view and they're very accurate geographically. Historically, they have very strong Artificial Intelligence influences. These titles will be published across the ST, PC and Amiga formats. The first, Borodino, is out now and Armada (which recreates the invasion of the Spanish Armada) is now complete. The next, to be released in April, will be Arbela, which delves further back into warfaring history.

Still another label is to be called Mindgames, and will feature computer versions of classic board games—largely developed by David Levy of Bray Research. The first one, Go-Moku/Renju (the Japanese board game) is already out, to be followed by Backgammon, Bridge Master, then Go proper and Bridge Tutor. A very advanced version of Chess featuring 2D or 3D graphics and an interactive tutorial mode is also planned for April/May release.

Each title will be GEM-based and fully monochrome compatible—rather like many Macintosh titles—and available presently only on the ST. In many cases, the playing code has migrated down from some of the big, semi-dedicated games-playing systems, so they're going to be very powerful indeed.

The U.S. release of the Atari Transputer Workstation should be sometime between six and nine months after the European debut.

The Hyper ST

Finally there is the productivity—or Hyper—series. Katz outlined the first three titles, HyperDraw, HyperPaint and HyperChart: "Paint is out now, and Chart and Draw are complete and we're just working on the documentation. Paint is an advanced pixel-based art package, whilst Draw is a sort of consumer oriented Easy-Draw, using object graphics. HyperChart is very different. It uses the Macintosh's Hypercard concept of having a hierarchical filing system, but instead of using text it's all based upon objects, which could be text, database data, spreadsheet data, object-oriented pictures or bit-image pictures—and anything else you can think of!

"Other titles in the productivity series include LDW Power, written by Logical Design Works in Poland. The thing that hits you straight away is that it seldom fails, unlike certain other products. Our database is called Adimens, from ADI GMBH in Germany. In terms of power, Adimens is very much like Superbase Professional, but is perhaps slightly less user-friendly, since its heritage comes more from professional databases. There's no forms editor as such, but it can import external files and it's very relational, indeed. Its programming language can link into others, such as C and Pascal. We'll also be releasing MicroSoft Write from the States."

Calamus, the high-end desktop publishing program from Germany is another Atari productivity title from the Hyper range. (Editor's Note: *Calamus is marketed in the United States by ISD Marketing, Inc. in Toronto, Ontario, Canada.*) It should be available in the U.K. in early March.

Of obvious interest to all you stateside readers will be the likely availability of these products in the United States, so I asked Katz to outline the overseas marketing concept: "All of them will be primarily available through Atari subsidiaries. For example, Scandinavia, Australia and Canada all have taken quantities of these titles. In all cases, our approach is to offer them first to Atari subsidiaries and if for any reason they don't want to sell them, then we'll approach another main line distributor in that country."

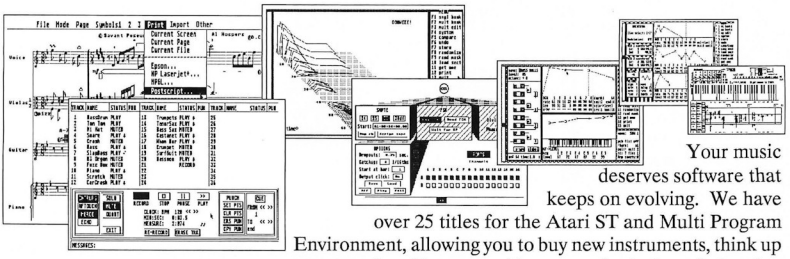
Although the final arrangements have yet to be completed, it looks likely that most of these products will be released in the United States through Atari itself, so keep an eye out for them.

More on the ATW

Development of the new transputer system has been moving apace since I last mentioned it. Formerly known as the Abaq, but now re-named the Atari

Continues on p.22 ...

And The Beat Goes On



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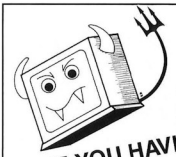

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European Report

Transputer Workstation (or ATW), the final production design is now complete. Shipment of the first non-development machines will be timed to coincide with this year's Hanover Fair in March, the largest and most prestigious European consumer electronics show.

Atari has opted for a tower-style casing which sits on the floor next to your desk, thus freeing up a good deal more surface space. (Editor's note: *See the photo of this configuration of the ATW in the March 1989 News, Notes & Quotes column.*) The standard configuration provides four megabytes of main RAM, plus a further one megabyte of video-specific RAM. Additionally, the user interface I/O port (better known to us mere mortals as a complete Mega ST) has its own 512K of RAM and can even be upgraded, should you wish to run any of the more memory-intensive ST software. Helios, the new transputer-oriented operating system from Perihelion, will be bundled with the machine.

In Europe Atari plans a big push of its own software.

One interesting point to note is that the system can support two monitors running completely independently. For example, a monitor connected to the transputer video card might be displaying a super-high resolution CAD image, while a standard ST monitor provides the menu and control facilities. This obviously opens up a whole host of commercial applications, not least of which is the broadcast video market.

Development systems have been available for some time now, and most of the major languages have been completed already. Currently under final testing are a number of graphic editors and Phoenix CAD, ported from the Fortran-based UNIX product. Software should be relatively simple to transfer from such systems due to the XWindows environment and Helios' similarity to the UNIX operating system.

Atari currently sees the ATW primarily as a European project, since there is much greater awareness of the transputer environment over here than there is in the States. The U.S. release should be sometime between six and nine months after the European launch, so don't expect to see any product much before Christmas. That will probably give you time to consider saving up the £4,000 ($7,080) price tag which is currently being quoted! ■

Andre Willey is the Technical Editor for Atari User, the United Kingdom's leading publication devoted to Atari computers.

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A Buyer's Guide to

TELECOMMUNICATIONS

BY JERRY McBRIDE

If you own a modem, you need telecommunications software that you can tailor to your specifications. ST users have several packages from which to choose. Reviewer Jerry McBride compares four of these: Flash! and Shadow from Antic Software, Interlink ST from Intersect Software and ST Talk Professional from Quantum Microsystems Inc.

Before you buy a telecom program, ask yourself a few questions. Do you need a program that is very easy to use? Do you want advanced programming features? Do you want to download or upload files while running other programs? Perhaps you want a balance of all these features, so you won't outgrow the program as you develop in knowledge and experience. Some of you will have very specific needs (you know who you are), such as VT-100 emulation so that you can interface with the computer at work.

I hope this comparison helps you find a telecom program that's right for your needs. In the following pages I review Flash!, ST Talk Professional, Interlink and Shadow.

Definitions

Some telecommunications terms are confusing to the beginner. Here are a few definitions:

Capture Buffer: a text window that can store all discourse between the two computers. Buffers also have word-processing features and may be used for creating messages or script files.

Compuserve B Protocol: B protocol is fully automatic: you tell Compuserve which file to download and it tells your computer exactly what to do and when to do it. It's fast and reliable.

Script: A series of commands that can be executed automatically (similar to macros for a word processor). A script mimics keyboard-entered commands and may have some programming or decision-making commands not available from the keyboard. Flash! uses a script language to automate common tasks.

Program: A series of BASIC-like commands that include "wait" statements, IF/THEN and other programming commands. ST Talk Professional uses a programming language to automate common tasks. It's more powerful than a script language, but also more complex and significantly harder to use.

Protocol: Error-checking method used during a file transfer.

Recording: A method of memorizing your actions with the keyboard and mouse that can later be repeated automatically. Used by Interlink to automate common tasks. This is not a script or programming language, but a fully automatic task playback feature.

Terminal Mode: This is the "mode of speech" between two computers when no file transfer is occurring.

Type-Ahead Line (or Buffer): Lets you compose an entire line (or more) of text and correct any errors before transmitting the text.

Vidtex Graphics: A simple form of

graphics available in certain parts of CompuServe (weather maps, for example) and on other private bulletin board systems.

Xmodem (CRC or CHK): The most common transfer protocol. It checks transmitted data accuracy every 128 bytes. Xmodem is recommended if your phone lines are excessively noisy. If you have quiet phone lines, Xmodem is slower than "Xmodem 1K/Ymodem" protocol. Most programs let you choose between two types of Xmodem error-checking, CHK (checksum) or CRC (cyclical redundancy check). CRC is better. (Early computers only allowed CHK; that's why you're given a choice.)

Xmodem 1K/Ymodem: These two terms refer to the same transfer protocol, which transfers 1K of data before error checking. It is faster than standard Xmodem.

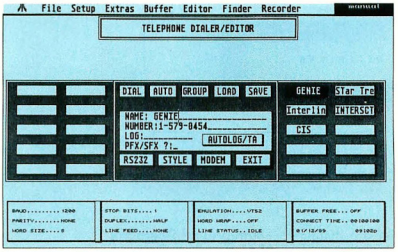
Ymodem Batch: This is different from Ymodem. Ymodem Batch can transfer groups of files automatically.

Now, on to the reviews.

INTERLINK ST

$39.95. Intersect Software, 3951 Sawyer Road, Suite 108, Sarasota, FL 34233, (800) 826-0130; (813) 923-8774 in Florida.

CIRCLE 164 ON READER SERVICE CARD



Interlink ST's Telephone Dialer/Editor.

★ **Report Card** ★

Category	Grade
Manual Operation:	A
Automatic Operation:	A
Documentation:	B
Background Use:	B

Overall Observations

Interlink ST is nothing short of incredible. It is a full-featured program, standing head-to-head with ST Talk Professional in most categories (see the comparison table). Interlink's advantage is that it has somehow integrated great power with unmatched ease of use, even in its automation features. Interlink has an auto log-on feature that is so simple a child could use it. It can also memorize an entire online session and repeat it automatically at any time. Interlink also has background transfer capability and even a built-in mini-BBS! And you know what? Even the BBS is easy to use!

No special installation is required, but Interlink does let you define separate pathnames for upload and download files.

Manual Operation

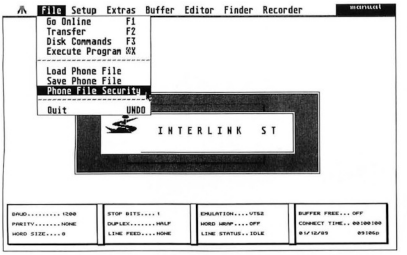
Where should I begin? Interlink uses a Terminal screen and a GEM screen with drop-down menus. You can open the Capture Buffer window from the GEM screen, but it is normally not shown. The bottom of the Terminal screen can ▶

switch between a type-ahead line and a status line. The GEM screen shows a wide variety of information in a status box.

All Interlink features are controlled by drop-down menus and handy dialog boxes. While in the Terminal screen the dialer and transfer dialog boxes are a mouse-click away. A minor feature that I really like is the quick-draw mode, which kills the lines GEM dialog boxes make when they appear or disappear. The boxes snap on and off, speeding things up considerably.

A new clipboard feature is also supported. Clipboard is a new standard for saving data to hidden files on floppy or hard disk. Programs that support the clipboard can transport data between applications easily. Interlink saves to the RAM clipboard until you quit, at which time the data is saved to disk. Interlink has Block-to-Clipboard, Clipboard-to-cursor and Clear Clipboard functions.

Running other programs from within Interlink is very clean and simple, but a minimum of one megabyte of memory is recommended.



Interlink ST's main screen.

Default capture buffer size, dialing directory and translation table can be set using a dialog box. You can also enter the name of a recording you want Interlink to execute immediately upon start-up (more on recordings later).

File access with Interlink is easy due to its improved item selector, which supports any number of disk drives and lets you change pathnames by clicking drive and folder names. All telecommunications default settings and function key definitions are stored in a single file, the dialing directory.

Text editing and file management is very easy with Interlink, thanks to a full range of disk- and buffer-editing features, including text search and place/find mark. Interlink can keep a log of online activities and has a separate cost calculation program.

Background Operation

Interlink's background transfer feature supports Xmodem, Xmodem 1K/Ymodem and Ymodem batch. To initialize the background transfer feature you summon the file transfer dialog box and double-click on "?????" (load a protocol from disk). Then select MULTIXY.TXF from the file selector. You are now ready to use the background transfer feature.

When you want to transfer a file, tell the BBS to begin and then *go to Interlink's GEM screen. Do not summon the transfer dialog box from the Terminal screen when using the background feature.* Go to the File drop-down and select Transfer. The transfer dialog box will appear. Select the desired transfer protocol and either send or receive. Now you can quit Interlink or execute a GEM program from within Interlink. *Under no circumstances should you go back to the Terminal screen until the transfer is done.*

The background transfer feature works quite well. During the transfer the desk accessory "Interlink Waiting" changes to show the number of blocks transferred and number of errors encountered. A click announces each block transferred and a chime rings when the transfer is complete.

Mini-BBS

I just have to mention the mini-BBS. This little jewel has three levels of access. Low-level access lets you upload, download, or leave messages in a predefined folder. The other end of the spectrum is high-level access, which places all drives and folders at your disposal. You can move, copy and delete files and more. The BBS is very easy to use and has online help menus, but I've saved the best for last: The BBS has a mode that lets you "call" it right from your own computer. This lets you see how the BBS works without leaving your home!

Dialing Directory Security

Interlink has a unique feature that lets you encrypt your dialing directory with a password. Each time Interlink loads the directory you must supply the proper decryption password. This feature is important for two reasons: one, you could have your terminal program disk stolen or copied, and two, Interlink's built-in BBS can provide access to your disk files. If an unscrupulous person learns the high-level access code they could download your dialing directory and passwords. Not a pretty thought. . . .

Autodialing Features

Each dialing directory file can hold 20 numbers and call a group of numbers, one after another, until one of them answers. Long distance services are also supported.

Interlink's autodialer contains the

auto log-on feature—and one of the most impressive features at that. Simply fill out a two-column form. Enter the expected prompt from the host computer in the left column and the proper reply in the right. Just fill in the blanks and Interlink takes care of the rest.

Automatic Operation

Interlink can mimic tasks you perform. Thus you could have Interlink call a BBS and read your mail (into the capture buffer), or it could get stock quotes, etc. It does this with its Record feature. A recording can also perform simple *offline* tasks when Interlink wakes up, such as bringing up the dialing directory or setting default paths.

Using the Record feature is simple. Just turn Record mode on with the Recorder dropdown menu and perform the task you want Interlink to mimic. When you're done, turn Record mode off and save the "recording" to disk.

Recordings are not editable, so they aren't as versatile as a script language. You wouldn't want to download the same game from GEnie twice, for example. This is the primary difference between a recording feature and a script language.

Documentation

Interlink's manual explains most features very well. I especially appreciated the informative appendices, which explained Ymodem batch use, Quick B mode, ATASCII, IBM 3101, VT-52 and VT-100/PC-ANSI terminal modes. The VT-100 section is *extremely* thorough. On top of all this, one appendix explains all major modem services, from GEnie to PC Pursuit. The manual's index should be expanded because it misses several key topics (which are hard to find in the manual).

The documentation has a few glaring holes. The explanation of the background transfer feature is hidden and incomplete and there is *no* explanation of how to use the cost calculation program.

ST Talk Professional's Terminal screen.

Summary

Interlink is an excellent program and I highly recommend it. It is reliable, powerful—but most of all it is simple to use. Its only caveats: you must be sure to start a background download from the GEM screen, not the Terminal screen. Also, the online cost calculation program is not explained.

The only thing missing that many users will need is a script language, though the auto log-on and record features will fill most automation needs quite well.

ST TALK PROFESSIONAL

$39.95. Quantum Microsystems Inc., P.O. Box 179, Liverpool, NY 13088, (315) 451-7747.

CIRCLE 165 ON READER SERVICE CARD

★Report Card★

Category	Grade
Manual Operation:	A
Automatic Operation:	D
Documentation:	B
Background Use:	Unknown

Overall Observations

As can be seen in the comparison chart, ST Talk Pro is a full-featured telecommunications program. Non-automated features are easy to learn and even easier to use. The autodialer, GEM dropdown menus, point-and click icons and full word processing features make ST Talk Pro a joy to use.

ST Talk Pro's automation features are based on an advanced programming language. Conditional statements, advanced keyboard, disk and modem I/O, logic functions and advanced string/array manipulation are supported. Programs can also be chained together.

In sum, there just might be something ST Talk Pro's programming language can't do, but it'll take you a long time to find it.

There is a drawback to all this power: it's much harder to learn and use than Flash! and Interlink. In fact, it may be too complex for many users to use effectively. Case in point: though the programming commands looked proper, I could not get the sample automatic GEnie log-on program to work.

Installation

ST Talk Pro lets you select different pathnames for various file types. Files for uploading, downloading, your favorite ARC program, ST Talk Pro "Autopilot" programs and more may be stored in separate drives or folders. This provides a great deal of flexibility when storing information. Choosing these pathnames is the only installation required by ST Talk Pro. "Why is a pathname provided for an ARC program?" you ask; because ST Talk Pro has a drop-down menu selection for ARCing and Un-ARCing files—for which you supply the ARC program. ST Talk Pro has to know where to find them. ▶

Manual Operation

ST Talk Pro switches between a Telecommunications screen and a Capture Buffer screen. The Telecom screen is powerful and easy to use. In addition to full GEM drop-down menus, ST Talk Pro has point-and-click icons which perform common tasks instantly. On the bottom of the Telecom screen is a status line that shows baud rate, remaining system memory, time online, accrued online fees and more.

The Capture Buffer screen has icons for selecting one of the 10 available capture buffers. ST Talk Pro has full-blown word processor features, invoked using Alt-key commands. Another plus for ST Talk Pro is that it provides all common disk functions such as directory, make folder, format, rename, view (text file), copy and delete. ST Talk Pro provides an improved item selector that supports drives A through J.

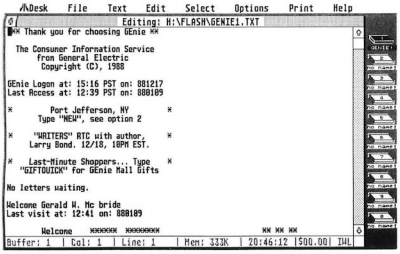
ST Talk Pro uses a fair bit of memory. If you have one megabyte or more, you will be able to run GEM programs from within ST Talk Pro. If you have a 520ST you will not have this option.

Autodialing Features

ST Talk Pro's autodialing directory provides a wide range of features. Baud rate and dialing options can be selected for each entry and hourly costs can be entered for online services. The dialer can run an ST Talk Pro program automatically and show statistics such as total calls made, total cost, cost this month, etc. Do you call bulletin boards that are always busy? Well, select *all* your favorite boards in the dialer menu and ST Talk Pro will call each one until one of them answers.

One bug I found is that the autodial directory refuses to dial after you edit it and save the changes. You must quit and restart the program to get it to work again. But a unique dialing feature permits you to install 10 of your favorite BBS phone numbers directly on the Dial drop-down menu, which is immune from the bug I just mentioned. Since installation to the drop-down menu is temporary, your installed BBS numbers go away when you exit the program.

In sum, manual operation is very easy and is packed with great features.



ST Talk Professional's Capture Buffer screen.

Background Operation

ST Talk Pro does not supply the background transfer program with the product. You must send in your registration card, plus $3, and cool your heels until they ship it to you. As of this review, there was no evidence that it existed.

Automatic Operation

Automating ST Talk Pro requires the use of a powerful but complex programming language called Autopilot. I found this a serious disadvantage. Why? The most common use of automation occurs when logging on. All users would like to have account and password sent automatically when the host computer asks for them. This is easy to do with Flash! and Interlink. Unfortunately, ST Talk Pro forces you to use their programming language to perform this otherwise simple task.

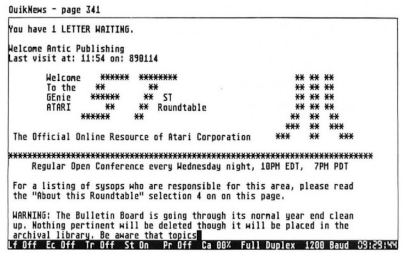
I feel that only those who have significant programming skills (and some luck) will be able to write their own ST Talk Pro function key or command programs. I feel that non-programmers may be overwhelmed by its complexity.

Documentation

ST Talk Pro's manual explains operation very well and includes many illustrations. It also has a complete glossary and index. Its organization is its major drawback. Here there are two problems. One: it's organized by drop-down menu – fine for cover-to-cover reading but a nightmare for finding specific topics. It needs bleeder tabs (or anything) so that you can find the start of each description. Two: tutorial and in-depth information for any given subject are spread across the manual. It's hard to find things unless you use the index, which isn't always accurate.

Summary

ST Talk Professional provides advanced and easy-to-use auto-dialing and point-and-click operation. Offsetting this is the fact that you must use a programming language to perform a simple auto log-on or to set up function keys. Also, there's no simple script capability, so again you must use the programming language. Finally, this programming language, although powerful, does not always work as anticipated and has a long learning curve.



The Flash! Terminal screen.

Flash! lets you execute other GEM programs without quitting. However, this works best if you have a full megabyte or more of memory. Also, you must change Flash!'s default directory to the drive and folder containing any necessary resource (.RSC) file. If you don't, Flash! will give you an error and refuse to run the other program.

FLASH!

$29.95. Antic Software, 544 Second Street, San Francisco, CA 94107, (800) 234-7001.

★Report Card★

Category	Grade
Manual Operation:	C+
Automatic Operation:	A
Documentation:	C
Background use:	None

Overall Observations

Flash! requires no installation or special setup. You just load and go. But it was not as easy to learn as I would have liked. Part of the reason is the documentation, which consists of a not-so-great manual and a 19-page addendum-on-disk. The other part of my confusion was due to the user-interface and the many ways any given command can be executed. Once I got the hang of Flash!, however, it was easy to dial, log on, go to a specific area of a BBS, upload, or download—all with the press of a single function key. (Editor's note: *We have it on good authority that a new version of Flash! will be available by the time you read this.*)

Manual Operation

Flash! uses two main screens, the Terminal screen and the Capture Buffer screen. The Terminal screen allows actual telecommunication and is controlled by a command-line (or Alt-key combinations). The Capture Buffer screen lets you change modem parameters and edit text—all using GEM dropdown menus. The drawback to the Capture Buffer screen arrangement is that all telecommunications are suspended while you are using it. The Terminal screen has an informative status line that shows the current baud rate, duplex mode, etc.

