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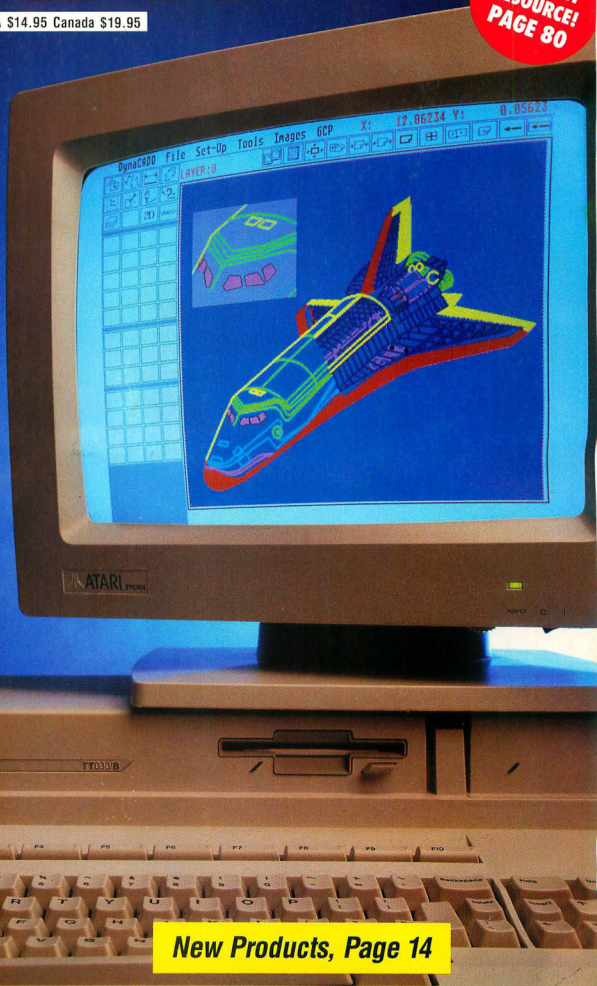
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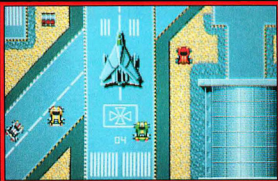


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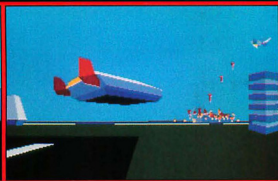
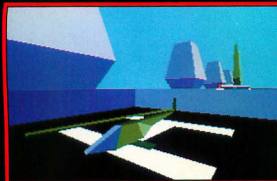


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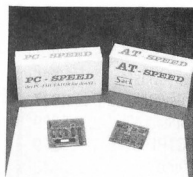
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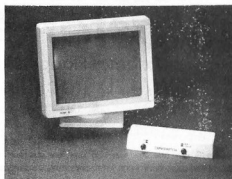
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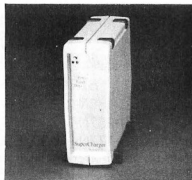
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START[®]

FEBRUARY 1991

VOLUME 5, NUMBER 6



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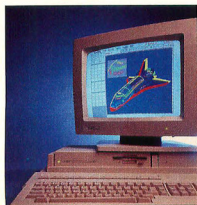
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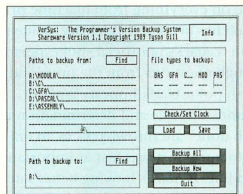


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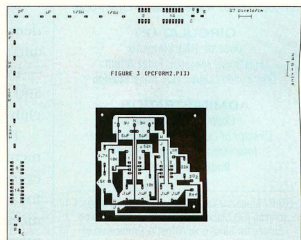
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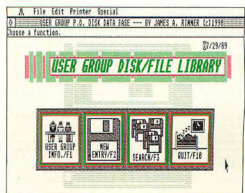
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BIGCOLOR By Jon Dalton BIGCOLOR is a color emulator for monochrome monitors. Follow the disk instructions to un-ARC BIGCLARC.PRG (it's in the PDOMAIN folder on your START disk). Read BIGCOLOR.DOC for information about the program. BIGCOLOR.PRG is the emulator, BIGCOLR2.PRG is a special version for 4MB systems. Note: START does not support this software.