The command line/Alt-key user interface is harder to learn than a point-and-click user interface. I found it difficult to remember Flash! commands at first—it takes perseverance. Fortunately, there are GEM drop-down menus (in the Capture Buffer screen) for uploading and downloading—but they're only available for Xmodem and ASCII transfer types, not for Ymodem batch. There is also help available from within the program, which you access by pressing the Help key.

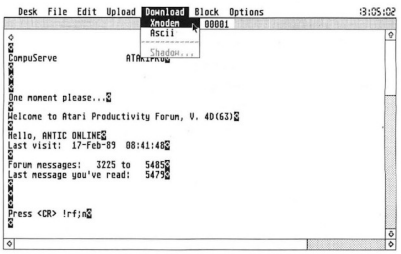
Autodialing Features

Flash! has an excellent automatic dialer which can custom set the baud rate for each individual phone number, access private long-distance services such as MCI or Sprint and even execute a script file automatically.

Automatic Operation

The same two-letter commands used on the command line are used in Flash!'s script language and function keys. Once you become familiar with the commands, automating Flash! is a breeze. This is just the opposite of ST Talk Professional, which is very easy to use manually but a nightmare to automate.

Flash! macros are also more versatile than Interlink's command recorder. Interlink can memorize any task you perform and repeat the same task later. This is a fantastic feature, but you can't edit it. A script file can be written to perform a certain task and can be modified as needed. But Flash! scripts are created by stringing commands together in a text file. You don't have to ▶



The Flash! Capture Buffer screen.

know how to program or learn a specialized programming language. A simple script can log on for you, upload or download files, or dial for you. Flash! also has basic programming/decision making commands not available on the keyboard. These allow conditional branching, nested routines (three deep), jumping, labels, string variables, etc.

A series of Flash! commands can be placed under one function key. You can also place one or more script files under each function key! 20 function keys are provided (F1 through F10 and Shift-F1 through Shift-F10).

Flash! lets you execute other GEM programs without quitting.

Flash! displays a 24-hour format clock, but does not track online costs.

Documentation

I've already mentioned a few problems with Flash!'s manual. It should be re-written. The biggest problem is its lack of an index, which makes it very difficult to find specific information. (Editor's note: *There will be an entirely new–and extensive–manual with the new version of Flash!*)

Summary

Flash! is a little hard to get used to at first, but it is still a very good, reliable program. Flash!'s main strength lies in its versatile function keys and script files. If you plan on using script files a great deal, my suggestion is that you consider Flash! rather than the other programs mentioned. However, Flash! does not itself have background transfer capability.

Telecommunication Program Feature Cross-Reference

Feature	Flash	Shadow	ST Talk	Interlink
Autodialer capacity	60 per file	60 per file	372	20 per file
Automatic log-on capability	yes	no	yes	yes
Automatic log on ease of use	easy	n/a	difficult	very, very easy
Automation (type of)	script language	n/a language	programming	Recorder
Automation ease of use	easy	n/a	difficult	very, very easy
ARC/Un-ARC ability:	no	no	yes	no
Background operation:	no	yes	unknown	yes
Reset-proof	n/a	yes	no	no
BBS features	no	no	no	yes
Security levels	n/a	n/a	n/a	3
Disk functions	n/a	n/a	n/a	yes
Message base	n/a	n/a	n/a	yes
Upload/download	n/a	n/a	n/a	yes
Clock	yes	no	yes	yes
Capture buffers	1	none	10	1
Cost tracking	no	no	yes	yes
Dialer features				
Auto-redial	yes	yes	yes	yes
Call statistics	no	no	yes	no
Call list of BBSs	no	no	yes	yes
Directory encryption	no	no	no	yes
Different baud rate for each number	yes	no	yes	yes
MCI, sprint, etc	yes	yes	yes	yes
Online cost statistics	no	no	yes	no
Run automatic file	yes	no	yes	yes
Disk functions				
Copy file	no	no	yes	yes
Create folder	no	no	yes	yes
Directory	yes	no	yes	yes
Delete file	yes	no	yes	yes
Delete folder	no	no	yes	no
Disk space	yes	no	yes	yes
Format disk	no	no	yes	yes
Rename file	no	no	yes	yes
View file	no	no	yes	yes

Telecommunication Program Feature Cross-Reference

Feature	Flash	Shadow	ST Talk	Interlink
Function keys	20	10	40	20
User-definable?	yes	no	yes	yes
Help screens	yes	no	yes	yes
Manual quality	fair	very good	very good	fair
Programming features	basic	none	advanced	none
Protocols				
ASCII (no checking)	yes	yes	yes	yes
Compuserve ''B''	yes	yes	yes	yes
Fmodem	no	no	yes	no
Quick B	no	no	no	yes
Xmodem CRC or CHK	yes	yes	yes	yes
Xmodem 1K/Ymodem	yes	yes	no	yes
Ymodem batch	yes	yes	yes	yes
Uploadable Protocols	no	no	yes	yes
RAM disk, reset-proof	no	yes	no	no
Status line	yes	yes	yes	yes
Terminal modes				
ATASCII	no	no	no	yes
Quick B	no	no	no	yes
IBM 3101	no	no	no	yes
TTY	no	no	yes	no
Vidtex	yes	no	yes	no
VT52	yes	yes	yes	yes
VT100	yes	no	yes	yes
VT220	no	no	yes	no
Uploadable modes	no	no	yes	yes
Translation	yes	no	yes	yes
Type-ahead line	yes	no	yes	yes
Vidtex graphics				
Graphic buffer	no	no	yes	no
Load from disk	no	no	yes	no
Print graphic	no	no	yes	no
Save as DEGAS	yes	no	yes	no
Save as Vidtex	no	no	yes	no
Upload graphic	no	no	yes	no
View filenames in archive	no	no	yes	no
Word processor features	basic	n/a	advanced	intermediate

n/a = not applicable

SHADOW

$29.95. Double Click Software, distributed by Antic Software, 544 Second Street, San Francisco, CA 94107, (800) 234-7001. (Upgrade $10 with original disk. Or, do it yourself with the patch program on CompuServe's SOFTEX–type GO ANTIC and select Antic Software Catalog for SOFTEX information.)

★ Report Card ★

Category	Grade
Manual Operation:	C
Automatic Operation:	N/A
Documentation:	B
Background use:	A

Overall Observations

Shadow makes uploading or downloading files as easy as calling a desktop accessory. It's also the only background program that can be initiated from within *any* compatible GEM program. (The other programs require you to start from the main telecom program.) Shadow can be used either as a standalone desktop accessory for dialing, uploading, or downloading–or as a companion to Flash!

Like all background programs, Shadow works with most GEM programs, but is not guaranteed to work with all of them. Shadow can be especially finicky with certain desk accessories. (Fortunately, it works well with Universal Item Selector II and Superboot, my favorites.) A software compatibility list is supplied on disk, but is not all-encompassing. If you need compatibility information on a specific program, contact Antic Software.

Reset-Proof RAMbo

The most amazing thing about Shadow is that it will reliably survive a system reset or screen resolution change and still complete a file transfer with ease. In fact, you can punch the little reset button as many times as you like, Shadow will still finish the job and come back for more! ▶

Installation

Shadow comprises a desktop accessory and a program that you must place in an AUTO folder. At initial power-up, Shadow entrenches itself firmly inside the memory of your computer; then it proceeds to *reset* the computer—your computer actually boots up twice. The second time around, Shadow is ready.

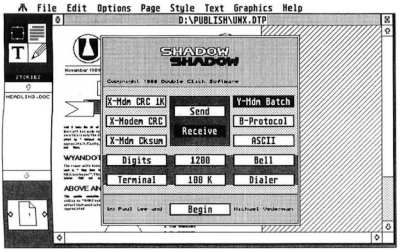
Manual Operation

To use Shadow you use the desk accessory drop-down. The main selector box appears (after a title box)—letting you set transfer protocol or RS-232 settings, or move to the Terminal screen. Once *you start* the transfer you can leave Shadow and do other work.

As a stand-alone program, Shadow is the Volkswagen Bug of telecom programs. It's not fancy, but it is simple to operate and gets you from point A to point B. Shadow supplies typical users with all they need to autodial, upload, or download. (Its dialing directory is compatible with Flash!'s directory and vice-versa.) One minor drawback with Shadow is the way it downloads. Shadow stores your downloaded file(s) in a temporary buffer, not directly to disk. The default buffer size (which you can change) is 100K, but the buffer *must* have enough space to hold the entire download *or else*. After the download is complete you are asked if you want to save the file to disk. The upshot of all this is that 520ST owners will not be able to run memory-hogging programs and download War and Peace at the same time.

Shadow uses a subset of VT-52 terminal mode and supports Xmodem (CRC or CHK), Xmodem 1K/Ymodem, Ymodem batch and Compuserve B protocols—as well as straight ASCII transfers.

On bootup, Shadow reads the RS-232 baud rate from your ST's Control Panel accessory. Shadow does *not* have any other terminal modes other than VT-52 and does not have auto log-on, script capability or a capture buffer.



Shadow's main menu.

Shadow can be used either as a desk accessory or as a companion to Flash!

Function Keys and RAM Disk

Shadow uses the 10 function keys for predefined purposes (duplex toggle, linefeed, abort file transfer and protocol selection).

The program also has a reset-proof RAM disk. You *must* use Shadow's RAM disk—or none at all; Shadow does not work properly with other RAM disks.

Shadow and Flash!

Shadow and Flash! combine to create an integrated telecom program that has the power and advantages of both programs. Shadow gives Flash! background operation and friendly point-and-click selector boxes, while retaining Flash!'s capture buffer, auto log-on, script capability and extra terminal modes. Normally, Flash! only has drop-down menus for X-modem and ASCII file transfers (Y-modem is available only from the command line). With Shadow behind Flash!, all transfer types are available from the GEM drop-down menu.

Using Shadow With C, Assembly-Language, or GFA BASIC Programs

Shadow's manual explains how to make C or Assembly-language programs interact with Shadow. Also, GFA BASIC "bindings" have been programmed into Shadow, so you can access Shadow's features from your own GFA BASIC programs.

Documentation

Shadow's manual is very good. It clearly explains basic operation first, then provides an in-depth reference section. The lack of an index makes it hard to look up specific information, however.

Summary

Shadow has fewer bells and whistles than other programs and has only one terminal mode—but it has strengths found in no other program. It is the only reset-proof background program and the only background program that can be initiated while in any compatible GEM-based program. It can also be integrated into Flash! or into your own programs. ■

Jerry McBride is a technical writer for Hewlett-Packard and the newsletter editor for ST-ACE in Santa Rosa, California.

ON DISK!

SPACE WARS 2400

The Online Adventure Is Just Beginning

ARTICLE BY DAVID RAMSDEN

PROGRAM BY DAVID RAMSDEN AND JIM KENT

Space Wars 2400 is a uniquely customizable space game that can even be played over the phone lines. Now, if your brother refuses to play anymore, you can call up a friend in Nome or Tallahassee and blast him or her from afar. Space Wars 2400 requires a color monitor.

Destroy the Romulan invaders! Files SPACE.ARC and SPACESRC.ARC on your START Disk

At the beginning of the 25th century, the uneasy truce between the United Federation of Planets and the Romulan Empire was suddenly shattered when an enormous star was discovered in a disputed area of control. Back on Earth, Federation ambassadors gathered at Star Fleet Headquarters to decide what actions to take about this potential threat.

Just a few miles from Star Fleet headquarters is the main office for Antic, InC. (Intergalactic Corporation), which has now been supporting Atari products for over four centuries. Rather than sending out expensive star cruisers and endangering hundreds of crewmembers' lives, the ambassadors voted to use a new type of ship (codenamed: "Cyberships") designed by Antic and controllable by a starship captain from Earth.

This is your mission as a starship captain: Destroy any hostile invaders who approach the star. The fate of the universe is in your hands.

Starting Up

Un-ARC the file SPACE.ARC, following the Disk Instructions elsewhere in this issue. Set your computer to medium resolution and double-click on SPACE.PRG to start the game. (The files SPACE.RSC and SPACE.INF must be in the same directory as SPACE.PRG; for sound effects, you'll also need the files EXPLODE.SND, GUN.SND, BELL.SND and SUN.SND.) After the title menu appears, you will see five large icons on the left side of the screen (see *Figure 1*). To start playing the game, click on the top icon. Press the spacebar to restart the game in the middle of play. To return to the main menu at any time while you're playing a game, press the Esc key.

For a two-player game on one computer, you will need to replace your mouse with a joystick. You can then move the mouse cursor by holding down the Alternate key while pressing ▶

the arrow keys; click by pressing Insert with the Alternate key held down. Click on Quit under the file menu to return to the Desktop.

Going to War

As you enter the battle, you will see your starship and a Romulan battle-cruiser (your opponent) hyper-zoom onto either side of a high gravity star. Plug a joystick into port 0 (the mouse port) to control your ship while your opponent uses a joystick in the other port. Both are armed with photon pixels, launched by pressing the fire button. You can move around by pushing the joystick forward to apply thrust.

The object of Space Wars 2400 is to blast any enemy vessels in this region of the galaxy. You can play two-player Space Wars at home or over the modem. If you get tired of piloting Romulan and Federated star ships, you can create your own ships using CAD-3D.

Customizing the Game

Being the captain of a Galaxy-class starship is fun, but you can also design your own space ships for Space Wars 2400. If you have The Cyber Studio (from Antic Software), you can use the extrude tool in CAD-3D to draw a ship and save it to your game disk as an .XTR template file.

Then, while you're still on the opening screen of Space Wars 2400, click on the space ship icon and load your own ships. Because of the time required to draw the images on the playing field, your ships are limited to a maximum of ten points. The game begins to slow down with larger ships, so it will ignore any extra points in the extrusion (.XTR) files.

You can also redefine the game sounds by clicking on the loudspeaker icon. For each type of sound (sun, laser, etc.) you can load in a different sound file. If you'd like to create your own sounds, Space Wars 2400 will load files created with G.I. Sound Tool (also from Antic Software).

Space Wars 2400 also lets you experiment with different gravity settings. Click on the OPTIONS icon at the bottom of the opening screen and enter any number between 0 and 99999 in the field labelled SOLAR GRAVITY. Higher numbers cause the star to "pull" more on your ship, while low numbers have the opposite effect. The Options Menu also has a button that brings up a dialog box for you to enter your names for the score display.

We've included several extra ships and sound effects files on your START disk in SPACE.ARC that you can use or experiment with in CAD-3D or G.I.S.T.

Reach Out and Blast Someone

Even if you've vanquished all of the opponents in your own house, you're still not finished. Turn on your modem and get your trigger finger ready, because Space Wars 2400 is also designed to be played over the phone lines!

Space Wars 2400 does virtually everything for you. If you're going to call another ST owner up to play Space Wars 2400, your friend first must boot Space Wars 2400, then click on the modem icon and select ANSWER MODEM from the menu that appears (*Figure 2*). Your friend should then click on OK if the modem settings are correct. This process can be aborted by selecting CANCEL or by pressing any key while the computer is waiting for a call.

In order to call the other player, click on the modem icon and then select DIAL MENU. Space Wars 2400 has a dialing directory (*Figure 3*) with room for five players and their phone numbers. To add a player to the directory, click on EDIT at the bottom of the dialing menu and select a directory entry with the mouse or cursor keys. When you finish typing in the name and phone number for a player, select PICK and choose the player that you're going to call by clicking on that person's name. The dialing process will begin when you select DIAL, or you can return back to the modem menu by clicking on EXIT.

Once you have connected up with the other player's computer, the program will automatically transfer any customized ships, sounds and playing options and then begin the game. The game sends custom features from the caller's computer, so make sure that you've set everything up before you call. You or your friend can abort the game and return to the main menu by pressing Esc, but this will cause the ship to go "dead" on the other player's computer. At the beginning of each game, you will see a message telling you that the program is trying to sychronize the game play before continuing. If the game gets "out of

sync" for any reason (going to the main menu will also cause this), you will see the game stop in the middle of play and attempt to re-synchronize with the other player. This feature insures that you will both begin playing at the same time so that you won't be blown up before you have a chance to react.

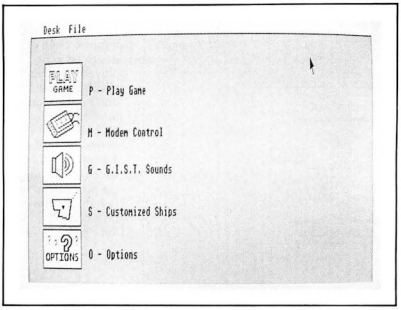


Figure 1.
The icons on the Main Menu give you the chance to customize Space Wars 2400 to suit your fancy. You can change the shape of the spaceships, the sounds of your space battle and even the sun's gravity.

Modem Settings

If you own a Hayes-compatible modem and a tone-dial telephone line, you probably won't have to change any of the settings on the Dialing or Answer menus. The only settings that you *must* be sure to check are the connect strings on both menus. Make sure that you change them from "CONNECT 1200" to "CONNECT 2400" if you own a 2400 baud modem.

The dialing prefix is also a convenient place to add "*70" if you have call waiting and want to disable it when calling another player. Another setting that you might want to modify are the busy strings—if the modem returns either of these strings, then the program knows to redial the phone number that you selected. Some modems return strings other than "BUSY" or "NO CARRIER" and you can enter the correct busy strings for your modem.

The RING [ON/OFF] buttons on the modem answering menu have been included in case your modem cannot automatically pick up the phone and answer an incoming call. When a phone call is detected and the ring string is sent from the modem, the program will output the answer string that you have entered. If your modem has an auto-answer feature, make sure that this button is turned off. Several modems have DIP switches that must be set to turn on the auto-answer feature, but most Hayes-compatible modems will use the default setting of "ATS0=1," which answers the phone on the first ring. Some modems use other commands, such as the popular low-cost Avatex modem. The less-expensive version of this modem is not 100% Hayes-compatible and uses "ATAA" instead.

If you encounter any problems while trying to call another person to play Space Wars 2400, check the manual for your modem to see if all of these settings will work correctly. Once you have everything working, use the Save Settings button on the Modem Control menu to save the information into the SPACE.INF file for later use.

Going Where No Modem Has Gone Before

A few companies have begun to see the potential for playing games over the phone using a modem: Flight Simulator II, Jet and Falcon are all examples of commercial software that can be played via modem. And as you've probably noticed, all three of these products are flight simulation programs. Let's look at a few possible ways to control a plane over the phone. If you would like to study the source code for Space Wars 2400, it is in the archive file SPACESRC.ARC on your START disk.

The first problem that you'll discover is the inherent speed limitations with using a modem; a 300 baud modem can send approximately 30 characters per second (cps), a 1200 baud modem sends about 120 cps and a 2400 baud modem can transfer about 240 cps. These are "best possible" transfer rates, but in the real world of telecommunications, you can't always count on it being that fast because of random noise in your phone connection with the other computer.

Creating Your Own Game

Let's assume that you just want to be able to move your ship around on your screen while sending the joystick movements to the other player: we'll send N if there is no movement, U for up, D for down, and L or R for left or right. It sure looks nice and simple, right? This means that you could still send almost 30 moves in one second, even at 300 baud. But what would happen if Aunt Harriet picked up the phone upstairs or WQST Power Radio suddenly decided to start transmitting on your phone line? Because of the noise, the player on the other side would probably see your plane go into a nose dive and make a kamikaze run on the Statue of Liberty.

Anyone who's ever downloaded a program by modem has probably heard of the Xmodem transfer protocol. The computer transmitting a file sends 128 bytes, and when the other computer receives the data, it sends back a few bytes used for error-checking, called checksum data. If the checksum data sent back to the transmitting computer ▶

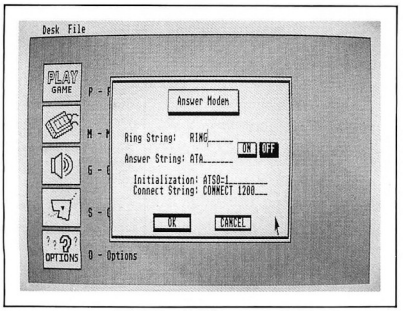


Figure 2. Space Wars 2400 has also been designed to be played over the telephone lines. You don't even need a terminal program—it's built into the game. This is the Answer Menu in which you configure the program to automatically answer an incoming Romulan's call.

is not equal to the sum of the 128 data bytes added together, then it sends that block of data over again. This principle can be applied to computer games as well.

Instead of just sending a single byte of information that could be lost or garbled in the transmission, you can send a "packet" of information containing the plane movements *and* the error checking data. If the other computer receives the packet, adds all of the data together and it isn't equal to the checksum data that was sent, then it will ignore that move. Although this solves one problem, it brings up another one: What happens when your plane starts to move up, but the movement packet sent to the other player is affected by noise so it's ignored? Even if the rest of the movement packets are correct, your plane and the plane on the other player's screen are now out of sync; and if enough packets are wrong, then you could be heading north while the other plane is still heading south.

This problem can be fixed by slightly changing the packet transfer method. Before your plane can move, your computer must receive some sort of acknowledgment from the other computer saying that the last movement packet sent was correct. While this still leaves the remote possibility that an incorrect movement could be made, it should work most of the time. This method is only useful in games that don't require rapid updates for the objects that the players are controlling. In a flight simulation, the movement of the plane can be updated occasionally by turning the plane to correct heading and placing it in the right position in the "simulation" universe. For Space Wars 2400, several of these ideas have been used.

Being the captain of a Galaxy-class starship is fun, but you can also design your own space ships.

Behind the Scenes

After you've connected up with another computer and started to play Space Wars 2400, the two computers begin rapidly exchanging information between each other. There's no time to wait and see if the last movement was correct, so more data is sent in the packet. Along with the ship's heading and speed, the X and Y coordinates of your spaceship are sent. If you've fired a shot or been killed, this information is also sent.

The packet actually consists of two unique starting bytes which signify the beginning of the movement data—these bytes could be virtually anything, since it's unlikely that the same sequence will occur frequently during the transmission. When the other computer sees this sequence, it knows that it's the beginning of a packet and it extracts the new ship data. Finally, two checksum bytes are sent which are equal to the sum of all of the data (except the two starting bytes) in the packet. If the checksum data that the receiving computer has computed is equal to the data sent, then it knows that everything is correct and moves the ship on the screen accordingly.

Now let's look at the problems encountered with the other methods. Since there's error-checking data in the packet, it's highly unlikely that a bad packet could ever get through to the other computer—and since the next packet would fix any errors by placing the ship in the right position with the correct heading and speed, then one bad move wouldn't make any difference. And if a bad packet is received, the ship will already have been set to a specific heading and speed so it will keep moving. Also, there's no waiting for the other computer to synchronize your movements, so the game is still running at full speed. The only drawback to this method is that more data must be sent, so fewer moves can be made in a second.

While Space Wars 2400 would probably work at 300 baud, the game will be too slow to play. There is also a slight chance that a shot could be fired on one screen but wouldn't be seen on the other screen because the packet was lost or damaged. The packet tells both

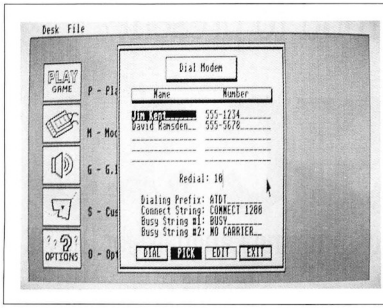


Figure 3.
The calling player in Space Wars 2400 uses this menu to configure the program correctly. You can set up a dial directory of up to five victims (friends) and automatically dial them with a single mouse-click.

players if the other ship has been destroyed, so the shot would still be registered; the only drawback to this method is that the other player might get destroyed by an "invisible" missile. If this happens, you will probably see the "Synchronizing Game Play" message once or twice while the program tries to correct the problem.

There are many different kinds of programs that these ideas can be applied to, and with the growing popularity of modems it might be profitable to create more games which can be played with another person over the phone. The next time you head into Zork, someone might be controlling a grue from their house; or one day you might pull the lever on a wall and find another group of explorers down in the dungeon looking for you. ■

David Ramsden is the author of Cyber Texture from Antic Software. He wishes to express his appreciation to David Johnson and Norman Morgan for their help play-testing Space Wars 2400. Jim Kent is the author of Cyber Paint and Aegis Animator.

PRODUCTS MENTIONED

G.I.S.T. and **The Cyber Studio, with CAD-3D**, $34.95 and $89.95. Antic Software, 544 Second Street, San Francisco, CA 94107, (800) 234-7001.

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*GFA-BASIC 2.0 owners who received their program on the START Magazine disk, please call for upgrade information.

CIRCLE 005 ON READER SERVICE CARD

Your Turn at Bat

Sports Forum on CompuServe

BY HARRY CONOVER

"Welcome to Talking Sports. You're on the air."

"Hello? Am I on?"

How many times have you sports fans heard that? The radio call-in sports show: people from around the block and around the country calling to praise, pan or pontificate about hot (and not-so-hot) sports topics. There's always been something missing from these shows. Callers, frustrated by busy signals, give up. Bored hosts act rude. Long commercial breaks add to the lack of spontaneity.

But there's another way to reach out and touch someone: an online forum

"Yes, but please turn down your radio so we can understand you."

for discussing sports with people all over the country; a place to get vital statistical information; an opportunity to participate in America's hottest game: Fantasy Sports.

It's the Sports Forum on CompuServe, America's largest commercial online telecommunications service. Generally, a CompuServe Forum has three areas of activity: the message base (also known as subtopics); Libraries where files can be uploaded (for *free*!) and downloaded; and the real-time Conference area. The Sports Forum can be reached from any CompuServe prompt by typing GO FANS.

"I've got a great idea for a trade. What if. . . ."

What's New In Sports

Here's a tour of the Sports Forum's activity areas:

SPORTS FORUM TOUR MAP

Sports Forum Message Sections

1 Forum Business
2 Football
3 Basketball
4 Hockey
5 Sport of Kings
6 Baseball
7 Other Sports
8 The Sox Exchange
9 Fantasy Sports
10 FBB Statistics
11 Fantasy BB Talk ▶

12 AL FBB Transactions
13 NL FBB Transactions
15 Fantasy Football
16 FFB Transactions
17 Sports Collectibles

Virtually every message subtopic in the Sports Forum also has a "sister" Library, making it easier for users to navigate around the Forum.

Message Subtopics

The heart and soul of the Sports Forum is its message base, where people indulge in their passions about sports, whether real or fantasy. Messages can be composed online using one of two editors provided through the Forum's own software, or offline using a word processor or telecommunications program. A typical message might look like this:

#: 190961 S6/Baseball
22-May-89 12:29:30
Sb: NY Yankees
Fm: Harry Conover
(*Sysop) 76701,220
To: G. H. Ruth 76789,714

So you think that his bat was _really_ loaded with mercury? The AL office sure handed down a heavy fine for _whatever_ they found in it, that's for sure!
Harry

Since all public messages can be read and replied to by any other Sports Forum member, any number of people will join in and create what is known as a "thread," a series of messages which *occasionally* remain true to the original subject but can go off on almost any tangent.

Final Champion of Champion Standings as of Wednesday October 5,1988

Team Owner	User ID	Team Team Code Name	League Points	Team Champ Pts	%
MITCH RUBIN	71231,565	RUBN GRILLED RUBINS	DUROCHER NL(80)	77.0	96.3
Steven Rubio	70807,3374	RBGN Rubio Begonias	Yogi AL(96)	83.0	86.5
Dave Shlapak	72307,1266	BNDT Beltway Bandits	Casey AL(80)	69.0	86.3
Lem Skidmore	75535,463	NIGH Knights	Mays NL(72)	62.0	86.1
J.J.Mathias	73557,2226	BREH Brewers	Lou AL(96)	79.5	82.8
Roger Knight	71470,173	RAKS Rakateers	Yogi AL(96)	79.0	82.3
Walt Kirspel	76702,247	WALT Succasunna Crack	Banks NL(72)	59.0	81.9
Jim Dawson	76176,1036	FLIE Sacrificial Flie	Uecker NL(80)	59.0	81.5
Jim Grimes	73157,1552	GRIM Terre Haute Cuis	Cepeda NL(80)	65.0	81.3
Mike Meyers	71360,1361	SPAM Span Weasels	Berra NL(72)	58.0	80.6
Mike Plunkett	74620,355	MPLK Bloom County Poi	Bob AL(96)	77.0	80.2
Steven Levy	72065,635	HCKR Random Hackers	Maris AL(80)	70.0	79.5
Walt Kirspel	76702,247	WALT Succasunna Sledg	Maris AL(80)	69.0	78.4
John Santos	75160,3631	JSAN Pythons	Kaline AL(80)	62.5	78.1

Fantasy Baseball is big business in CompuServe's Sports Forum. Listed here are the top Fantasy teams for 1988.

The Sports Forum has 16 libraries with files for baseball, football, basketball, hockey—even sports trivia.

The Sports Forum also lets you send private messages which only you and the recipient can view. This enables Fantasy Sports owners to negotiate "in secret" with other owners without having to leave the Forum at all.

Dream On

The Sports Forum Tour Map shows that there is a large area devoted to Fantasy Baseball (not unlike the popular "Rotisserie" baseball leagues, except that in the Sports Forum, no money changes hands). Owners in the Sports Forum's 25 leagues can leave transactional messages in the appropriate message subtopic involving their teams, view weekly standings and add to the textual history of their teams.

Exclusive to the Sports Forum is the presence of The Sox Exchange, which owns and operates a Red Sox-oriented Fantasy Baseball Camp in Winter Haven, Florida. Forum members can leave messages for the camp liaison, including a completed online signup form, and receive information through either the message board, CompuServe EasyPlex electronic mail or regular U.S. mail. The overall winner of Sports Forum Fantasy Baseball is awarded free registration to the camp, thus adding further incentive for Fantasy Baseball owners to participate in this burgeoning "real-time" sports activity.

Sports memorabilia and trading card collectors also have a message subtopic devoted to their specialized interests. Perhaps because of the return on investment on some cards, this is a well-read message section on Sports Forum.

Data Libraries

The Sports Forum Library area boasts 16 sections filled with files and programs for baseball, football, basketball, hockey—even sports trivia.

For instance, message subtopic 6, baseball, has a sister library, also called Baseball, containing major league schedules, the most current end-of-year Official Major League Baseball statistics, even a program to run your own Fantasy Baseball League.

Libraries 10, 11 and 15 contain the most current playing rules, league rosters, player statistics and information files for Fantasy Baseball and Football.

Library 1 contains the Forum's Help files to assist users with answers to their most commonly asked questions and tips for easier Forum navigation.

The special Forum Library menu lists uploads to the Libraries to aid in finding the latest and greatest uploads.

Conference Area

As if the message base, subtopics and libraries weren't enough for the enthusastic fan, the Sports Forum's 18 live online conference channels let several people communicate, in real-time, from anywhere.

Special Conferences (CO's) with sports personalities and "news-makers" are announced on the Forum's News Flash page well before the target date and are usually standing room only. A recent conference with former Red Sox pitcher Bill "Spaceman" Lee was attended online by hundreds of people.

The CO area also serves as the Forum's "neighboorhood couch" because of its informal, spontaneous get-togethers. Users are bound to come across an online acquaintance in the CO areas and are sometimes pleasantly surprised by a surprise visit from a sports personality. In addition to those activities, the Fantasy Sports leagues hold all their pre-season player drafts in the CO area.

If you're a sports fan and you haven't tried the Sports Forum on CompuServe, you owe it to yourself to log on, sign up and drop in. ■

Harry Conover is Chief Sysop of CompuServe's Sports Forum (user I.D. 76701,220) and Chief Executive Officer of Computer Simulated Sports, a Boston-based sports database company. His articles have appeared in BYTE, MacUser and Computer Gaming World magazines.

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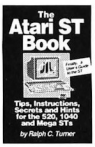

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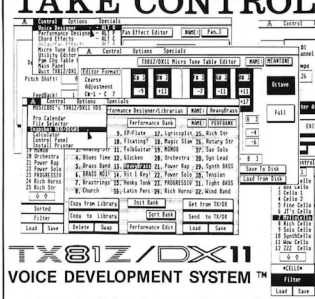

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CIRCLE 031 ON READER SERVICE CARD

pc-ditto II: An Interview with Avant-Garde's Bill Teal

BY DAVID PLOTKIN

Even as you read this, chances are good that pc-ditto II is available for purchase. Bill Teal and his crew at Avant-Garde Systems have been working long and hard on the upgrade, and the results are impressive. What's also interesting is that pc-ditto now looks more like Spectre 128, the Mac emulator. What follows is excerpted from a lengthy telephone conversation with Bill in mid-December.

The new version of pc-ditto is now cartridge-based rather than disk-based, as the original was. You still need software on disk to make it work, but the cartridge fulfills the main wish of every pc-ditto owner: increased speed. Considering that it was long considered impossible to emulate the Intel 808x family of Motorola chips, the fact that pc-ditto worked as well as it did is amazing and a testament to Avant-Garde's hard work and dedication. But it was *slo-o-ow*, because even though the 68000 in your ST is twice as fast as the 8088 built into the original PC, it still can't emulate that chip at full speed.

As with so many other things in the computer world, the answer is hardware. Using custom gate arrays, which

Avant-Garde Software partner Bill Teal.

are very advanced hardware devices, Avant-Garde managed to produce an emulator that can run at the *full speed of an IBM PC*. Of course, it may have been possible just to build an "emulator" containing an 8088 chip, as well as the attendant circuitry (essentially creating a PC in a small box), but such a device would likely cost almost as much as a PC clone! By doing it the way they did, the price of the new pc-ditto was kept astoundingly low. At the time of this writing, the price has not been set, but it will be very reasonable.

The use of a cartridge makes other things possible, including emulation of the higher-resolution PC graphics modes such as EGA and VGA. Unfortunately, only the "base" modes can be used (320-by-200, 16 colors) because of the limitations of the ST monitor! Enhanced EGA and VGA can't be used, and this probably won't change in the near future. It certainly is an interesting development when the Atari hardware *limits* what can be done with a PC emulator!

As you may know, the original PC can only use 640K of RAM. To combat this, a specification for extended memory was developed by Lotus, Intel and Microsoft (and so is known as the LIM specification, or more generically, as EMS—Extended Memory Specification.) With four-megabyte STs becoming plentiful, it would be nice to use EMS 4.0 with pc-ditto. While this might not be implemented in the very next version of pc-ditto, it is a very real possibility and something Avant-Garde is interested in doing. ▶

In our discussion, some very interesting information came to light. Software publishers must be very careful in setting their price points; often, the price they feel they can (reasonably) charge for a product determines just how much time and effort they can put *into* that product.

The engineering resources of Avant-Garde are considerable; they could probably design almost any feature into a hardware box that plugged into the ST. But there are some important considerations in pricing the new pc-ditto. The first is that STs are not very expensive. "Great," you say, but ST owners rarely buy software that costs more than their machines, so this places an upper limit on what can be charged. Another very important consideration is that PC clones are available for under $600. If the cost of pc-ditto is even reasonably close to that, people would probably just buy the clone. Finally, the product should be inexpensive enough to encourage dealers to bundle it in a package with a Mega, as was often the case with the original pc-ditto—which was very good for Avant-Garde.

Since the new pc-ditto is a cartridge-based product, it must pass FCC certification. Now, contrary to what you may have heard, it is not especially hard to get FCC certification. The first step is to submit your equipment to a testing lab, which will run the requisite tests. Ah, but there's an interesting rub: the cartridges are plugged into STs—and many of those that Avant-Garde tried to use emit so much radiation that they won't pass the FCC tests even *without* the pc-ditto cartridge plugged in.

The final interesting tidbit has to do with Atari's published list of dealers. In the process of marketing pc-ditto, Avant-Garde contacted many of the dealers on the list and, according to Bill Teal, found that in fact they were *not* Atari dealers. They may have requested information from Atari at one time, but did not sell Ataris and some were quite annoyed that anyone would think that they would. The final numbers are somewhat disconcerting: perhaps 200 to 250 dealers in the United States, perhaps 60 in Canada and about 700 in Europe. I admit that the European numbers look good, but the U.S. numbers are scary. On the up-side, Avant-Garde also discovered that some pretty prestigious companies, including Boeing and NASA, are using STs.

Advantages of Speed

The extra speed available through pc-ditto II will permit operations that the original pc-ditto couldn't handle. One minor item is that PC games will now work more or less normally, giving ST owners access to some of the better ones that have never been available for the ST. These games worked with the original pc-ditto, but they were so slow that they really couldn't be used. More importantly, many graphics-based programs can now be used. Print Magic from Epyx lets you make your own cards, banners, signs and calendars. There is similar ST software, notably Unison World's Print Master Plus, but Print Magic's print resolution is much better. Print Magic is easy to use and comes with many icons, fonts and borders. It supports the mouse and uses dialog boxes, and herein is the problem: when you move the mouse, you must wait for the pointer to move, and drawing a dialog box on the screen takes an incredible 28 seconds! With full PC speed, this excellent package should become fully functional on the ST. ■

Contributing Editor David Plotkin is a chemical engineer for Chevron U.S.A.

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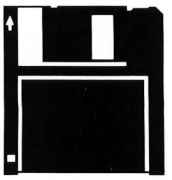

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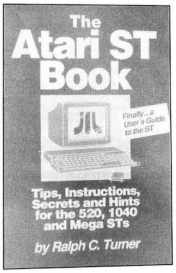
The Atari ST Book of Tips, Instructions, Secrets and Hints

BY RON LUKS

My bookshelves are loaded with books about the Atari ST. Some are too simplistic to be of any real instructional value and the rest are too complex or technical to understand. Lacking any useful manuals or tutorials, whatever expertise I've managed to acquire on the ST came from three years of trial and error (mostly error) and lots of hair-pulling. However, in somehow compiling most of my hard-learned tricks in just over *one* year, Ralph C. Turner has managed to publish what is arguably the best ST users' guide to date: *The Atari ST Book of Tips, Instructions, Secrets and Hints for the 520, 1040 and Mega STs.*

At one end of the spectrum of users' guides is the type of book that rehashes the basics of clicking on icons. At the other end are those esoteric tomes that discuss disk-seek rates and BIOS error codes. The first type is insulting in its simplicity (although if you need to read three books to figure out how the mouse works, maybe you shouldn't own a computer anyway). The second type is irritating in its complexity (you don't always need to know how a car *works*; you just need to know how to drive it). Unfortunately, instead of falling somewhere in between, most ST books end up at one end of the spectrum or the other.



The Atari ST Book of Tips, Instructions, Secrets and Hints by Ralph C. Turner.

Atari's GEM Desktop interface is actually a sophisticated and powerful program. You wouldn't consider buying a piece of commercial software unless it included a detailed, understandable users' manual. However, the basic information from the Atari GEM manual barely scratches the surface of what you need to know. Digging this knowledge out of the many technical manuals is an awesome task and most users don't even try. They simply struggle along, making mistakes and learning the hard way.

Turner's book was written for the vast majority of ST and Mega owners who want to learn how to use their computers quickly and painlessly. A new user will understand it easily and yet it contains enough tricks and tips to be worthwhile reading even for experienced users.

Questions and Answers

The 159-page book is presented in a question-and-answer format. The first 10 chapters thoroughly describe all you need to know to set up and use the Desktop interface. Turner explains the DESKTOPINF file format and how to edit this file to save any desired changes.

Turner devotes one chapter to adjusting the color palette with the Control Panel desk accessory and another to an excellent discussion of desk accessories in general and talks specifically about those accessories packaged with the ST. Here he presents the advantages and disadvantages of these programs and offers some alternatives.

The book discusses files and file management, including copy operations and an alternative to the standard GEM file selector. Also, many users were mystified by the cryptic one-page expla- ▶

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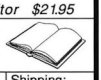

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nation of installing an Application in the ST owners' manual, but Turner devotes an entire chapter to it, clearly explaining the feature and putting forth some excellent arguments that changed my views on this subject.

Rounding out the first part of the book are chapters on RAMdisks and the boot process (warm and cold boots). The author puts quite a lot of emphasis on using a RAMdisk but barely comments on using a hard disk. I'm told that Turner has a second book in the works and, considering the potential problems and benefits involved, I hope he discusses hard disks in more depth.

Big PD Fan

The remaining seven chapters discuss software and applications. Turner is a *big* fan of public domain software, devoting an entire chapter to it and mentioning specific programs throughout the book. He warns the reader about the "uneven" quality of these free programs, but clearly he has many personal favorites. He mentions that you can download PD programs from bulletin board systems but recommends purchasing collections from various companies or users groups that compile such packages, which he says lowers the chances of getting poor quality programs.

I've used most of the selections listed in the book and while they do work as described, I feel that better programs are available. And considering how high Turner is on PD programs, he fails to mention the largest source of PD or "copyrighted but free" software: commercial information services such as CompuServe and The Source. My experience has shown that the programs contained on PD collection disks have usually been available many months earlier on the commercial services. The nominal hourly connect charges to download such files are cheaper than calling long-distance bulletin boards and not much greater than purchasing the disk sets themselves.

And That's Not All

While the material on modems and telecommunications was rather weak, the chapters on printers and word processors were very good. Considering all the different printers available, each with its own peculiarities and requirements, the author has managed to touch upon the common issues and problems remarkably well.

Rather than pick the "best" word processor, Turner devotes a chapter to a general discussion of the typical features found in word processing software. After explaining what features should be considered when shopping for a word processor, Turner continues with a second chapter that profiles six popular word processors. The same logic can apply easily to other software application decisions.

The book ends with an extensive list of ST-oriented magazines published worldwide, and an unusual offer: each copy of the book comes with a free consultation coupon that lets you mail in one question or ask about an ST-related problem and receive a personal response from the author. In times when customer service is a rare commodity, this offer is quite refreshing.

In summary, I heartily recommend this book to all ST owners, new and old. It fills a huge educational gap between the overly simple and overly technical manuals now available and is a bargain at any price. If I owned Atari Corp., I'd make sure to include a copy of this book with every ST sold today. ■

Ron Luks is the founder and manager of the Atari Forums on CompuServe. He has been an Atari owner since 1979.

PRODUCTS MENTIONED

The Atari Book of Tips, Instructions, Secrets and Hints for the 520, 1040 and Mega STs by Ralph Turner, $16.95. Index Legalis Publishing, P.O. Box 1822-21, Fairfield, IA 52556, (515) 472-2293.
CIRCLE 161 ON READER SERVICE CARD

Clipboard

Tips and Tricks for the ST Owner

Compiled by Heidi Brumbaugh,
START Programs Editor

To the Readers of START:

ST owners form a dynamic community, constantly learning, growing and increasing in size. The job of START's editors is to determine the needs of that community and then respond to those needs.

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Send your tricks, hints and tips to the Clipboard. Submit material to our columns in programming, MIDI, graphics, online or desktop publishing. If you'd like to review games for START, send us a sample 500-word review of your favorite game. If we assign a review to you, you'll get to keep the game we send you. No matter what your interests are, there's no better way to reach more ST users than by writing for START.

For information on how to submit your work, send a self-addressed, stamped envelope to:

START Author Guidelines
544 Second Street
San Francisco, CA 94107

Finding .RSC files

If a program has an accompanying resource file, the applications environment service (AES) will first look for the resource file in the same directory as the program. If it doesn't find it there, it will check drive A. If the resource file isn't on drive A either, the program will abort or the system will crash. Thus, if you're running a program from a drive other than A and the A light comes on before a program crash, this may be what is happening.

GFA BASIC programmers especially take note: If the GFA BASIC interpreter is in the root directory of a drive and you loaded your program from a folder such as MYPROGS, AES will look for the resource in the *root* directory of that drive rather than the subdirectory. You should either copy GFABASIC.PRG to the subdirectory where you do most of your programming or move the resource file into the root directory.

WK1—WKS files

This issue's Tax Template was created in LDW Power from Logical Design Works. We wanted to publish the Tax Template in such a form that any ST spreadsheet that reads Lotus files could read it. However, LDW power is the only ST spreadsheet that reads both the old WK1 Lotus formats *and* the new WKS format. All the others can read only WKS files. The LDW conversion program that comes with it generates WK1 files only. We were unable to find a public domain program to do the job, but fortunately version 2 of Lotus 1-2-3 comes with a program that can convert between the two types. We simply put the WK1 file on a floppy with an MS-DOS boot sector (courtesy of DCFormat) and ran the conversion program on a PC-compatible running Lotus.

Saving Control Panel Settings

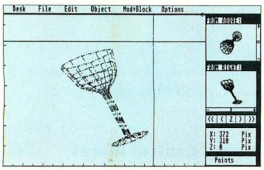
Previous Clipboard tips have emphasized that you can save the Desktop colors you set with the Control Panel by clicking on Save Desktop under the Options menu. Another feature of Save Desktop is that it saves your other Control Panel settings, for example, keyclick on or off and keyboard sensitivity. The Install Printer options work the same way.