EMULA By Oliver Saalfeld EMULA emulates a color monitor on monochrome systems or a monochrome monitor on color systems! It's a powerful program; the catch is that the full documentation is in German. Un-ARC EMULAARC.PRG (in the PDOMAIN folder); ENGLISH.TXT will get you started. Note: START does not support this software.

USER-GROUP LIBRARY By James A. Rinner Keep track of your user group's public-domain library with User Group Disk/File Library. USERARC.PRG is in the SHARWARE folder on your START disk. Un-ARC it, then read README.1ST. Note: START does not support this software.

REGISTERED USER GROUPS Joining a user group has never been easier — the official list of over 250 registered Atari user groups is on your START disk! You need to un-ARC GROUPARC.PRG from your backup START disk, then load the ASCII file USERGRUP.LST into your favorite word processor or text editor. Note: This list is accurate as of Dec. 1, 1990.



User-Group Library

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Sure It's A Tough Job, But Somebody's Got To Do It

Bob Brodie hasn't been called the Atarian's best friend for nothing. Since his arrival at Sunnyvale in late 1989, Bob has turned the office of User Group Services into the place where corporate executives seek the user's perspective on everything from machine prices to presidential hires. In the process, Bob has become a celebrity. Aside from his duties as user-group liaison, Bob is Atari's unofficial spokesperson, fielding tough questions from the press and ST owners with point-blank honesty and wit.

Bob's hands-on style and determination to "get the job done" are throwbacks to an era when product support was just as important as the bottom line. If Atari's looking better lately, this perception is due in large part to Bob's dynamic efforts. START, for one, is glad he's around.

Associate Editor Amy H. Johnson's incisive look at Bob begins on page 32.



What Are You Waiting For? Join A User Group

Software, magazines and dealers are excellent sources for learning more about your computer, but none of them comes close to providing the benefits of a user group. A well-run user group is an invaluable resource for information on the latest applications and utilities — with plenty of hints and tips — that will make your computing life easier.

User groups commonly meet once a month. Here members can see demos of the latest in public-domain, shareware and commercial software and swap computer "war stories" with other users.

Larger user groups sometimes produce a club disk packed with shareware and public-domain software, and a monthly newsletter. A more established club maintains a bulletin-board system.

There are plenty of other benefits to joining a user group. Verifiable members often receive special discounts at their local Atari dealership and, every once in a while, software houses conduct special promotional offers for club members only. Guest speakers also show up to make that month's meeting even more interesting. (Bob Brodie is a frequent guest at these meetings throughout the country and usually brings loads of goodies from Atari to either demonstrate or give away in raffles.)

Where To Find Them

Through a special arrangement with Atari (and thanks to Bob Brodie), START presents on disk the entire list of registered Atari user groups in the United States. If there isn't one in your area, think about starting one yourself. Bob tells us that the rules for founding a club are fairly loose — a user group can be any amount of members (over one). To that end, present and future user-group presidents will find Jim Rinner's User-Group Disk/File Library, also on this month's disk, an indispensable tool.

Tom Byron

TOM BYRON
START Editor

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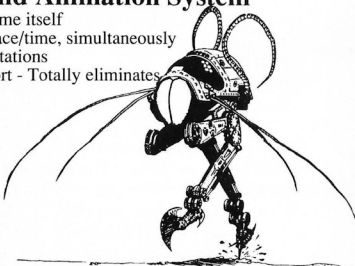
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Color On Monochrome

In your October Dialog Box, Joseph A. Gaudet inquires as to running color-only software on a monochrome system. I have two possible solutions to his problem. One is Omnires, available from E. Arthur Brown Co. for \$22.95. Omnires will emulate a color monitor on a monochrome system, or a monochrome monitor on a color system. It works! There is also an emulator called BIGCOLOR, which I saw on ST Informer's August 1990 public-domain disk.