Control-G + Control-G = Great Styling

ST Writer formatting controls are in the format Control-G (shown as a reverse video G) followed by a number followed by a hyphen or other dummy character. For example, Control-G 1 is bold and Control-G 4 is italics. If you want a word to be in *both* italics *and* bold simply add the two code numbers together, e.g., Control-G 5 for boldfaced italics.

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. ■

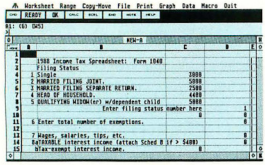
Disk Contents



GFA Object. . . Page 55

Space Wars 2400. . . Page 33

File Translator. . . Page 88



Tax Templates. . . Page 86

Space is the Place

Create a universe with **GFA Object**, a commercial-quality 3D object generator. You can load your objects into GFA BASIC or GFA Vector and animate them for stunning special effects in your programs. GFA Object also can generate ASCII object files and GFA Draft Plus macro-data files. Runs in medium resolution; files OBJECT.ARC and ANIMATOR.ARC.

Be the commander of a Federation or Romulan star ship in **Space Wars 2400** by Jim Kent and David Ramsden. Shoot photon pixels at the enemy as you fight the gravitational pull of the sun. Two people can play this game on one computer—or miles apart via modems! Files SPACE.ARC and SPACESRC.ARC; runs in medium resolution.

Transporting files between Word Processors is finally a snap using **START's Instant File Translator** (SIFT) by Bruce Noonan of ST Writer fame. Transfer files to or from ST Writer Elite and 1st Word, Word Writer ST and WordPerfect. File SIFT.ARC; runs in medium or high resolution.

Delmar Searls continues his tutorial on True BASIC this month as this issue's Programming in BASIC columnist. Want to learn more about subroutines, functions and modules? Study the source code to the demonstration program that converts a number from one base to another. The **Base Conversion** program is in the file BASCNVRT.ARC; runs in medium or high resolution.

Tom Chandler returns once again with his annual **START Tax Template**. Save time by using your Lotus-compatible spreadsheet (in .WKS format) to compute your taxes—April 15th is just around the corner! File TAX88.ARC; refer to your spreadsheet's manual on how to load the file.

Hard drive hangups giving you headaches? Revive it with the **Hard Disk Reviver**! Originally published in START's Spring 1987 issue, this hard disk tool from Dave Small and Dan Moore will let you bypass your hard disk's normal autobooting procedure. File REVIVE.ARC; runs in any resolution. ■

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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 percent 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.

All programs on your START disk are copyrighted. They are for your own private use, and are not public domain.

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."

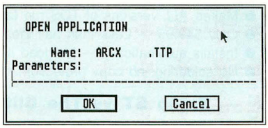
Now, put your START Backup disk in Drive A of your computer and double-click on the Drive A icon to see the disk's contents.

Un-ARCing the Files

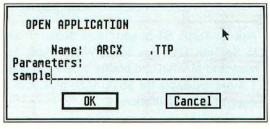
To use START's compressed disk files, please follow these steps:

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. If the Drive A window is already open on the Desktop, you can press the Escape key to see the new disk directory. Otherwise, double-click on the Drive A icon to see the 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 and press Return. You do *not* have to type in the extender .ARC. You can type in the name in upper or lower case.



(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.

```
Archive: SAMPLE.ARC
Extracting file:EXAMPLE.PRG
Extracting file:FILE.TXT
Extracting file:SAMPLE.PIC
Extracting file:README
```

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. Be sure you begin each time with a blank, formatted disk.

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 such a 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). ■

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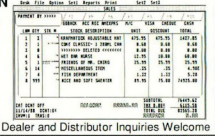

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ON DISK!

Small Tools

Autobooting Your Hard Disk

BY DAVID SMALL WITH DAN MOORE

Add another tool to your toolbox with REVIVE.ARC on your START disk.

Over the last months, we've been looking into the seemingly vague science of floppy and hard disks: the lore, the myth and the mystery. Let's continue with a discussion of autobooting hard disks.

In the best tradition of "tell them what you're going to tell them," this column and the next column on hardware *should* give you an in-depth understanding of hard disks. The column after that will begin our "troubleshooting" series. You know now about CRC errors, sectors, partitions, RWABS and how the hard disk hooks in, plus you have some tools to help debug your floppies and hard disks in a variety of situations. (If you've missed part of the series, let me recommend getting the back issues of START beginning with the December 1988 issue.)

Now, onwards and forwards. . . .

Autobooting Hard Disks

Not long after the first ST hard drive hit the market, Atari and the after-market people found out how to make the hard disk start up automatically, without floppies. It was more than a little tricky.

I'm going to go into this, not because I enjoy confusing you, but because this is the process that *often* fails and prevents you from starting up your hard disk. It happened to me at COMDEX a little while ago, for instance—and only the tools I'd brought along let me diagnose the problem.

Remember back to the RWABS column (START February 1989)? I explained there how the ST "wakes up" with only the floppy disk handlers for drives A and B. Now, you say, how can the Atari start up the hard disk if it can't talk to it without reading a hard disk handler from the floppy drive? No floppy + no handler = no hard disk.

Well. . . the ST *does* have a primitive, baby hard disk handler built into its ROMs with the ability to read in only the partition sector. It's not a full RWABS handler, just barely enough to read in one sector.

On power-up, an intricate dance takes place between the ST and its drives. Let's take a look:

1. As the ST wakes up, it polls the A floppy drive and tries to read in its sector 0.

If the floppy disk in drive A has an "executable sector 0" (which means that this sector is flagged in a special way), then the ST goes ahead and executes it immediately. NOTE: This virtually *never* happens these days. But if you're a long-time ST owner, you've seen it; your old TOS-in-RAM boot disk did this! Way back in 1985, no one had TOS in ROM; the system came shipped with two baby ROMs which could only read in sector 0 of floppy drive A on startup. The program in sector 0 would tell the system to load TOS, the entire operating system from the floppy disk.

These days, by the way, TOS 1.4 is being beta-tested via an autoboot floppy disk, so we're back to where the ST started from! The rest of the "startup process" described below doesn't apply on an autoboot from a floppy, but again, this is rare. (Note: This is where a "virus" usually locks onto a floppy.)

Most floppies these days do *not* have an "executable sector 0"; I'd say about 99 percent. The exceptions are some games, TOS in RAM and the Hard Disk Reviver program's floppy disks (more on this later).

Let's assume that either we could not read in sector 0 of the drive A floppy, ▶

(usually because there's no disk in the drive), or we read it in and it wasn't marked "executable" (like 99 percent of all floppy disks). The start-up process then will continue.

2. The system then tries to read in the partition sector of the hard disk.

The ST handles this the same way it handled the floppy disk; if the sector is marked executable, it executes the instructions within. Yes, that means that there's a *program* in the partition sector, which can also contain partition information for up to 12 partitions—pretty crowded for one sector, isn't it? There's just 512 bytes in there.

If the partition sector *can't* be read (the hard disk's not ready yet, not hooked up, broken, turned off, etc.), then the system proceeds to the next step.

If the partition sector *can* be read in, but isn't marked executable, the system shrugs, says "Oh well," and goes on to step three, where an "ordinary" boot continues.

If the partition sector *can* be read in and is marked executable, strange and wonderful things happen. Let's say that you have a particularly clever hard disk partition sector with exactly the right program in it. This program would self-install a hard disk driver (into the RWABS hook) at this stage in the system boot, and then tell the ST to look at drive C for things like the Desktop Information. The start-up proceeds from there.

Most likely, the next thing that will happen is for the hard disk driver to look at the partition sector, figure out which drive letters it wants to handle, and settle into the system. And now you've done it—you've managed to boot from the hard disk without the floppy attached!

All of the things that I've mentioned can go wrong—*will* go wrong—at some point. If the system won't boot up from the hard disk, one of these many points has gone wrong; you'll have to trace through and find out which one it is. *However*, you now have a list of things to check—knowledge is power.

3. If neither sector 0 is executable, then the system *really* shrugs, figures it's that sort of day and starts up the Desktop with the icons found in drive A's DESKTOP.INF file.

If there's no such file/disk—which happens a lot—it'll say "Oh Well," and plot the A and B drive icons as a default. (Note: This is where you'll usually end up with a hard disk boot problem; you don't get a C: icon. Even if you install one by hand, it's not hooked up through RWABS to work.)

You now know about CRC errors, sectors, partitions, RWABS and how the hard disk hooks in.

Timeout

It takes a long time for the system to get through step number one if there's no floppy in the drive—the system has to "time out," and that takes a while. Thus, if you turn on your ST with no floppy in the drive, it takes a long time for the system to reach step two and try to boot the hard disk. This is why autobooting sometimes seems to take forever.

The solution? Just keep a normal, formatted, empty floppy disk in drive A. Make it a *formatted* floppy please; blank floppies must also time out, which also takes a while. What you need is for the system to read in sector 0 from the floppy as quickly as it can, look at it, conclude that it's not executable and move on to step two, start-up from the hard disk. (Note: This delay has been considerably shortened in the Mega and TOS 1.4 ROMs, so you Mega owners can probably skip formatting, if you like.)

Manual Start

If the hard disk is not spun up, reset, and ready to go on power-up, you're going to fail on step two. I mentioned this already; it's the Dread Power Strip Problem discussed in this column in the February 1989 issue of START. The system then won't know the hard disk is there unless the system is reset.

Note, however, that if you run the hard disk driver program *by hand* (by double-clicking on the driver; it might be called AHDI.PRG, or SUPBOOT.PRG or whatever), you can "wedge" the hard disk driver in after the system has started up. It will then install itself into the RWABS hook, read the hard disk's partition sector to see what requests it ought to handle, and so on.

This is one very useful technique to remember when the "autoboot" fails; very often you can run the hard disk driver by hand and then access the hard disk. Also, very often, if you can't get to the hard disk at all to find the hard disk driver, you can run this program from a floppy disk and the hard disk will "wake up." Oddly enough, sometimes that fixes the problem.

Some hard disks need to "clear their throats" before they can autoboot. My Hewlett-Packard drives, for instance, *always* fail on the first hard disk read after power-up—they're designed that way. (I have no idea why.)

Of course, if you do this from the Desktop, you'll probably have no disk icons for the hard disk, so you'll have to go to the trouble of installing them. (Or

you can use a command-line interface shell program and not bother with the Desktop at all.)

Re-Run

You can re-run the hard disk driver program many times. There is no danger in this. All that will happen is that you'll use up a little more memory (where the program and tables are stored) each time and you'll keep trying to read in the hard disk partition sector. This can be handy when debugging a flaky hard disk, because you're definitely doing something that should cause the hard disk light to flash, as sector 0 is read. If the light doesn't flash, it's a hardware problem. (Even better is to use Supra's utilities, but if you don't have them. . . .)

The Mark

A floppy or hard disk sector is marked "executable" by having its contents add up to $1234. (You adjust the last two bytes to make the sector come out to $1234). Thus, if you do *anything* that modifies the hard disk partition sector, it will not come out to $1234 anymore unless you make the effort to fix it. It won't autoboot any longer and you'll end up with two floppy icons on the screen—making you think you've lost your drive.

Note: *Any* time you change a partition to another type, as with Magic Sac, Spectre 128, and possibly pc-ditto, this happens.

The solution? Just re-install the autoboot, using whatever program you originally set it up with; all fixed!

Multiple Autoboots

If you have multiple hard disks out there (as many people are starting to do; see also "Megabytes, Not Megabucks," START, Winter 1987, on how to install a second hard disk into your present drive), then the system will boot *all* of them that have "bootable" partition sectors. If you see the "xxxx Drive AutoBoot. . ." message several times during boot, you'd best go turn off the other drive's autoboot process, using its autoboot utility. If not, you've got several drivers, possibly of different brands or revisions, using up memory and possibly even fighting with one another.

Multiple Drives

The Atari will attempt to start up from LUN 0 (Logical Unit 0) of SCSI devices 0-7 during boot. It tries to boot all eight devices at start-up. Hence, any time you press the reset button, you should see every LUN 0 on the system flash its light briefly as it is polled. When you have five drives hooked up (as I do), there's a neat rippling effect across them. Anyway, if your drive doesn't flash after a reset, there's hardware trouble.

Kludged Partition Sectors

You can get into a nasty "no win" situation if the self-boot process becomes corrupted. Let's say the partition sector's program becomes fouled up somehow. (Damage to AHDI.SYS or SUPBOOT in the AUTO folder, for instance—say, if a hard disk write goes awry.)

On power-up, the floppy will read in briefly, the hard disk will read in, try to boot and the system *will crash* while running the partition sector program. Typically, you'll get two or three bombs onscreen, but it can vary—once I saw 23! To fix this, re-install the Autoboot driver from floppy. But you can't even turn the system on, can you? Hmmmm-MMMmmm.

If you turn off the hard disk, you can at least boot. Well, great. But turning on the hard disk when the computer is already on will crash the computer. (This doesn't happen with *all* drives: it depends on the model of hard disk you have. The early Atari interfaces, for instance, did this a lot.)

Believe it or not, there's a solution to this logjam: the aforementioned Reviver program originally published in the Spring 1987 issue of START. Because of its usefulness, we're republishing Reviver in this issue's START disk. All it does is make you an "executable" floppy disk that does *nothing* except bypass the hard disk boot. You run Reviver, put in a floppy, and that floppy becomes executable. In other words, Reviver lets you power on the Atari with the hard disk powered on, but zaps the autoboot. (Reviver is a good example of a program written in desperation; my hard disk had gone bad in this way. It's the only solution I know of to this particular method of the hard disk going bad. ▶

Dave Small's Reviver!

The Hard Disk Reviver was originally published in the Spring 1987 issue of START, but because it's such an indispensible tool we're including it again on this issue's START disk. Read Small Tools for a description of what Reviver does; you only need it in certain circumstances with certain hard disks. Un-ARC REVIVE.ARC, following the Disk Instructions elsewhere in this issue. To use Reviver:

1. Turn off your hard disk so you can boot.
2. Format a blank floppy. Single sided, please.
3. Put in a disk with REVIVE.PRG. Run REVIVE.PRG. It will ask you to swap disks in A and press the Shift key; do so.
4. It will then write an executable boot sector out to drive A.
5. Turn your ST off.
6. Turn your hard drive on.
7. Turn your ST on. It will boot from drive A almost instantly and ignore the hard disk. From here you can do all you usual things, such as installing the hard disk drive.

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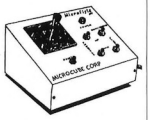

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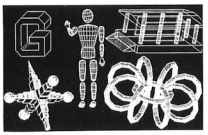

GFA BASIC 3.0 AT A DISCOUNT!

We here at START are always looking for good deals for our readers. Nowhere else will you find programs like GFA BASIC 2.0 and GFA Object available for the price of a START disk. But now we have another spectacular deal for you:

Through a special arrangement with GFA and Antic Software, you can now purchase the latest versions of GFA BASIC 3.0 at a *30%* discount! It's normally priced at $99.95, but for START readers *only*, you can get it for just $69.95 plus $3.50 for shipping and handling. This is the latest and most powerful version of the BASIC that's the standard in the ST world. And included is a newly revised manual and Antic Software's technical support that's second to none.

All you have to do is send your original January 1989 START disk (the one with GFA BASIC 2.0 on it) with a check or money or for $73.45 to:

GFA BASIC UPGRADE #TH0003
544 Second St.
San Francisco, CA 94107

Reviver is on this issue's START disk for you to add to your tool library.)

Then, you can start up your computer with the hard disk attached, the floppy overrides the hard disk self-boot and you can at least get to the Desktop and run the hard disk driver by hand. Then you can try re-installing the autobooter to fix it. Reviver is a *good* thing to have; it's on my "must take" list of utilities for computer shows, etc.

You *may* be able to switch on your hard disk after your computer is turned on and booted without it crashing. Go ahead and try it. If you get away with it, install the hard disk driver (SUPBOOT, AHDI, etc.), and re-install the hard disk autobooter. That should cure things. (Note: The same thing applies to bad desk accessories or Auto-folder programs. You'll crash on start-up and the only way out of it is to boot without the hard disk, get it online somehow and remove the offending accessory.)

Warning: The upcoming TOS 1.4 ROMs are incompatible with many Auto-folder programs and probably many desk accessories. Beware when you switch!

Next issue we'll take a look at some hardware details that should provide you with a balanced (and fairly complete) picture of the entire ST/hard drive relationship. ■

START Contributing Editor David Small is the creator of the Magic Sac, Translator 1 and Spectre 128. 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

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

GFA Object

A 3D-Modeling Program For Use With GFA BASIC

BY ANDREW REESE
START EDITOR

In the January 1989 issue of START, we brought GFA BASIC 2.0 to the START disk and your response was overwhelming. This issue, we present GFA Object for use with color monitors. GFA Object lets you create three-dimensional objects that you can use in your own GFA BASIC programs. If you're at all interested in 3D, read on. . .

Into the third dimension with GFA Object. Files OBJECT.ARC and ANIMATOR.ARC on your START Disk!

Most of you are aware of the power of GFA BASIC. Version 2.0 of the Interpreter is *the* standard against which all BASICs for the ST are judged.

Because of the power of GFA BASIC, GFA Systemtechnik created a whole series of programs designed to work with it—and many were actually written in GFA BASIC itself. GFA Object, featured on this issue's START disk, is a good example. It not only shows just how capable GFA BASIC is as a language, it also is a powerful 3-D object creator in its own right. You can use it to create objects or images for use in your own GFA BASIC programs or as macro-data for use in GFA Draft Plus. As a bonus, you can use objects created in GFA Object with GFA Vector, the 3D animation program, coming to you soon on your START disk!

Getting Started

GFA Object is on your START disk in the file OBJECT.ARC along with six module files. (Modules are basic shapes—building blocks for more complex objects.) Copy OBJECT.ARC to a blank, formatted disk and un-ARC it, following the disk instructions located elsewhere in this issue. When you are finished, double-click on the OBJ_COLR.PRG icon to run the program. You will need an ST or Mega system with a color monitor to run GFA Object and must be in medium resolution.

Because it's impossible to reproduce the entire GFA Object manual in the pages of START, what follows is a quick overview with some basic information and a button-by-button and menu-by-menu explanation of the program's functions. However, just as we were able to do with GFA BASIC 2.0, we have obtained a limited number of copies of the original 150-page manual. If you would like to purchase one, see the instructions at the end of this article.

When GFA Object loads, you will see the editing screen shown in *Figure 1*. This is the screen in which you will create and edit your objects. The main window (the Edit Field) shows the Front View of any object, while the two small Help Screens to the right show the Right and Top Views (and are labeled, appropriately, as "From Right" and "From Top"). The menu bar at the top of the screen includes Desk, File, Edit, Object, Mod+Block and Options headings. Below the two Help Screens are the Z-scroller, the coordinates box and the status box. ▶

Diving In

If you are familiar with CAD-3D and Cyber Sculpt from Antic Software, you may be a bit disorientated in the GFA Object universe at first. In GFA Object, the Y-axis runs vertically in the front view, the X-axis horizontally and the Z-axis represents depth. In the Edit Field, the origin (0,0 point) in the X and Y dimensions is in the lower left-hand corner of the window and the dimensions of the universe are approximately 42,000 units (pixels) in all directions.

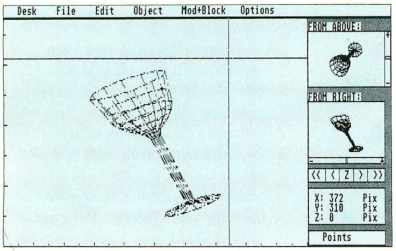


Figure 1. GFA Object's Edit Field, in which you create and modify your objects. All functions are selected from the extensive drop-down menus for easy operation.

When you enter GFA Object, you will be in Point mode, as indicated in the status box. In this mode, you can place points anywhere in the Edit Field. To create edges, you will need to select the Edge mode from the Edit Menu. In the Edge mode, you can create edges by first left-clicking once in the Edit Field. When you do so, you will see a question mark appear in the status box. this indicates that you have not finished an edge. When you left-click a second time in the Edit Field, you will see an edge line appear between the two points. As long as you are at the same Z-location as an edge, it will appear as a solid line; move away from that Z-location and it will appear as a dotted line.

To create a surface, select Surface mode from the Edit window and place up to 20 points in the Edit Field; as long as you have not finished a face, two question marks will appear in the status box. You *must* finish a surface by left-clicking on the *first* point you set. You may find it difficult to find the precise location of that first point; if you do, move the cross-hairs near the point and then *right-click*. The cross-hairs will move to the closest point; if it's the first point you set, left-click and you will complete a surface.

If you try out making a few edges, you will notice in the help screens that they are all in the same plane, i.e. at the same Z-location. You may use the Z-scroller to change the Z-location. Click on the double arrows to change it rapidly or the single arrows to change it more gradually. If you want to change the Z-location quickly to that of one of the points in the Edit Field, left-click on the "Z" in the center of the Z-scroller. The cursor will change to an open cross-hairs. Place the cursor over the point whose Z-location you wish to use and left-click. The Z-location will immediately change to that of the point.

Alternatively, you may left-click on the Z location in the Coordinates box. The Z-location will disappear and you may then type in a new Z-location. Finally, you may use the sliders on either of the help screens to move the Z-location roughly. To move them, you must click and hold the left mouse button on the slider "handle." You can then drag it in the direction you want.

NOTE: Unlike CAD-3D and Cyber Sculpt, creating a series of connected edges *does not create a* surface. *You must use the Surface mode to create a surface that will be shaded in the Display mode.*

Coming Up For Air

Take a few minutes to play with the program. You can create surprisingly complex objects through the simple techniques you've already learned. Don't worry if you make mistakes. You can't hurt your computer by making a Frankenstein's monster of a mess in the Edit Field. When you're done playing, select New object from the File Menu. When you click on the Yes box in the confirming dialog box, all your mess will be gone.

Let's run down the menus now.

The Desk Menu

- GFA-OBJECT Info–Displays the program information and a fascinating little drawing routine.

- Desk Accessories–Any desk accessories you have installed can be accessed from the Desk Menu.

The File Menu

- Load Object–Lets you load an object from saved in GFA Object format. A bit of explanation of the nomenclature is needed here. You will see the term "module" used in the Menus; *any* object can be treated as a module and vice versa. Modules are intended to be small "building blocks" (in CAD-3D, they're called primitives), from which you create more complex objects. You may load any of the modules that came on your START disk directly into the Edit Field by using the Load Object option.

- Save Object–Saves your current object to disk with the filename extender .OBJ.

- Load as ASCII–Loads an object from disk in ASCII file format. The full file format is explained in Chapter 7.2 of the GFA Object manual.

- Save as ASCII–Saves your current object to disk in ASCII file format.

- Load picture–Lets you load a .PI2 DEGAS (or Doodle) format picture file. You must be in Display Mode first to see it, however. GFA Object uses the current color palette for any picture you load. You will need to have the Control Panel loaded as a desk accessory to change the palette to suit the picture you load.

- Save picture–Lets you save the current screen as a DEGAS .PI2 (or Doodle) format picture.

- Delete File–Lets you make room on your disk by deleting a file.

- Drive–Lets you select the current disk drive that GFA Object will look to for files.

- Memory–Displays the number of points, edges and surfaces you have used, the number still available, the amount of free memory available and the amount of free disk space.

- New Object–Clears the Edit Field of all objects.

- Quit–Exits GFA Object.

The Edit Menu

- Edit mode–Selects the Edit Field for creating and modifying objects. Occasionally, when switching from Display mode to Edit mode, the large cross-hairs will "print" on the screen, creating unwanted lines. Simply re-select Edit mode and the Edit Field will be re-drawn and the lines removed.

- Display mode–Selects the Display screen for displaying objects. See *Figure 2.*

- Point mode–Selects Point mode for placing points in the Edit field.

- Edge mode–Selects Edge mode for placing edges in the Edit field.

- Polyline mode–Selects Polyline mode for placing a polyline in the Edit field. A polyline is a series of up to 20 points continuously connected by edges. Remember: a polyline–or any other edge–does not define a surface that will appear solid in Display mode with Hidden line active.

You can create surprisingly complex objects with simple techniques.

- Surface mode–Selects Surface mode for placing surfaces in the Edit field.

- Delete mode–Selects Delete mode to remove points from the Edit Field. To remove a point, select Delete mode and then click in the Yes box in the confirming dialog box. The letters "De" will appear in the status box. Move the cursor near the point you want to delete (you may have to move the Z-location so that it is the same as the point), right-click to move the cross-hairs onto the point and then left-click to delete the point. *NOTE: Deleting a point will also delete all edges connected to it.* To exit Delete mode, re-select it from the Edit Menu and click in the No box in the dialog box.

- Displace points–Lets you move a point in any dimension. To displace a point, select Displace points, then type in the amount of displacement you want in the dialog box; pressing the Return key indicates no change. when you have entered the values, the dialog box will disappear and the cursor will change to an open cross-hairs. Place it near the point you want to displace and left-click. The point will be displaced according to your instructions. You will remain in Displace point mode until you right-click to exit.

- Point size–Lets you choose the size of the points already placed in the Edit Field. Default is 1-by-1 pixel, but you can change this to 3-by-3. Points added after this change will appear as small crosses in the Edit Field.

- Blend in numbers–Lets you add in numbers that identify the point numbers, the edge numbers or both to aid you in defining an object. This is especially useful when defining an object by entering data manually (see below).

- Smooth out data–Converts all fractional point definition data to integer data. This will, however, prevent use of the slow mode of displaying Hidden-Line objects (see below).

- Enter data–Lets you define points, edges or surfaces by entering numerical location data manually.

- Display data–Displays the location data on the screen for the current object.

- Print data–Prints the location data on your printer for the current object.

▶

The Object Menu

- Rotate object–Lets you enter values (in degrees) to rotate the object in the Edit Field.

- Displace object–Lets you enter values (in pixels or the currently defined unit of measurement) to move (displace) the entire current object in the Edit Field.

- Change object size–Lets you change the size of the current object. Values of less than one reduce the size of the object in that dimension, while values of greater than one increase its size.

- Hidden-Line–Lets you select one of three modes for displaying objects in the Display screen: No hidden lines, quick and approximate or slow and exact.

- Central projection–Lets you select whether to display your object in parallel projection or with a vanishing point (central projection), to give a sense of perspective to the observor. Selecting central projection (and confirming its choice) actually changes the shape of the object. If you don't want to do this permanently, copy the object into the object buffer before selecting Central projection.

- Vanishing point–Lets you select a vanishing point for central projection. The default is in the center of the screen and 1,000 pixels deep.

- Centre of rotation–Lets you choose between the default center of rotation (the center of "gravity," or computed center of mass of the object) and an arbitrary center of rotation that you can select.

- Light source–Lets you choose the location of the light source used to shade objects in the Display screen. Default is X=1, Y=1, Z=1, placing the light to the left, below and to the front of the object. Values of X=-1, Y=-1, Z=-1 places the light to the right, above and to the rear of the object.

The Mod+Block Menu

- Load module–Lets you load a module (an object) into a special buffer so that you can use it to create complex objects.

- Show module–Lets you display the module in the main window to insure that the module is the one you want.

Rotate profile is like using a lathe to turn wood or metal.

- Merge module–Lets you move the module into the Edit Field and merge it with the current object. Step-by-step instructions will appear in the upper right-hand corner of the screen to guide you through this.

- Object buffer–Lets you store the current object in a temporary buffer.

- Change over–Lets you swap the contents of the object buffer with the object in the Edit Field.

- Mark block–Just as in word processing, Mark block lets you select all or a portion of the current object for later manipulation. Again, step-by-step instructions will appear in the upper right-hand corner of the screen to guide you through this.

- Show block–Once you have marked a block, it will be shown by heavy, black points. If you then change the Z-location, the block will no longer be shown. Show block restores the heavy marks so that you can see what you've marked.

- Block as module–Lets you place a block in the module buffer, so that you can "copy" portions of an object back onto that object repeatedly. Placing a block in the module buffer will replace whatever is alrady in the module buffer.

- Rotate block–Lets you enter rotation values (in degrees) to rotate a marked block.

- Displace block–Lets you displace (move) a marked block, by entering values (in pixels or the current unit of measurement).

- Change block size–Lets you change the size of a marked block, similar to changing the size of an object.

- Delete block–Lets you delete a marked block, along with all edges running to points in the block.

The Options Menu

- Set units of measure–Lets you name and define an alternate unit of measurement, instead of the pixel used as a default. The new unit of measurement can be anywhere between 10 and 100 pixels in length.

- Blend in scale–Displays a scale along the bottom and left edges of the Edit Field. It is on by default.

- Blend in grid–Toggles a grid on and off in the Edit Field to aid you in locating components of an object.

- Help windows–Whenever you make a change in the object or the Z-

location of the Edit Field, the Help windows are redrawn along with the Edit Field. If you find that the time that this takes is burdensome, you may switch off the Help windows by selecting this option. To restore them, reselect this option.

- Rotate profile–Similar to Spin in CAD-3D and Cyber Sculpt, this option lets you define a profile and rotate it around a center axis to create an object. This operation is like using a lathe to turn wood or metal. If you have an object in the Edit Field with fewer than 50 points, you may use it as the rotation template. In any case, creating a rotated object will replce whatever is in the Edit Field. Be sure to save or buffer any object you wish to keep before rotating a profile. The screen for the Rotate profile function is self-explanatory; experiment with this function to get a feel what it can do. Just remember that when you are satisfied with the settings, click on the Rotation-parameter OK box to reach the Edit Field for the Rotate profile function and when you have placed all of your desired points for the profile, right-click to create the object.

- Translate profile–Similar to the extrude function, this option lets you "squeeze out" an object, like toothpaste from a tube. You define the shape of the opening of the tube with 20 or fewer points, tell the program how many sections you want to squeeze out and how far apart they should be. Operation of the Translate profile function is quite similar to that of the Rotate profile function; switch the various settings by left-clicking on them and then click on the Translate-parameter ok box to reach the translate profile edit field. After defining the profile by left-clicking to set up to 20 points, right-click to create the object. Again, this will replace any object in the Edit Field.

- Pic background–In Display mode, lets you load in a DEGAS .PI2 (or Doodle) image to use as a background for your object. (If you have selected background in the Hidden-Line dialog boxes, you won't see your picture. Be sure that you say "no" to background if you want to load in a picture.

- GFA-DRAFT plus \.MAC–Lets you save a two-dimensional projection of an object as macro-data for use in the GFA Draft Plus CADD program.

- GFA BASIC \.GET–Lets you cut part of the Display screen and save it as a GFA BASIC Get file. You can then use the PUT command to load it into your program.

- Printer–Lets you choose drivers for 9- or 24-pin printers and print out an image of the screen.

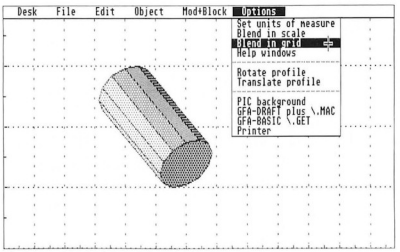


Figure 2. You can choose a number of options for the Display screen. For example, you can choose to hide the lines at the back of an object, set a vanishing point and apply perspective and define the location of the light source.

Extras

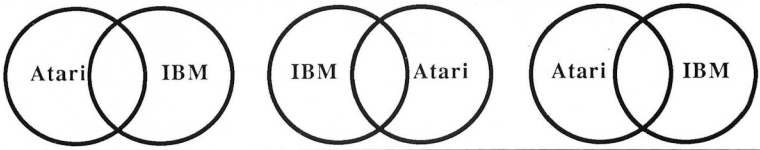
We've also included on your START disk an animator program that does two things: First, it lets you convert your GFA Object .OBJ files into .DAT vector files so that you can load them into GFA Vector and GFA BASIC *as objects*. Second, it lets you experiment with animation of any object with fewer than 1,024 points. Now, you can get a feel for how your object will look in motion.

The Animator program is called ANIMATOR.PRG; you will also need to have ANIMATOR.CHN in the same directory to run Animator. These two files are contained in a separate ARC file named ANIMATOR.ARC. To use Animator, un-ARC ANIMATOR.ARC following the Disk Instructions located elsewhere in this issue and then double-click on ANIMATOR.PRG in either medium (color) or high (monochrome) resolution.

Also, on an upcoming START disk, we will present a file converter program to convert GFA Object files to CAD-3D format and vice-versa. Watch for it!

Finally, we have available a limited number of the original 150-page manuals for GFA Object. The price for the manual is $12.95, plus $3.50 shipping and handling. For VISA and MasterCard orders, simply call the Disk Desk toll-free at (800) 234-7001 and ask for #TH0002 or send your check or money order in the amount of $16.45 to: GFA Object Book Offer, 544 Second Street, San Francisco, CA 94107. Remember, the number of manuals is limited, so act fast! ■

If you would like to buy the original GFA Object manual, see page 54 for details



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Programming In BASIC

Using True BASIC: Subroutines, Functions, Modules

BY DELMAR SEARLS

Convert numbers from any base to any other. This program, with sample source code in ASCII format, is in BASCNVRT.ARC on your START disk.

In the February 1989 issue of START we introduced a continuing series on True BASIC. This issue, take a look at how True BASICs subroutines, functions and modules are structured. If you own True BASIC, brush up on these concepts and follow along with the sample program on disk. If you're just curious about True BASIC, read on to see if this full-powered, interpreted language will meet your needs.

We All Live in a Yellow Subroutine

In True BASIC the definition of a subroutine starts with the keyword Sub and ends with End Sub.

```
Sub Name(Parm1, Parm2,. . . )
  Body of Subroutine
End Sub
```

A subroutine is invoked by the statement

```
Call Name(Value1, Value2,. . .)
```

where Name is the name of the subroutine and Value1, Value2,. . . correspond to Parm1, Parm2,. . . respectively. For example, Parm1 in the subroutine has as its initial value Value1 from the Call statement.

The purpose of a subroutine is to execute a group of commands. The primary purpose of a function, on the other hand, is to return a single result. The definition of a function begins with Def and ends with End Def.

```
Def Name(Parm1, Parm2,. . . )
  Body of Function
  Let Name = Result
End Def
```

Somewhere within the definition, Name must be assigned a value. In the example, the assignment came at the end of the function. While this is often the case, the assignment can be made anywhere within the function.

A function is used just as if it were a variable name.

```
Let X = 3 * Cuberoot(A)
Print Average(Numlist)
```

In the first example Cuberoot is a function with one numeric parameter. In the second, Average has an array parameter and returns the average of the numbers in the list. This value will be printed on the display device.

Parameters and Arguments

In the definitions above, Parm1, Parm2,. . . are *parameters*. Value1, Value2,. . . are values (variables, constants or expressions) and are called *arguments*. When a subroutine or function is used, Parm1 takes on Value1, Parm2 takes on Value2 and so on. The parameters and arguments must agree in number and each pair (e.g. Parm1 and Value1) must be of the same type (either numeric or string).

The arguments of a function are passed by value. The value of each argument is passed to the function and copied into a temporary storage location (corresponding to the name of the parameter). If a parameter is altered, it *does not* affect the actual argument since only the copy was altered.

However, the arguments of a subroutine are passed by reference. The address of the argument is passed to the subroutine. If the argument name is X and the parameter name is Num, both X and Num identify the *same* storage location in memory. Consequently if Num is altered within the subroutine, the value of X is also altered because they both refer to the same location.

Passing by reference is limited to variable arguments. If the argument of a subroutine is a constant or an expres- ▶

sion, then a temporary storage location is created and its address passed to the subroutine. True BASIC can be tricked into passing even a variable argument by value rather than reference.

Call Do_it(A, B)

This statement invokes the subroutine Do_it and passes the addresses of variables A and B.

Call Do_it(A, (B))

This statement invokes the same subroutine and passes the address of A. However, because the variable B is in parentheses True BASIC thinks it is evaluating an expression. Consequently a temporary storage location is created and the value of B is placed in it. The address of this temporary location is passed to the subroutine. Thus any changes made to the corresponding parameter in the subroutine will *not* affect the value of B, only the value in the temporary location.

One final observation needs to be noted. Arrays can only passed by reference to subroutines since there are no array expressions in True BASIC. Passing arrays to functions is time-consuming because a local copy of the entire array must be made each time the function is invoked.

Internal Versus External

An internal function or subroutine is one which appears before the End statement in a True BASIC program. All of the variables in an internal program unit are global. For example suppose that the variable Index is used in the main program and in an internal subroutine. They would both refer to *the same* memory location. Any change to Index in the subroutine would change the value of Index in the main program as well. (Note that we are not talking about parameters here, just about variables that are used in a subroutine or function.)

An external function or subroutine follows the End statement. All variables used in external program units are local. That is, they are known only within the unit. Suppose Index is used in the main program and in an external function. They refer to two different memory locations. When the function is invoked a temporary storage location is created and identified by Index. Any use of Index in the function refers to that temporary location. When the function terminates, this temporary location is released. References to Index in the main program will refer to the storage location created by the main program itself.

The definition of a subroutine starts with the keyword Sub and ends with End Sub.

Generally speaking, external subroutines and functions are preferred to internal ones. The main reason is that the variables in external units are local. Many a programmer has wasted hours searching for the cause of a program error only to discover that a variable identifier (in a global environment) was inadvertently used for two different purposes.

True BASIC Modules

A True BASIC module is a collection of external subroutines and functions having two distinct properties. First, the subroutines and functions can share data (including arrays) that are stored independently of the main program and that cannot even be accessed by the main program directly. The only access allowed by the main program is through the subroutines and functions in the module.

Normally, external functions and subroutines allocate space for local storage when invoked and release the storage when they are done. In a module, however, data storage (for shared data) is permanently allocated.

Furthermore you can specify which subroutines and functions in a module can be accessed from outside and which cannot. Those declared to be private can only be accessed by subroutines and functions within the module itself. Thus the programmer is able to limit access to the module to only a limited number of subroutines and functions.

Consider a program that maintains its own data stack. In BASIC the stack would normally be implemented as an array. Subroutines to Push values onto the stack or Pull values from the stack would either have to be internal (accessing the stack as a global variable) or external (passing the stack as an argument). Using internal program units to access the stack requires additional care in choosing the names of variables since all the variables would be global.

Incorporating the stack (and the routines that directly manipulate it) within a module allows us the best of both worlds. We can use external subroutines, with their local variables, to access the stack *without* passing the stack as a parameter. We can hide the details of the stack and worry only about the logical operations Push and Pull. The details are handled by the module. Inadvertent changes to the stack are all but impossible. Finally, once a module is written, it can be freely incorporated into any program needing its services with a minimum of effort.

Base Conversion

The program BASCNVRT.TRU illustrates the use of subroutines, functions and modules in True BASIC. Copy BASCNVRT.ARC and ARCX.TTP onto a blank, formatted disk and un-ARC the file, following the Disk Instructions else-

where in this issue. BASCNVRT is extensively documented so I won't go into details here. It allows you to convert numbers in any base (2 to 16) to any other base. You can execute the runtime version, BASCNVRT.PRG, from the Desktop even if you don't own True BASIC.

Watch this column for more on True BASIC. Next up: Using True BASIC to write great, portable graphics programs. ■

Delmar Searls is the author of Grapher in the Fall 1987 issue of START and See Sorts in the December 1988 issue of START.

PRODUCTS MENTIONED

True BASIC language system and runtime package, $99.95. True BASIC Inc., 45 Theodore Fremd Avenue, Rye, NY 10580, (800) 872-2742; technical support: (603) 298-5655.

True BASIC Libraries: Making Your Life Easier

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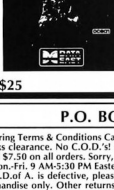

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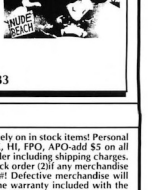

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CALAMUS

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BY DANIEL FRUCHEY

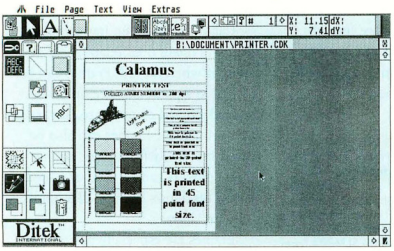

Figure 1. Calamus features a unique nested icon menu structure (on the left) and an intuitive design that makes its power a pleasure to use. While the screen fonts are not perfect, Calamus' use of vector fonts makes laser output crisp and clean.

In the desktop publishing world, two products have traditionally lead the pack: Aldus Pagemaker and Ventura Publisher. These programs have maintained a stranglehold on the publishing market that, up to now, has seemed inviolate. Things are about to change.

ISD Marketing has released Calamus, a versatile program that redefines the desktop publishing metaphor. It is a serious contender that could bring new attention to "Power Without The Price" publishing on Atari computers. The user's manual describes Calamus as a "third-generation DTP program that has pushed development significantly forward." By any standard it is a revolutionary new product that could profoundly change the publishing market.

I first saw Calamus in September, 1988 at the Seybold Desktop Publishing Exposition in Santa Clara, California. No Atari developer made a bigger impression there than ISD Marketing. Nathan Potechin, president of ISD, spent the Expo surrounded by enthusiastic customers and envious developers as they watched him put Calamus through its paces.

The expressions on the faces of those who viewed Calamus varied from sheer delight to jealous surprise. Macintosh and IBM users alike, intent on ridiculing Atari publishing, retreated from the attack to injured defense of their favorite publishing software. One gentleman who spent a great deal of time attempting to find fault with Calamus finally commented, "I always knew that Atari (developers) would get it together someday and produce a decent product."

Background and System Requirements

Calamus is the latest software coup executed by ISD Marketing. The Canadian firm has also marketed other well-known ST and Mega products including DynaCadd, VIP Professional and Masterplan. ISD obtained the English language rights for Calamus from Ditek International, a German software company. ISD completely revised the manual for Calamus and will soon be offering a wide range of new fonts. (Editor's note: *See the announcement in News, Notes and Quotes in the April, 1989 issue of START.*)

Calamus is an advanced publishing tool that uses all the speed and flexibility your ST/Mega can muster. Though ISD recommends you use the program with a Mega 4 and an Atari SLM804 laser printer, the minimum system requirements are a monochrome monitor, one megabyte of RAM, a double-sided disk drive and a dot matrix printer—well within almost everyone's reach. ▶

General Description

The Calamus package includes the manual and two disks. The well-written manual is spiral-bound and was actually created with Calamus. It includes tutorials on program use and detailed information on desktop publishing. The disks contain the program, help and resource files, 12 fonts, utilities and sample files.

Calamus utilizes actual WYSIWYG screen output. The familiar mouse, windows and drop-down menus used by GEM are all available. But additionally, there are icon-oriented menus below the menu bar and to the side of the editing window. These menus allow access to many layers of powerful options and also provide information on actions within the editing window.

Calamus can be divided into four basic modes which I will cover individually: Page Setup, Frames, Text and Graphics. The integrated format of the program allows many of these functions to overlap to make operation more versatile.

Page Setup

The Page Setup menu lets you create, copy, edit, insert, delete and save layouts, pages and documents. Eight predefined page sizes are available and special page sizes can be defined. Pages can be created in portrait or landscape orientation.

You can create documents from scratch or use page layouts automatically stripped from previous documents. Any number of pages can be inserted anywhere in a document with or without predefined layouts. Pages can be moved or deleted without disrupting the continuity of a document. There is no traditional "master page" option available, but changes in the format on one page can be transmitted to all the other pages automatically.

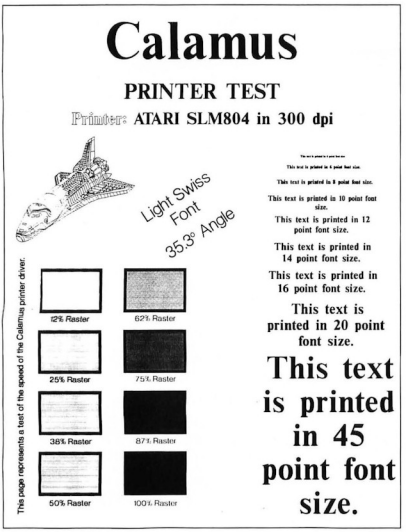

Figure 2. This test document—the same one shown on the screen in Figure 1—was printed with a Mega ST4 on an Atari SLM804 Laser Printer. This is an excellent desktop publishing set-up, combining good quality, reasonable cost and high-speed output.

Frames

Frames are used to enclose each component placed on a page. Whether it's a stretch of text or a simple graphic, a placement frame surrounds every object. Markers surround objects so that they can be moved, stretched, resized or proportioned. Each frame is identified by an icon in its upper left-hand corner that indicates whether the frame should contain text, rotated text, indexes, headers, footers, lines, boxes, raster graphics or vector graphics.

Once a frame is defined, you can fill it with text or graphics that have been created with Calamus or imported from a word processor or graphics program. The ability to manipulate the contents of these frames varies according to their contents.

Calamus can group frames so that they will retain their relationship to one another when moved. Frames can be locked to a particular size or location, layered, copied or optimized for screen and printer use. Frames can also be saved separately from pages so that their contents can be used or edited later. This allows creation of a frame "clip art" library.

Frames are especially powerful for manipulating text. Frame functions are used to map text routes when graphics, text columns and additional pages are encountered. Text flow (referred to as piping) can be adjusted automatically to indicate the direction text should flow. Commands are available that lock text to a page and keep it from being pulled into previous pages when changes are made. Pages and frames can be added to or deleted from a layout without breaking text chains. And text can be flowed across graphics and to either or both sides of them.

Alignment tools including grids, rulers and guidelines are accessed via the frames menu. You can adjust these placement aids freely to any size or measurement system, and frames can be snapped to the grids and guidelines.

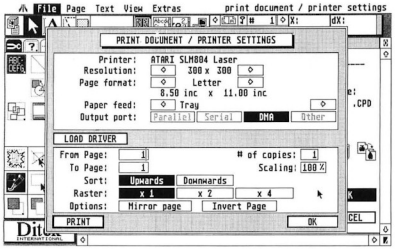

Figure 3. Calamus' printer controls are both precise and controllable. This is the print screen with the Atari Laser printer driver loaded. The program is designed to monitor printer status and will report any printer malfunctions in alert boxes, as well.

Instead of cut-and-paste options, Calamus contains *five* clipboards for storing frames and groups of frames.

Text

Calamus includes an integrated text editor that will import text in ASCII, 1st Word/1st Word Plus, Word Writer and Microsoft Write formats. An updated version soon will allow importation of WordPerfect files.

The text editor actually acts more like a word processor. It has functions to insert chapter and page numbers, dates and times directly into your document. The editor also includes an editable dictionary that allows the insertion of discretionary hyphens in blocks of text. Reference marks can be placed in the text to access other pages or chapters in a document. Text can be moved or copied the clipboards and recalled whenever necessary.

You can add an endless number of rulers to documents to adjust margins, indentation, tabulation, line spacing (leading), paragraph spacing, kerning and text formatting (flushed left/right, justified or centered).

Some of these options will not be visible until text is placed in a frame in the editing window. Once text is placed in a frame, you can recall it to the editor for additional spell-checking or editing. Text can be saved in ASCII, Calamus frame or page-layout formats.

Text can be outlined, shadowed, underlined, super/subscript or any combination of these features. Calamus provides separate fonts for italic and bold characters and it uses versatile vector fonts for both screen and printer output. The fonts that appear on screen are the same ones used for printing. Vector fonts consume less memory and overcome the size limitations imposed by bit-mapped (GDOS) fonts. Text is endlessly resizable from 1 to 999 points in 1/10-point increments.

The text menu includes a series of powerful, user-definable macros that speed up page editing considerably. You can save virtually any command or series of commands as a macro and save or recall any number of macros as needed.

Graphics

The current version of Calamus cannot create vector or raster graphics, but it can import graphics from most formats including DEGAS, DEGAS Elite, IMG, GFA block, IFF, STAD and GEM. Additional import formats are in the works and pictures can also be scanned directly into Calamus from several different scanners.

Calamus will create lines using many patterns and any user-defined point size. You can change the lines to arcs and right angles or adjust them at will. You can also select a wide variety of predefined frames and fill them with many different patterns. Frames and lines can be shadowed in any direction, made transparent or opaque, color separated, etc.

Additional Options

The visible area in the editing window is user-definable. You can view a full page or any percentage of the page you wish, allowing an endless variety of zoom levels for detail work.

Calamus will save backup copies of your files automatically, show statistics and remember up to 11 different paths for saving resource files, fonts, text, documents and graphics.

Printing

Calamus has a quick and versatile print option. Many printer drivers are included and the program makes full use of printer options. You can select the appropriate resolution setting, paper feed method (tray, cassette, form feed or ▶

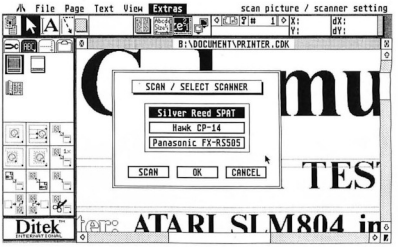

Figure 4. It may seem like gilding the lily, but Calamus even has built-in facilities for controlling a scanner from within the program. If you're in the middle of laying out a document and need to scan in a graphic, you don't have to exit Calamus—an extremely nice professional touch.

single sheet) and output port (Parallel, Serial or DMA). You can also choose the number of pages to print as well as the scaling for a document (Calamus acts like a reducing and enlarging device, too!). Finally, you can indicate the sorting order of pages and whether they should be mirrored or inverted; you can even select the density of pixels using a raster function.

Tests for this review were performed using an Atari SLM804 laser printer. Calamus prints as fast as GDOS programs with an average print speed of 30 to 45 seconds. The fonts are cached in available RAM until they are ready for use.

Calamus will even let 1040ST users access the laser printer using a print-to-disk option. A creative print utility directs all system memory toward printing a 300 dpi page with only one megabyte of RAM available!

Calamus vs. Pagemaker and Ventura Publisher

How does Calamus stack up to the "big guns" on other computers? Option for option, Calamus is comparable to, or surpasses, the desktop publishing competition.

Pagemaker can't rotate text or group frames and has no clipboards available for moving objects. Ventura Publisher lacks versatility in font sizing and consumes more RAM and disk space in fonts alone than the entire Calamus program. Ventura's screen output lacks detail, screen refreshes are slow and only three zoom levels are available.

Both Pagemaker and Ventura Publisher print much more slowly than Calamus (at 30 minutes a page, we nearly gave up). They are more expensive and bound by some of the basic GEM rules that Calamus circumvents.

Wrap-Up

Without a doubt, Calamus is the most daring entry into the desktop publishing market in years. It's a powerful program that incorporates all the best features of existing publishing products into a fast, easy-to-use product. ISD Marketing is committed to the Atari market and to support of this program. They have already fixed every bug I encountered in testing the program and additional options are planned for future releases. ■

Dan Fruchey, formally the desktop publishing columnist for ST Applications, works as a paramedic in Santa Rosa, California and runs a small clip-art business on the side.

PRODUCTS MENTIONED

Calamus, $299.95. ISD Marketing, Inc., 2651 John Street, Unit #3, Markham, Ontario, Canada L3R 2W5, (416) 479-1990.

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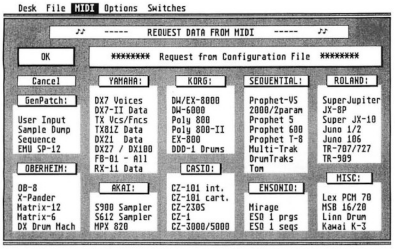
Break On Through to the Other Side

BY JIM PIERSON-PERRY



Default configuration for GenPatch ST showing instruments it can access directly. Additional ones can be created easily for any MIDI equipment.

You might have thought Christmas was in December, but musicians know it really comes one month later with the winter NAMM (National Association of Music Merchants) trade show. Although most companies are saving their new product releases for NAMM, there are a couple of new goodies to tell you about. Look to next month's issue of START for an in-depth report on the NAMM show by our frequent MIDI contributor Jan Paul Moorhead.

This month we will take a look at MIDI files, what they are and why you would want to use them. The newly endorsed standard MIDI file format may be the needed Rosetta stone to allow programs from different developers to work on or with the same music files. Imagine laying down some tracks with your sequencer, then sending the file around the world to collaborators—who use different sequencing programs and even different computers!

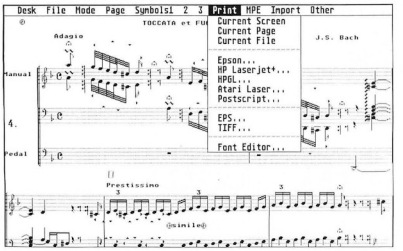
Update on Updates

What better way to start the new year than by upgrading your workhorse software? New versions of SST Super Sequencer (version 2.0) and Superscore (version 1.3) have been released by Sonus. Hybrid Arts is also in the spirit with new versions of their MIDItrack sequencer programs, now including MIDI file compatibility, and ADAP I version 1.3.

The Copyist scoring software from Dr. T now comes in three flavors. The new version (1.6, now shipping) is available in entry level, standard and advanced models: Copyist Level I, II, III. A menu bar has been added for accessing program commands. All three versions can run under Dr. T's proprietary multi-program environment (MPE), sharing data with the Keyboard Controlled Sequencer and other compatible programs. The Level III version can export scores in several formats suitable for desktop publishing applications (such as EPS, TIFF) and comes with the Sonata font for Postscript output. Samplemaker, the sample synthesis and editing program also from Dr. T, now supports the Ensoniq EPS.

Bank Deposits

A librarian program is one of the unsung heroes of the MIDI age. Unlike its more flashy siblings, like sequencers or patch editors, the librarian is a fairly passive beast. It takes in whatever MIDI data you feed it (patch banks, sample dumps, sysex info, etc.) and spits it back on demand. Typically, a single librarian file can hold all the data to configure your entire MIDI setup at once. ▶



Sample score from Copyist Level III showing the variety of print options available from the command menu.

GenPatch ST from Hybrid Arts has long dominated the ST librarian program niche. It comes ready to use for a host of different MIDI equipment; and can be programmed to handle those not already covered. Numerous configuration and synthesizer patch data files in GenPatch ST format can be found on MIDI bulletin boards that attest to its popularity.

Two new programs that may change the ST librarian balance of power are Omni-Banker ST from Paradigm Software Products and Super Librarian from Pixel Publishing. Both of these can work as desk accessories and come ready to handle almost all common MIDI instruments and effects devices (expandable to add new ones). Showing faith in its ability to meet your needs, Omni-Banker ST even comes with a 30-day money-back guarantee on direct orders.

New on the Block

Passport will port Encore, their Macintosh scoring program, to the ST. Fully compatible with their Master Tracks sequencers, Encore can also read standard MIDI files, accept live MIDI input or work from the mouse in step-time. Dr. T has added two more patch editors to the extensive Caged Artist line. These new ones are for the Yamaha DX7II (and compatibles) and Korg M1.

Those looking for something a bit different should check out Laurie Spiegel's Music Mouse. This program turns the mouse controller into a real-time performing music instrument. Offered by Aesthetic Engineering, this port of the popular Macintosh program offers a number of enhancements over the original version.

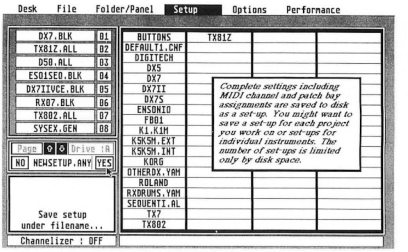
Making Use of MIDI Files

Back in the old days (last year), picking a sequencer program was a bit like getting married. You tried to find the one program offering most of the features you needed and learned to overlook (or work around) its flaws. If you were really lucky, there were compatible programs available to take care of additional functions like scoring, algorithmic composing or librarian functions. Musicians were divided into camps, separated by both the computer and the software they chose.

MIDI files came about as a way to bridge these chasms between users and between programs. They are largely the brain child of Dave Oppenheim from Opcode Systems, a major Macintosh MIDI software developer. He proposed a standardized format for storing sequencer music data that could be shared between programs across all computers. The preliminary standard was put forward in 1986 and, slowly but surely, picked up by other developers. The finalized version was adopted last June by the MIDI Manufacturers Association and became part of the standard MIDI specification.

The standard MIDI file format provides for three levels of complexity. Type 0 is the simplest and has all MIDI data contained as a single linear track. Type 1 files allow for multiple linear tracks while type 2 files can handle multiple tracks of multiple independent sequences (patterns). Depending on their sophistication, not all sequencers will recognize all the information contained in the MIDI files. Virtually every major ST sequencer and composing program can recognize type 0 MIDI files, either directly or through a conversion utility. Hybrid Arts sequencers are the only holdouts at present; however, new, compatible versions should be available by the time you read this.

A MIDI file is made up of data



Super Librarian from Pixel Publishing can work as a desk accessory and handle almost all common MIDI instruments and effects devices (expandable to add new ones).

chunks. There are two types of chunks: header and track. Header chunks define the file type (0, 1 or 2), number of tracks in the file and the time base. Actual sequencer data are represented in track chunks through three types of activities: normal MIDI events, sysex events and a new entity, meta-events. MIDI events operate at the note level (note on, change program, etc.), sysex events are for the instrument level (load a patch file, change internal settings, etc.) and meta-events are for the application program level (time signature, key signature, lyrics, etc.).

What can we do with MIDI files? For starters, you can exchange music files using your sequencer on an ST with someone across the country who uses a different sequencer on a Macintosh, Amiga or IBM. You are no longer tied to software from only one developer. If you love your sequencer but covet a scoring program from a different company, fill your needs with MIDI files! Better yet, be a MIDI connoisseur and use the best parts from several different programs. Lay down some starting tracks with a sequencer. Feed them into an algorithmic composing program and take the combined output into another sequencer that has advanced editing capabilities. Finally, send the whole shebang into a primo scoring program to document your masterpiece.

Well, okay, maybe you can't blithely run hither and yon among all programs yet but the pieces are falling into place. By way of real-world testing, I successfully created a drum part with MusicSoft's MIDI Drummer in MIDI file format and imported it into Dr. T's Keyboard Controlled Sequencer and The Copyist. Worked like a charm.

Just as MIDI redefined our approach to musical instruments, MIDI files will offer new ways to work with software tools. For those interested, copies of the MIDI file format (along with the detailed MIDI specification itself) are available from the International MIDI Association. ■

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

Have any questions, comments or new product information? Drop Jim a line care of START, or through electronic mail: PIERSONPERRY on PAN, REMO on GEnie or 73617,1300 on CompuServe.

PRODUCTS MENTIONED

Music Mouse, $79. Aesthetic Engineering, 175 Duane Street, New York, NY 10013-3309.
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Copyist I, $99; **Copyist II**, $249; **Copyist III**, $399; **Keyboard Controlled Sequencer** version 1.6, $249; **Samplemaker**, $299. Dr. T's Music Software, 220 Boylston Street, Suite 306, Chestnut Hill, MA 02167, (617) 244-6954.
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ADAP I version 1.3, $1,995; **GenPatch ST**, $149; **Synchtrack ST**, $375; **SMPTE Track ST**, $575. Hybrid Arts, Inc., 11920 West Olympic Blvd., Los Angeles, CA 90064, (213) 826-3777.
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International MIDI Association, 5316 West 57th Street, Los Angeles, CA 90056, (213) 649-6464.
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MIDI Drummer, $99.95. MusicSoft, 1560 Meadowbrook, Altadena, CA 91001, (818) 794-4098.

Omni-Banker ST, $95. Paradigm Software Products, 1369 Concord Place, Suite 3-B, Kalamazoo, MI 49009, (616) 372-5972, extension 752.
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Encore, $495 (Macintosh); **Master Tracks Jr.**, $129.95; Master Tracks Pro version 2.0, $349.95; Passport Designs, Inc., 625 Miramontes Street, Half Moon Bay, CA 94019, (415) 726-0280.
CIRCLE 158 ON READER SERVICE CARD

Super Librarian version 2, $149. Pixel Publishing, 1573 Eglinton Avenue West, Toronto, Ontario M6E 2G9, Canada, (416) 785-3036.
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SST Sequencer version 2.0, $149.50; **Superscore** version 1.3, $299. Sonus Corp., 21430 Strathern Street, Suite H, Canoga Park, CA 91304, (818) 702-0992.
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The Gateway Arch dominates the St. Louis, Missouri skyline. This Arch overlooks a super-detailed Mississippi River that can be navigated from north of La Crosse, Wisconsin through the Quad Cities to south of Dyersburg, Tennessee. St. Louis Lambert is just one of over a dozen airports equipped with the Visual Approach Slope Indicator (VASI) landing light system. You'll really appreciate this feature if you've ever had trouble landing with Flight Simulator.

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CIRCLE 045 ON READER SERVICE CARD

Atari Goes to College

BY MARD NAMAN
START CONTRIBUTING EDITOR

A typical work station in the Cogswell College Music Engineering Technology lab.

Eric Peterson is the Director of Cogswell College's new Music Engineering Technology program.

A Four-Year Degree-In MIDI

Cogswell College's innovative Music Engineering Technology program has drawn students from all over the world. Here, junior student Johann Kristjannson assists at the Open House.

Looking for a new career? Are you a computer nut who likes music? Or a music nut who likes computers? Now there's a college program that's perfect for you. Cogswell College in Cupertino, California is offering the West Coast's first four-year degree program in Music Engineering Technology—and the computer of choice is the Atari ST.

If you're interested in MIDI, music or STs, then Cogswell College in Cupertino, California is the place to be. Harold Johnson, shown here, is a junior at Cogswell in the Music Engineering Technology Program.

Eric Peterson speaks with the enthusiasm and conviction of a true believer. "I know the market is ready for a MIDI College," he says. "Electronic musical instruments did $300 million in sales last year. Who's going to fix that stuff? Who's going to write software for it? Who's going to provide technical support?"

If Peterson has his way, the answer to all of the above questions will be the graduates of the West Coast's first four-year degree program in Music Engineering Technology. The program is being offered by Cogswell College in Cupertino, California, and Peterson is the director.

To help get this pioneering program off the ground, Atari has donated 10 STs for use in the college's MIDI lab. Students will learn exclusively on the STs—which, of course, is the way it should be, because there is no finer computer for making music. MIDI pros like Peterson are unreserved in their praise. "I'm an enthusiastic promoter of those things I think are the best in the world, so my attitude toward Atari is one of extreme enthusiasm," he says. "My allegiance is wholehearted. I use it professionally; I use it here at the school. I vastly prefer Atari for music over Macintosh—it eats Mac alive. And Atari software is written right."

Future career opportunities will be plentiful for MIDI-literate people. They will be doing everything from music sales to software design to hardware technical support. They will hold jobs ranging from recording studio engineers to customer service representatives, from service technicians to music composers, from MIDI systems design consultants to rock stars. And Atari is there on the ground floor to help train them.

It's Happening Now

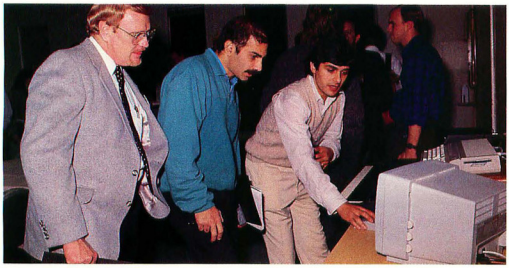
What's surprising is how fast this is happening. "A few years ago it would have been unimaginable that enough people would have entered the field of high-tech music to open a college," says Peterson. "Today it seems like a logical extension." Indeed.

As affordable MIDI instruments have exploded on the scene in the last two years, the one missing element has been a systematic approach to teaching all there is to know. Until now, people have been forced to learn in a hit-or-miss fashion. However, by combining expertise in music technology, computer engineering and electronics, the Cogswell program plans to give students the skills to not only function, but thrive in the music and computer industries. Perhaps the need for this school is best expressed by Dave Kusek, president of Passport Designs. "I wish there'd been a ▶

program like this years ago," he says. "We sure would have had an easier time staffing our company." But the price for this training will not be cheap. Tuition for full-time students will be $3,000 per semester.

To introduce the program last November, the College held an open house and invited many representatives from the electronic music industry. In addition to Atari, representatives from Yamaha Pro, Passport Designs, E-mu and DigiDesign demonstrated the latest hardware and software products.

At the open house, two things were immediately obvious. First, it's a hands-on, very practical program with a lab component to every class. "We make engineers," says Peterson. "We don't have a football team. We don't have a TV station. This is all we do: create technical engineers with practical skills for the job market. It's like the Japanese style of instruction, which generates practical technology more than research and development. In reality, that's what we need in this country. Japan's got 400 engineers per 10,000 people. We've got 70. Our goal here is to close the gap."



Ted Bahas of Digidesign (far right) demonstrates the latest MIDI software to Tom Bunker of Kurzweil Music Systems and Mard Naman, START Contributing Editor.

Secondly, the program is very small now, though it may grow rapidly. In addition to the STs, the lab has benefited from the donation of great samplers and sequencers from E-mu (the Emax) and Casio (the FZ-1). There are only 10 students so far and Peterson is the only instructor. With 10 MIDI stations in their current lab, each student basically has his or her own equipment to use at all times. "I'd like to see up to 20 students this year," says Peterson. "One to a station is great, but I know it can work with two." The plan is to expand the program over the next two or three years to a maximum of 185 students. They would then have 10 lab rooms and eight full-time instructors. "It's ambitious," says Peterson, "but I'm convinced that the market is there."

Cogswell is over 100 years old and already offers degrees in computer science, electronics and mechanical engineering. Their track record in these fields is very good indeed: according to Peterson, 95 percent of Cogswell's graduates are working in their field after four months.

The music technology program does not have to be a four-year commitment. The school offers a one-year certificate program. In both cases, students can either go two days a week, or if they have a day job, three nights a week.

The first semester alone gives students a solid grounding in MIDI. It includes four courses, starting with MIDI Fundamentals, which teaches MIDI vocabulary and practical application of MIDI theory, including systems diagrams. Next comes Sound Analysis and Design, which covers how to program synthesizers and develop samples on samplers. Students edit sound libraries, learn analog and digital synthesizer programming and explore sound creation and alteration. Music Technology examines the historical impact of technology on music style and performance and looks at basic audio recording principles and techniques. Music Skills teaches musicanship, keyboard and ear training proficiency. As Peterson says, "An engineer with a pack of pens needs to know the difference between Bach and rock. He needs to be able to create stuff on his own."

The second semester is equally ambitious. Students learn system design, time code compatibility and sound accompaniment for video and audio post-production. They learn digital signal processing in multi-track recording, software-assisted recording technique, automated mixing and applied sound design for MIDI composition and song production.

If it sounds very technical, that's because it is. "In one year, every student should be a MIDI monster, because he's working six hours a day—two classes, each with two hours of guided lab work and one hour lectures," says Peterson. "At the end of the second semester, we're going to have industry people come in and look into the crystal ball for us. Each student will walk out of here with his feet on the ground. He'll be equipped to go into the field and start working. A retail store or studio will jump to hire someone like this because he'll be qualified."

This Side of the Screen

If the first year teaches what Peterson likes to call "this side of the screen," years two and three take students deep inside the machines. He says, "We're go-

ing to catch up on DC and AC circuits, structural programming, microcomputer programming, digital principles. It's all way inside the screen. These lectures will have the same content as normal computer classes, but when we get to the lab, students will build a musical device. Instead of building a generic modem, they'll build a MIDI interface. After four years, a guy could tear the board apart, do digital repair or any kind of troubleshooting." In the fourth year, says Peterson, "We'll have agreements with recording studios so that we can send students out and offer credit for field work."

Class Schedules

The school's curriculum was carefully developed with the help of an advisory board made up of respected electronic music industry leaders. They include Scott Wedge, president of E-mu Systems, Dave Kusek, president of Passport Designs, Peter Gotcher, president of DigiDesign and Dominic Milano, editor of Keyboard Magazine.

At the open house, advisory board members made themselves available to answer prospective students' questions. DigiDesign showed off its hot new Notator sequencing program that runs on the Atari 1040ST and can do everything in real time. Passport Designs demonstrated its Master Tracks Pro sequencing program and E-mu put its excellent Emax sampler through its paces. Back in the MIDI lab, five students made music and talked with prospective students.

The first few students might be a microcosm of the range of people potentially interested in this program. There's a guy who works in the computer industry but wants to get specific music skills. There's a professional musician who has some free morning time and wants to learn MIDI. Another student is from Iceland and is studying to be an engineer and another, Robert Lewis, is an aspiring record producer. Before coming to Cogswell, Lewis had enrolled in a recording studio program in San Francisco, but found it lacking. "It just scratched the surface," says Lewis. "I wanted to get much more in depth than that."

"This is exactly what I want to do," he says. "I love electronics, computers and music and this program is the perfect blend of all three for me. When I get out, my options will be unlimited."

Lewis says the program so far has been "really hard core. You really have to want to do it. A year ago I would have said, 'What do I need this stuff for?' Now I know what I didn't know, and that makes me want to learn more. I want to get inside the machine."

Music Redefined

Outside the lab, advisory board member Scott Wedge talked about the need for MIDI education for musicians. "The entire process of making music is being totally redefined," he says. "We're now dealing with instruments that are completely orchestral in capabilities. Where does a musician learn how to play an orchestra? Until now, the answer has been word of mouth, or they asked a buddy or they went to a store and the store didn't know. It's time for this school."

Wedge says that while MIDI instruments make life easier for musicians in some ways, in other ways they make life more challenging. Says Wedge, "Now, not only does the musician simply play the piano, but since he can play piano and drums and strings at the same time, how does he make it sound good? He can be the composer, arranger, orchestrator and conductor all in one. So we have basic courses in how to use these tools to make interesting music."

"Digital sampling allows these instruments to duplicate musical sounds exactly. It's completely natural and possible to work in any musical medium. I don't mean to say it replaces the symphony orchestra at all, because musicianship and keyboardship are precious art forms and it would kill me to see them hurt. But for a composition student, sitting down with a sequencing program and a sampler, it's like being the orchestra. It's the way all the musical scores are done for movies, TV, records and commercials. It's just the way music is being made now—with MIDI studios, often never going to paper at all. Yet we still need the classical knowledge of how to arrange instruments. What *is* music? What sounds good and what doesn't? We have to bridge that gap. With this program I think we can do just that."

"These instruments have only been available at affordable prices for two years," adds Wedge. "Traditional music programs are totally unequipped to really teach electronic music technology. Most schools are still in the stone ages. They don't have a MIDI lab; they don't have personal computer labs; their instructors don't have a place to go to learn this material; they can't introduce these tools to their students because their instructors don't know about it. They only know traditional compositional tools."

So Wedge's goal is not only to teach students but to teach teachers. "I hope to see teachers enrolling here—piano teachers, instructors at music schools—because that's when we'll really get the leverage."

By creating this ambitious program that serves the serious musician, the engineer and the teacher alike, Cogswell has gone a long way toward establishing educational standards for the new and rapidly growing field of MIDI music. "I want the industry to see that we're leaders," says Peterson. "What we're doing here can be used as a model for other schools that will open. We're pioneering a model so people will say, 'They're doing it right at Cogswell!'" ■

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

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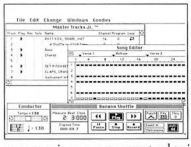

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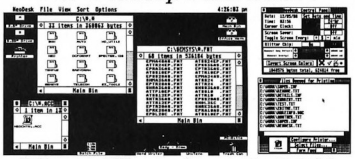

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Aussie Joker Poker's $100,000 Contest

REVIEWED BY GREGG PEARLMAN
START ASSISTANT EDITOR

Try implementing your own rules with Aussie Joker Poker, such as "must hit on two pair and must stay on three of a kind."

Australia's Joker Software certainly takes its games seriously. They're offering a $200,000 contest and all you have to do is play Aussie Joker Poker, enter the contest and be one of the 20 finalists. When the smoke clears, you'll be $1,000 to $100,000 richer. *Don't forget, however, that final entries must be received by* ***April 30, 1989.***

Aussie Joker Poker is the first game ever released in six computer formats at once. It resembles casino poker machines, but plays more like blackjack than poker because you can continually hit (draw cards) to improve your hand. In fact, if you hit, you *must* improve your hand—if not, you go bust.

Gameplay

In Aussie Joker Poker you can limit the deck size so that the lowest card can be anywhere from two to 10. You receive 1,000 points for a pair, 2,000 for two pair and so on—and nothing if you bust. Each player can play up to 99 hands, and you can impose some fun variations of your own. You can set bets ranging from a penny to $9,999.99 per hand and the game keeps track of winners and losers.

Look and Feel

Aussie Joker Poker is potentially addictive, but the sound effects and flickering cursor arrow might work your nerves after a while, and you can't exit a game in progress without turning off your computer.

At this writing, the game still has one or two bugs, but I'm confident that by the time you read this, Joker Software will have eliminated them. Also, despite what the package says, Aussie Joker Poker works on *color monitors only.*

Wrap-Up

Overall, Aussie Joker Poker is a fun example of its genre. While it can be played by up to 90 people at once, the truth is that Joker Poker works better as a game for one or a few players. It's hard to imagine a room full of people—say, at a party—gathering around the monitor and jostling for position, to play a single-computer, multi-player game. But if you like computer card games with a difference and want to try to win the big jackpot, look for Aussie Joker Poker. ■

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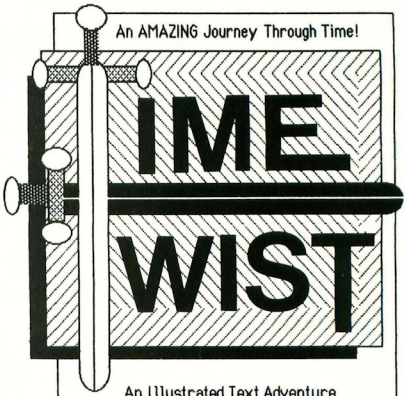

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VARIATIONS ON A THEME

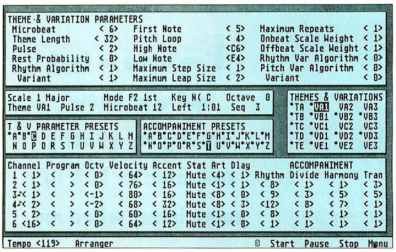
Algorithmic Composing With Tunesmith

BY JIM PIERSON-PERRY

A number of MIDI software programs have been designed as replacements for musical equipment or standard operations. Some classic examples are sequencers, patch editors, echo effects and scoring programs. The end result could be achieved by hand if needed; the computer acts mainly to improve ease of use for the operation rather than contributing to the musical process.

An altogether different situation occurs when software approaches are used to produce music or effects that could not be done in any other way. Synthesizing sounds from first principles, remapping MIDI note and controller information in real time and editing sequencer data to create special effects are all instances where the computer is an integral part of the creative process.

Algorithmic composing is one of the best examples of using computers in a musically creative setting. The basic idea involves constructing musical parts according to a set of predefined rules (even picking random pitches still counts as a rule). The algorithms can apply to the actual note selection, music performance or both. The idea is not new to the computer age; selecting notes with respect to star charts was one of John Cage's approaches. Even Mozart wrote a series of short sketches where the order of performance was determined in real time by rolling dice.



Tunesmith's main working screen. Parameters that control the theme and variation generation are at the top. The actual theme selector box is mid screen on the right. Accompaniment generator parameters for the six output voices are at the screen bottom.

The Ghost in the Machine

Enter Tunesmith, a second-generation algorithmic composing program, developed by Jim Johnson, that can assist with both music creation and performance. The original version was part of the Algorithmic Composer program from Dr. T's for the Commodore 64. This program took on legendary proportions after being endorsed enthusiastically by synthesist Jan Hammer, who bought a C64 system just to run the Algorithmic Composer as a front end to his $80,000-plus Fairlight Series III sampler/sequencer.

As good as its predecessor was, Tunesmith surpasses it by both extending the original concepts and adding numerous new features. In its current format, Tunesmith can generate musical themes and derive accompaniments or variations based on your own music or as a performing instrument of sorts. Even better, it can run as a part of Dr. T's multi-program environment (MPE) and seamlessly trade musical parts back and forth with the Keyboard Controlled Sequencer (KCS). I've come to feel quite at home having my ghostly collaborator kick in some ideas when my own muse deserts me. ▶

As is typical for a Dr. T program, Tunesmith uses key disk copy protection. It can be backed up or installed on a hard drive but you must insert the master disk in drive A during the initial load. A *real* pain, however, is that it locks out your computer if it detects any desk accessories (other than the Control Panel), memory resident programs or RAM disks. This means that you must reboot twice: once to restore the ST and turn off (or delete) the offending programs and a second time to actually load Tunesmith. Standard GEM is bypassed for proprietary screen and mouse routines that run very quickly. Several help screens can be accessed through the Help button, even while the program is pumping out music. The manual is in the new Dr. T format: readable print, clear writing, plenty of illustrations and an index. Good job!

Structured Programming

The core idea of Tunesmith is to generate a single monophonic phrase of music (theme) based on user-specified parameters and develop it, with five derived accompaniment parts, into six-part output music. Along the way, you can control virtually every aspect of the composing and performance processes, either as preprogrammed control sequences or in real time. Many changes are made with the mouse by clicking on some of the myriad onscreen buttons. Other controls come in from the ST keyboard, or optionally via MIDI keyboard input. Provision is made for receiving control MIDI input on a separate channel from that used to play along with the program.

There are five main components in the music generation process: theme generation, theme/variation selection, accompaniment generation, tonality controls and performance controls. A separate module, the arranger, can act as a general overseer and control the other modules through a command sequence.

An initially confusing aspect is that the composing algorithms do not directly generate customary note data. All pitches selected are with respect to a generalized seven-note scale. The actual conversion to real MIDI note data comes when the pitches are processed through the tonality controls.

A Winning Theme

Themes are created with respect to a set of parameters that put boundaries on rhythm and pitch data. Examples of these include the note range, number of notes to generate, maximum distance between consecutive notes, base timing interval and probability of drawing a rest. The user also selects which of six algorithms to use for composing the theme's rhythmic backbone. Descriptions of these algorithms are given to aid your choice. A variation is a spinoff from a theme, based on one each from four rhythm and four pitch variation algorithms.

I've come to feel quite at home having my ghostly collaborator kick in some ideas when my own muse deserts me.

At any time, Tunesmith can supply five themes with three variations of each. These are indexed in the selector box as TA (Theme A), VB2 (Variation 2 of Theme B), etc., and chosen by clicking on the name. Themes and variations are computed on the fly, when selected for the first time, from the current parameter values. Clicking on a name with the right mouse button erases any existing phrase and generates a new theme or variation in its place. Parameter changes only take effect when a new theme or variation is selected and do not affect music in progress. Current parameter settings may be memorized as a preset. Up to 26 presets may be kept in memory and recalled at any time with a click of the mouse—that's right, also in real time. Presets may be saved or loaded as independent disk files.

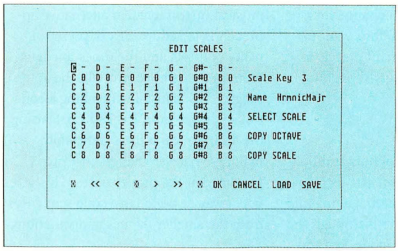
One Gets You Five

The accompaniment generator section of the program takes the current theme and comes up with five accompanying voices. This works with respect to a set of accompaniment parameters, analogous to the theme parameters for theme generation. Unlike their theme counterparts, accompaniment parameter changes take effect immediately. Each voice has an independent set of parameters to specify the rhythm and harmony algorithms used to create it. The entire parameter set may be stored to one of 26 accompaniment presets and recalled at any time. These presets can be saved or loaded as disk files.

Twelve rhythm and 16 harmony algorithms are available. Harmony algorithms are subdivided into 11 for musical voices (e.g.: synths, samplers) and five for drum parts. Each algorithm is described along with a music transcription example in the manual. Some of the more interesting harmony styles are contrary motion, parallel movement and different types of arpeggiation. Individual voice rhythms can be further modulated with a divide parameter that specifies what fraction of notes are to be played. On the harmony side, each voice can be independently transposed up or down.

Drums are handled somewhat differently, as drum sounds are locked into specific MIDI note assignments. Their voice parts need to be kept stable with

respect to final MIDI note output while other standard synth parts are free to transpose and modulate up and down the keyboards. This is done by drawing drum notes from a set of drum tables that can be tailored for each user's drum machine or equivalent. Once set up, these tables can be saved and loaded as disk files.



Typical dialog box for editing one of the 46 available scales used by Tunesmith to convert internal note representations to actual output MIDI data. Each scale holds 10 octaves of seven pitches each. The example shown is for the default harmonic major scale.

Performance Controls

These settings add in various MIDI control information to the six output voices: MIDI channel, program number, octave, velocity, mute/unmute, articulation algorithm and delay time. Actually, these are considered by Tunesmith to be part of the accompaniment parameters and are saved, loaded and changed like the others. I found it conceptually easier to separate them out from the program actions that create the additional voices.

Tunesmith handles velocity in a limited fashion. Notes can be at a base velocity or have an accent velocity value added or subtracted from the base value. The theme generator determines which of the three velocity levels a note will have. While individual voices can be changed separately, the ST keypad cursor arrows act as master controls for all voices and do real-time fade-in and fade-out effects. Taking the idea an extra step, particular voices can be exempted from the master fader controls. There are lots of possibilities here.

The articulation algorithms, eight of them, determine individual note lengths (e.g.: staccato, legato and all in between). Individual voices can be turned on or off by muting or soloing them. A MIDI channel reassign map can be activated from the main program menu that reroutes the MIDI channel number shown in the accompaniment parameter box to any desired destination chan- ▶

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nel. This is useful if you change your MIDI configuration and don't want to edit all the accompaniment presets to reflect the changes—a very thoughtful feature.

Setting the Tone

And now for the musical nuts and bolts, how does Tunesmith translate its insulated mathematical perambulations into actual notes? The answer is through the tonality controls: scale, mode, key and octave. Each of these controls can be changed while Tunesmith is playing or programmed to change at specific times with the arranger module.

A scale is a series of 70 defined pitches (or, more properly, pitch intervals) running the gauntlet from the bottom to the top of a keyboard. More specifically, these pitches are broken into 10 octaves, each with seven pitches. Tunesmith can draw on any of 46 scales and comes with 38 predefined that represent all possible normal scales. These start with familiar classics like the major and minor, then lead off into the unknown. Some seem to have a certain ethnic tinge associated with them and are correspondingly named—Oriental, Persian, etc. For the experimentally inclined, all 46 of the scales can be changed at will and saved.

Mode refers to which of the seven possible notes in an octave that the scale should start from. Within a given scale, a modal change can have a pronounced effect on the flavor of the music. Key is the root note of the chosen scale. Keeping to a major scale and changing the key through C, F and G would let Tunesmith come up with its own version of "Louie, Louie". Octave is a transposition factor that affects all of Tunesmith's output voices at once.

Putting it All Together

Until now we have looked at the process Tunesmith uses to create music and ways to interact with it in real-time—essentially playing it like a computer musical instrument. An alternative approach is to set up a list of presets, tonality controls and the times to change them in a master control file, the arranger. This is just like invoking a control sequence from Dr. T's KCS. Starting the arranger lets it drive Tunesmith, making whatever changes you programmed at the proper times. This gives you a way to build large song sequences from the smaller themes and variations.

Keeping to a major scale and changing the key through C, F and G would let Tunesmith come up with its own version of "Louie, Louie".

The control list can be spelled out before starting to play or it can record your actions and create a matching control list. The latter is similar to having a spreadsheet learn a macro by recording your actions. Needless to say, just because you use the arranger doesn't mean you are locked into it. You have the ability to force it into looping while you break into a spontaneous solo, prevent it from making particular parameter changes or change any of the programmed steps on the fly.

Odds, Ends and Other Goodies

Tunesmith provides a number of other features and creature comforts designed to make composing fun and easy. Files can be saved in Dr. T format and used as input to the KCS. Other sequencer users can use a Dr. T to MIDI file conversion program available at better MIDI bulletin boards everywhere or from Dr. T directly. A notepad screen can be called up to jot notes during your playing session or to document those all important preset, scale or drum files. Several predefined MIDI control messages (all notes off, local control, omni status, poly/mono) can be sent to any or all MIDI channels with a single mouse click. A variety of global options can be set: internal clock rate, default disk drive, ST keyboard debounce time, support MIDI merge (no rechannelization), metronome, etc.

Wrap-Up

I strongly recommend this program. An excellent example of a musical application that can only be realized through software, it succeeds on several fronts: it's musically interesting, educational and fun. After even just a little time with Tunesmith, you also realize it was crafted by a musician who uses it extensively. Sure, it can be intimidating with the screens full of numbers, but despite all its power, it's still very simple to use and start making music. On the flip side, its sheer depth guarantees that even confirmed techno-weenies will be kept busy for a long time before exhausting its potential.

I have long respected programmer Jim Johnson's coding and writing abilities. After working with the many facets of Tunesmith, I'm now equally impressed with his organizational skills—how did he ever keep track of everything that went into it? ■

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

PRODUCTS MENTIONED

Tunesmith version 1.05, $149. Dr. T's Music Software, 220 Boylston Street, Suite 306, Chestnut Hill, MA 02167, (617) 244-6954.
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ON DISK!

TIME FOR TAXES!

START's 1988 Federal Tax Templates

BY TOM CHANDLER AND ANDREW REESE

Get ready to buckle down and finish those tax forms, April 15 isn't far off! File TAX88.ARC on your START disk.

Once again it's time to file those tax returns with the Internal Revenue Service. Well, we can't help you pay your taxes, but we can sure help you figure them out correctly. On your START disk is template for use with Lotus 1-2-3-compatible spreadsheets, such as VIP Professional and LDW Power. If you have one of these programs and a megabyte of memory or more, you're all set to get your return in on time and avoid those penalties.

Tearing your hair out doing your taxes? Almost ready to hire a CPA? Before you go bald or broke, try loading our 1988 Tax Templates into a Lotus-compatible spreadsheet program. These templates will help you prepare the following forms:

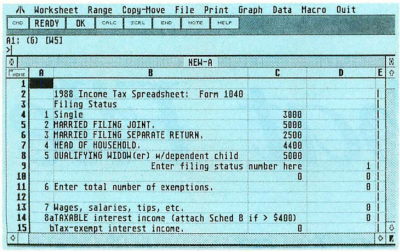
1988 Form 1040 (Long Form)
Schedule A (Itemized Deductions)
Schedule B (Interest and Dividend Income)
Schedule E (Supplemental Income Schedule)
Form 2106 (Employee Business Expenses)

Getting Started

START's 1988 Tax Templates require an ST or Mega with at least one megabyte of memory; a Lotus-compatible spreadsheet program, such as VIP Professional by ISD or LDW Power from Logical Design Works; your 1988 Form 1040 Forms and Instructions; and your START disk.

For further tax assistance there are a number of books available at bookstores and newsstand, or you can pick up a free copy of Publication 17, *Your Federal Income Tax*, from the IRS. You may also want to have a printer connected to your ST, so that you can print out your completed templates.

To get started, you'll need to un-ARC the START 1988 Tax Templates. Copy the files TAX88.ARC and ARCX.TTP from your START disk to a blank, formatted disk and un-ARC TAX88.ARC following the Disk Instructions else-



START's annual Tax Templates are a proven aid in the long hours spent calculating your yearly income tax. The 1988 version works with any spreadsheet program that will accept Lotus .WKS templates.

where in this issue. When you're finished, you'll find the file named TAX88.WKS.

Now, start up VIP Professional, LDW Power or any other spreadsheet program that can accept Lotus .WKS spreadsheet templates. Load in TAX88.WKS and you're ready to begin.

Spreadsheets and Taxes

Spreadsheet programs are sophisticated calculation tools, ideal for preparing tax returns. You provide your income, expense and exemption information by entering them into the spreadsheet and then built-in formulas instruct the program how to crunch the numbers. But the sophistication of a spreadsheet program means that it has a wealth of commands and formats. Don't leave learning how to use one until the last minute and *then* try to learn it as you do your taxes.

Each piece of information is entered in a spreadsheet cell – similar to the lines and columns on your tax forms. We've already derived and included the formulas you'll need. If your data changes (you find another stack of receipts, for instance) go to the appropriate location, change the number there to the correct figure and the relevant portions of your tax return will be recalculated.

Many different taxpayers can use the same tax template. If you're using LDW Power, for example, you can save your own template out to disk under the name MYOWN.LDW and then reload the blank template for your brother to use. He can then save his to disk under the name BROTHER.LDW, and your aunt can then use the blank template.

Keep your IRS Forms and Instructions booklet nearby while you're preparing your taxes. While we have identified every line on the template with the line number from the forms, we couldn't include all of the notes, references and cautions on the original forms. You'll need the instructions to decide how to treat some of your income and expenses.

If you need to complete forms that are not a part of this template, you'll have to complete them manually and then transfer your figures from them into the spreadsheet. The program and template can take over from there.

You'll have to compute your own tax; we just couldn't include all of the Tax Tables and Tax Rates without ballooning the size of the template substantially. Once you've completed Form 1040 down to Line 37, Taxable Income, follow the instructions from the IRS to calculate your tax and enter it on Line 38.

When you have completed your template and arrived at a correct figure for Line 62 or Line 65, save your template to disk! Then, follow the instructions that came with your spreadsheet program to print out a copy. For example, LDW Power comes with a utility that lets you print spreadsheets sideways, enabling you to fit wider printouts on a page. See the appendices to the LDW Power manual for directions. Remember that the IRS will not accept your printed spreadsheet in lieu of completed forms; you'll have to manually copy the figures onto your official return.

As with any complex and important project, be sure to save your work often. Think of the fun you'll have if you haven't saved your work and your dog knocks the computer power cable from the wall at 11:30 p.m. on April 15!

Examine your results with great care. If something doesn't look right, check your figures carefully and if you can't find any errors, seek the advice of a professional tax preparer. The most common errors reported by the IRS are incorrect data entry and arithmetic errors. To the extent possible, we've included formulas that will make correct calculations, but you're responsible for entering your information correctly. Note: *START cannot be held responsible for any mistakes that might be made in your tax calculations as a result of using this template.*

Good luck! And remember: tax avoidance is not a crime, but tax evasion is! ■

Andrew Reese is the Editor of START and a former attorney and tax preparer. Tom Chandler is an accountant in the San Francisco Bay Area.

PRODUCTS MENTIONED

VIP Professional Ver. 1.2, $149.95. ISD Marketing, 2651 John St., Unit 3, Markham Industrial Station, Markham, Ontario, Canada, L3R 2W5, (416) 479-1990.
CIRCLE 150 ON READER SERVICE CARD

LDW Power, $149.95. Logical Design Works, Inc., 780 Montague Expressway, Suite 205, San Jose, California 95131, (408) 435-1445.
CIRCLE 151 ON READER SERVICE CARD

ON DISK!

SIFT That File

START's Instant File Translator

BY BRUCE D. NOONAN, M.D.

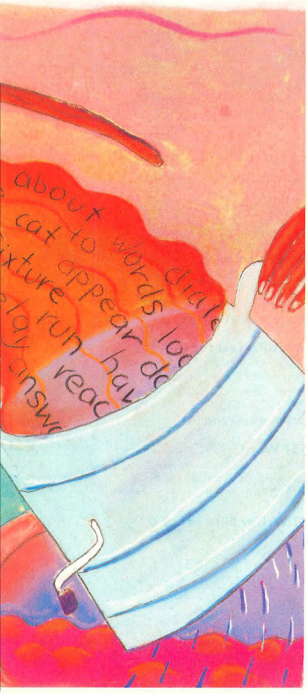
SIFT converts text files from Word Writer, 1ST Word or WordPerfect into ST Writer Elite—and from ST Writer Elite into any of the other three. This program has become an essential here at START, and we knew that if *we* needed it, lots of our readers would, too—especially those who create flyers, newsletters, etc.

Convert text files to the word processor format you like best. File SIFT.ARC on your START disk.

On television many years ago, I saw an entertaining demonstration. Seven men, each of whom spoke two and only two languages, were asked to translate a humorous story from one language to the next. The first spoke English and Polish, the second Polish and German, the third German and Slovenian, etc., and the last spoke Spanish and English. Each translator in turn repeated the story and the last man interpreted it back into English. As you might expect, the final version of the story bore little resemblance to the original. The humorous aspects had been distorted so much that the humor now lay in how badly the story had been mangled rather than in its punchline.

Even with this in mind, I was excited when START asked me to write a program which would translate files from one word processor format into another. The result is START's Instant File Translator (SIFT). With this handy utility, you can convert files from Word Writer, 1ST Word and WordPerfect into ST Writer Elite format—or from ST Writer format to one of the other three. But what if, for instance, you want to convert a Word Writer file to WordPerfect format? Simple. Just convert it to ST Writer format first; then convert the new ST Writer file to WordPerfect format.

To run the program, copy SIFT.ARC and ARCX.TTP onto a blank, formatted disk and un-ARC the file following the Disk Instructions elsewhere in this issue. Double-click on SIFT.PRG, then choose the direction for the translation: either TO STWE or FROM STWE. Next, select the format for conversion: 1ST Word, WordPerfect, or Word Writer. Now you'll select the names of the input and output files using the item selector. You will be told when the translation is complete and then asked if you wish to convert another file. If "Yes," the process is repeated. If "No," you are returned to the Desktop.



MERCEDES McDONALD

Roadblocks

Each of the word processors has features that the others don't—and for which there are no translations. 1ST Word and Word Writer both have a light text feature not found in ST Writer or WordPerfect—and WordPerfect has a strike-out or overstrike feature not found in the other three. In fact, WordPerfect has so many extra features not found in any of the other three word processors—such as footnotes, math columns, indexing and table of contents generation—that clearly no translation (or even approximation) was possible. In these cases, only straight text movement was performed.

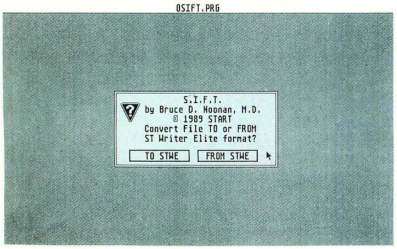
I translated as many features of each word processor as I could. Consequently, WordPerfect translations take the longest to convert. My file of the ST Writer Elite manual (over 100K) took 1 minute, 48 seconds to convert to 1ST Word or Word Writer format, but 4 minutes, 13 seconds to WordPerfect.

1ST Word makes no allowance for writing text in any pitch other than Pica.

I was glad to be able to use the outline features of both WordPerfect and ST Writer and swap them without losing information. Likewise, I was able to do this with the outdenting features of all four programs.

When transferring a file to ST Writer, the beginnings of paragraphs are marked with the Control-P character, and if the first line of the paragraph is indented, the paragraph indentation is set with Control-I—if the indentation has changed since the last paragraph. Transferring from ST Writer reverses the procedure.

The centering and right-justification functions of 1ST Word and Word Writer caused a problem. The WYSIWYG text files created in these programs are formatted before they're saved, and a lot of indent spaces and ▶



Finally you can exchange your word processing files between ST Writer, 1ST Word, Word Writer ST and WordPerfect. Simply select whether to convert from or to ST Writer format, click on the current (or destination) format and then enter the appropriate file names. SIFT does the rest!

variable spaces are used in front of the text being centered or right-justified. ST Writer, on the other hand, uses one Control-C character to mark centered text and two Control-C characters to mark right-justified text. (ST Writer doesn't center or right-justify the text until you print it.) I elected to remove the space padding from 1ST Word and Word Writer files when translating to or from ST Writer format. After translation, you'll need to inspect the file and alter centering and pagination as needed. WordPerfect files did not present this difficulty and centering and justification translated just fine.

1ST Word makes no allowance for writing text in any pitch other than Pica (10 pitch), while Word Writer, which is very similar in file structure, lets you change pitch by embedding printer controls directly in the text. WordPerfect allows Pica, Elite (12 pitch) and condensed (15 pitch) typefaces, but not expanded print, unless you set up a font to represent expanded print. I arbitrarily assigned ST Writer's expanded print to font 2 of WordPerfect and vice versa.

As you can see, if you translated a WordPerfect file to ST Writer, then to 1ST Word, to ST Writer again, then to Word Writer, to ST Writer once more and then back to WordPerfect, it might look very different than it did at the beginning.

On-The-Fly Translation

I ran into several limitations while writing SIFT.PRG. One is the fact that ST memory configurations vary, ranging from 256K 520STs with TOS on disk to Mega 4s. To make the program more widely acceptable, I had it read the file into RAM and write the translation to disk. This lets SIFT use the maximum amount of memory for files to be converted, but it also means that it must do *linear* translations—that is, "on the fly," without being able to go back and insert a particular code or text segment in front of text that had already been written to disk. An example could involve writing an ST Writer header into 1ST Word format. 1ST Word writes its header text in a formatting segment which precedes the normal text in the file. If the header occurs later in the ST Writer file *after* some text has been written to the disk, it cannot be placed in the 1ST Word file. To fit it in would require moving the disk drive read/write head to the appropriate disk sector and byte, then pushing text aside to squeeze it in. This could be done in RAM, but not on disk. Therefore, when converting ST Writer files to Word Writer or 1ST Word, be sure the header and footer lines are written directly after the format line at the top and before any text. Headers and footers occurring later in the ST Writer file will not appear in 1ST Word or Word Writer translations.

Each of the word processors has features that the others don't.

Wrap-Up

SIFT is a great utility if you have a RAM disk; if you put your input files on it, you'll save wear and tear on your floppy drives—converting a large WordPerfect will not only take forever, but it will keep your floppy drive's moving parts moving continuously.

The source code was written entirely in C and compiled with the Megamax Laser C compiler. ■

Bruce Noonan is an opthamologist who lives in Seattle, Washington and is the godfather of Atari's public domain ST Writer.

PRODUCTS MENTIONED

Word Writer ST, $79.95. Timeworks, 444 Lake Cook Road, Deerfield, IL 60015, (312) 948-9200.
CIRCLE 169 ON READER SERVICE CARD

WordPerfect for the ST, $395. WordPerfect Corp., 288 West Center Street, Orem, UT 84057, (801) 227-4010.
CIRCLE 170 ON READER SERVICE CARD

1ST Word, Atari Corp. $19.95. 1196 Borregas Ave., Sunnyvale, CA 94088 (408) 745-2000.

ST Writer Elite ver. 3.0, April 1989 issue of START. 544 Second St., San Francisco, CA 94107, (800) 234-7001.

For The Fun Of It

From the Forties to the Future

In this issue we look at three games that test your skill and nerve as you fight for your own survival. In Captain Blood you've been cloned and you must find all your copies before the alotted time expires. In Spitfire 40 it's you against the Germans in the Battle of Britain. And in SpaceRacer you take on the galaxy's best racers in a battle for the championship.

In Captain Blood, from Mindscape, you're a cyborg and you've been cloned many times over. Somehow all of your copies have escaped and have hidden themselves within one of the more than 32,000 planets in the Hydra galaxy. Find them all or you die.

CAPTAIN BLOOD

reviewed by George Miller

Spectacular graphics highlighted by fractal landscapes and meticulous attention to detail make Captain Blood a one-of-a-kind game. The interesting thing about Captain Blood is that you not only get involved with the game, you actually become a part of it.

As the scenario goes, you're a cyborg who has been cloned many times over. The clones are draining your energy and if you don't find them all soon you'll die. The clones are hiding somewhere within the 32,768 planets of the vast Hydra galaxy, and you've got to find them all.

Given enough time, you could visit each planet and eventually find and disintegrate the clones in your ship's fridgitorium, but time is one thing you don't have. You have about two and a half hours of real time to find the first clone and get back some vital fluid before your arm becomes completely uncontrollable. If you *do* find the first clone, you've got about another two and a half hours to find the next one.

Getting Started

Control gameplay from the Control Panel. Most of the options are selected by moving your mechanical hand to the appropriate buttons.

So, how do you locate the clones? Simple! Just ask. Some planets are inhabited. Many more planets are not. Fortunately, the first planet that appears always contains intelligent life. Just land and talk to the inhabitants.

Actually, it's not all that simple. You must guide your OORXX, a friendly little creature designed for reconnaissance missions to the planets of Hydra. The OORXX are your eyes and ears. For- ▶

tunately, you have an unlimited number of OORXXes available, because you'll soon discover that a fractal landscape is not an easy place to land. When you do land successfully, you'll use the UPCOM (Universal Protocol of Communication) Icon system to communicate. This unique feature lets you point at Icons to communicate with the planet's inhabitants by building sentences.

Interactive Gameplay

The various races of planets' inhabitants have various personalities to match. You'll ultimately need to interact with many different types. Sometimes logic and reason will provide a clue. Sometimes bribes or threats work best. Some will even agree to be teleported aboard your ship.

Navigate through the universe by locating your destination on your Hydra-galaxy map, then activating hyperspace to travel at approximately twice the speed of light. At this speed, you can expect to see a few optical illusions. As you approach your destination, your speed will decrease and you'll be able to use your instruments to conduct a limited reconnaissance of the planet. You can then launch an OORXX to investigate further.

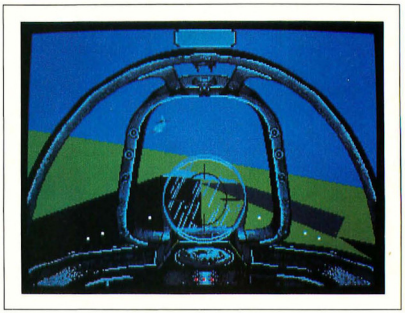
Recommendation

Captain Blood is both an exciting arcade action game and a challenging adventure game. No matter which type of game you prefer, you'll find something to suit your taste. The Hydra galaxy is huge. Use your best judgment as you search for your clones, and be prepared for the adventure of a lifetime!

SPITFIRE 40

reviewed by Wolf Griffey

Ever wondered what kind of exhilaration an English Spitfire pilot might have felt? Ever tried to guess what it might have been like sitting in that cockpit, with a roaring engine up front? Have you wanted to capture some of the thrill of racing across the English countryside in search of reported enemy aicraft? Is shooting down a Me-109 fighter or a group of Stuka bombers the type of action you crave?



Avalon Hill's Spitfire 40 lets you live the bygone days of World War II air combat. With authentic graphics and real-time updating, Spitfire 40 lets you choose between the Game and Simulation mode.

If your answer is yes to any these questions, you'll like Spitfire 40 from Avalon hill. Now it's your turn to experience the sounds, speed and thrill of World War II air combat.

Piece of the Past

In 1931 the Supermarine Company won a contract from the Royal Air Force to design a new fighter plane. Based on their champion racing designs, Supermarine produced the soon-to-be-famous Spitfire. It incorporated the untried Merlin engine in the smallest airframe that could be wrapped around it.

By 1940 the Germans were staging air raids over England. The new Spitfire was being flown off of many small airfields by young and mostly inexperienced pilots. Experienced or not, however, those pilots scored victory after victory.

Spitfire 40 returns to this period and that aircraft. The player/pilot is placed at the controls of the Spitfire IA and with a choice of either Game or Simulation enters the realm of World War II air combat. The best part is that the authors put their time into making the handling and action of the simulated aircraft very realistic.

Spitfire IA

As with a real Spitfire IA, the player quickly discovers all the joys and sorrows that come from flying a true propeller-driven aircraft. The speed decays as it should in climbs and turns. Rolls and dives are also true to the nature of the beast. Used properly, these characteristics will help to maintain the position needed for the victory.

The controls, instruments and handling found in Spitfire 40 follow the lines of the actual aircraft. If it was necessary for flight in 1940, you'll find it in this game. The same characteristics are here: faster in level flight, much quicker on the turn and overall more maneuverable than its German counterparts.

Authenticity

From the beginning, Spitfire 40 has a very authentic feel. The instructions are printed in the form of a working pilot's manual from the period. Called Pilot's Notes, this "rulebook" covers important items in the following sections: Pilot's Controls and Equipment, Navigation and Handling and Flying Notes For Pi-

lot. Here the new pilot finds out where everthing is, what it does and how to use it. Each section goes into excellent detail to provide the pilot with more than a basic understanding how to fly a Spitfire.

The Pilot's Controls and Equipment section has incredibly complete instructions for aircraft control functions and their proper uses. Not only is the player told the possible reaction to activating a given item, but also what can happen if it is not used properly. Warnings appear throughout this section.

The Navigation section explains how to use the map. Since the action can take place anywhere over England, it's important to know where the bad guys are. The pilot can find the locations of his Spitfire and the target on the map at any time. Whether in Game or Simulation mode, it is most important to learn to read and use the map. Lost pilots don't find targets—or worse, the targets find them first, which can mean a victory for the other side.

Takeoff, air maneuvers and landing instruction are found here in the section called Handling and Flying the Spitfire. Unlike some manuals that assume that you'll find the proper speeds and altitudes to complete things like rolls, loops and a split S, the notes give you the recommended control inputs and speeds to look for.

Game or Simulation

Spitfire 40 starts with two main selections, Game or Simulation. Common to both are the cockpit (controls/instrument screen and front-view screen) and map mode.

Game mode gives you time to sharpen air combat skills prior to recording actual sorties in simulated raids. Or you can just go there for the fun of destroying target after target (until you've been shot down three times.) Although there are no actual skill levels involved, as air combat time increases the skill of the enemy pilots you face will increase also.

Simulation is the heart of Spitfire 40. Here you have two options: Practice or Combat. Select practice and work with the controls until they become second nature. With propeller-driven aircraft, handling is very different from the more advanced jet fighters you may be used to in other flight simulations.

In combat you begin with a sortie message providing the number of aircraft, direction and altitude. After takeoff, it's up to you to find the incoming aircraft, score the victory and land.

Each flight is recorded in the flight log with a small entry regarding the results. Some embarrassed pilots have been know to quit before saving their logs.

In both the Game and Simulation, your goal is the same as it would have been 1940: patrol the English skies and shoot down incoming German fighters and bombers.

Well Done

The Spitfire IA was a combination of timely work and some necessary compromises. It went on to become a legend in aviation. Although Spitfire 40 may not have the full, more colorful graphics that other programs have, Spitfire 40 authors put a lot of work into the simulation. Because of just that, I think that Spitfire 40 will attain the same status as the Spitfire itself. Well done, Avalon Hill, well done.

SPACERACER

reviewed by Scot Tumlin

It's the 25th century, and neither war nor disease are to be found anywhere in the galaxy. The only excitement left is the Space Race Tournament. Every three years the best racers from each planet compete for the title of Space Racer Champ. You've been selected to represent Earth. Your honor is at stake—and so is your life. So goes the premise for SpaceRacer, the latest creation from Broderbund.

SpaceRacer from Broderbund. It's the 25th century and war has been eradicated throughout the galaxy. Where can you go to find violence and let off a little steam? The famous Space Races, of course.

The Space Races

In SpaceRacer, there are four races to complete: three world races and one championship race. Each race has its own course and its own challenges. The courses are rife with tight turns, fast straights, high hills and low valleys.

A power track runs along the center of each course and gives your cycle energy. Obstacles appear on each side of the course. Take a turn too wide, and watch out! Obstacles also appear on the course; some give you energy, others ▶

can ruin your day by killing you.

Riding the Cycle

With the joystick or keyboard, you can make your cycle turn, climb or dive. A quick double-press of the trigger fires the laser cannon. Hold down the trigger to move the cycle forward. Three function keys give the distance to the finish line, pause the game and invert the up/down controls.

In Broderbund's SpaceRacer, your honor is at stake—and so is your life.

Gameplay

As your cycle moves, a shadow is cast on the surface of the track. Keeping the shadow on the power track adds energy to your cycle. Moving off the track or climbing too high slows your cycle down. Once you learn the course, turning is a breeze and you'll be leaning with the best of them.

Signs, billboards and powerlines appear on each side of the course. Bump into a sign an you'll put your cycle in a temporary spin. Regain control and get going; remember your racing against time! Hit a billboard, and *splat!*—you're a pancake. Hit a powerline, and *zap!*—you're history.

Along the way, you'll meet the galaxy's finest racers; run them off the road. That's right, follow them into a turn, bump them into a powerline and don't look back. If they get stubborn, shoot them with your laser cannon. (The manual says that using the cannon will drain your power. That's fine by me; I prefer the bump-and-run tactic anyway!)

Wrap-Up

SpaceRacer is fun. The race courses are challenging but not intimidating. The clever animated sequences (especially during crashes) are Broderbund classics.

I think Broderbund should have used a different approach for acceleration control, though. The trigger/accelerator control causes thumb fatigue. Applying less pressure on the trigger relieves some of the discomfort.

SpaceRacer comes on two disks. When booted, the program asks you to insert disk B, even if you have a two-drive system. The program should look for the number of drives installed and go directly to disk B if a second drive is attached.

SpaceRacer takes race simulators to a new level. If you're a fan of Test Drive, Supercycle or games of that nature, then SpaceRacer is for you. ■

George Miller is Director of Product Support for MichTron, Inc. Wolf Griffey is a former Marine Corps fighter pilot and works in the Customer Service Department at Antic Software. Scot Tumlin is Direct Mail Sales and Support Supervisor for Antic Software.

PRODUCTS MENTIONED

Captain Blood, $49.95. Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062, (800) 221-9884.
CIRCLE 171 ON READER SERVICE CARD

Spitfire 40, $35. Avalon Hill Microcomputer Games, 4517 Harford Road, Baltimore, MD 21214, (800) 638-9292.
CIRCLE 172 ON READER SERVICE CARD

SpaceRacer, $29.95. Broderbund Software, Inc., 17 Paul Drive, San Rafael, CA 94903, (800) 527-6263.
CIRCLE 173 ON READER SERVICE CARD

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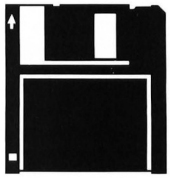

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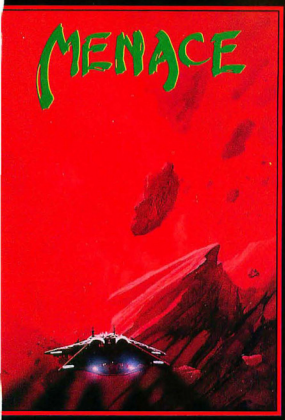

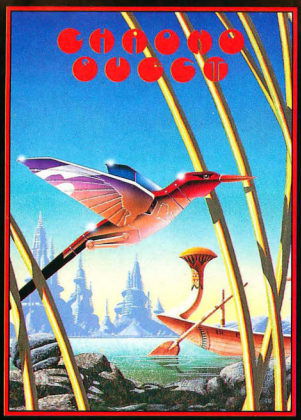

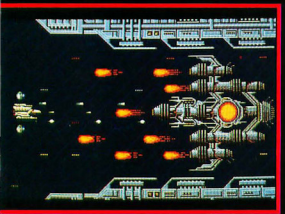

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Now an end must be put to their reign of terror. A large scale attack will prove too costly to our space fleets, Draconia has many orbiting defence systems, the sacrifice may be in thousands of lives. A single fighter craft, approaching undetected, may have a chance to avenge those who have perished, by destroying Draconia. You have that chance . . .

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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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