Ronald Ritzman
Marietta, GA

I am surprised that there are no monitor emulators available in the United States. In Germany and Austria, public domain catalogues contain a number of such emulators. The best known and most widely used program of that sort is MODULA, currently available in version 6.0. MODULA emulates both high resolution on color monitors and color resolutions on mono monitors. According to its author, it works with all versions of TOS, including version 1.6. MODULA is published in the "Special Program Series" of HEIM Publisher. For more information, you can contact: HEIM Verlag, PD-Versand, Heidelberger Landstrasse 194, D-6100 Darmstadt 13, Federal Republic of Germany. The phone number is 06151/56057.

Hans Winkler
Vienna, Austria

We certainly got an excellent response to Mr. Gaudet's letter. Many of our readers referred to Omnires, which is sold by E. Arthur Brown Co. The address is 3404 Paunee Drive, Alexandria, MN 56308 (800) 322-4405. Others mentioned public-domain or shareware emu-

lators, all of which come from Europe. If you look in the PDOMAIN folder in this month's START disk, you will find two screen-emulator programs! One is BIGCOLOR, mentioned by Ronald Ritzman above. It is ARCED in the file BIGCLARC.PRG, follow the instructions in READ_ME to un-ARC it. BIGCOLOR is shareware from Britain, and there are two versions of the program included: BIGCOLOR.PRG, the original version; and BIGCOLR2.PRG, a special version for 4MB systems. Read BIGCOLOR.DOC for instructions. BIGCOLOR does work—once you can get it to boot up. It is an AUTO-folder program, and sometimes it takes several attempts to get a successful boot.

While we could not find MODULA, we discovered another program from Germany that is very similar; EMULA. It is in the ARC file EMULAARC.PRG on the START disk. It is much more stable than BIGCOLOR, and it is capable of emulating color on a monochrome monitor, and monochrome on a color monitor. The catch is that the program and documentation are in German. However, there is a text file, ENGLISH.TXT, which provides enough information to get you started.

Please note: START does not support these programs, so use them at your own risk. Be wary of installing them in the AUTO folder of your hard drive. These programs perform some interesting tricks with GEM, and it is likely that they will not be compatible with some of your AUTO programs. If this is the case, you may not be able to boot from your hard drive. Boot these programs from floppy disks, and test them with your AUTO programs. — START Ed.

GFA BASIC Confusion

Your March 1990 issue contained a program that I consider to be potentially helpful in making my home videos more entertaining — the GFA Wipes and Dissolves software. Being a computer programmer, I was able to go through the program listing on the disk (using 1st Word) and make modifications. However, my attempts to get the modified program to execute were not successful.

First, I tried to compile the edited listing with the GFA BASIC 2.0 compiler made available to me in the January 1989 issue of START. I renamed the listing to contain a .BAS extension, as required by GFA BASIC, and got an error which said it was not a version 1.0 program, even though both program and compiler were supposedly version 2.0! I obviously could not edit the compiled slideshow program, and I have tried out several other brainstormers that have all met with the same results.

Am I missing the GFA boat completely, or have I stumbled onto a problem? The article about Wipes and Dissolves only stated that I could customize the program by "modifying the source", but didn't go into detail. The "NOT A V1.0 PROGRAM" error is what really bugs me, and my lack of experience doesn't help much, either. Any hints or help you could give me would be greatly appreciated.

Michael Kalinowski
Spring City, PA

First of all, the GFA BASIC provided in the January 1989 issue is a BASIC interpreter, not a compiler. It cannot produce executable .PRG programs.

GFA BASIC programs are normally tokenized, which means that they are saved in a special format. This format makes the program compact, but also makes it impossi- ▶

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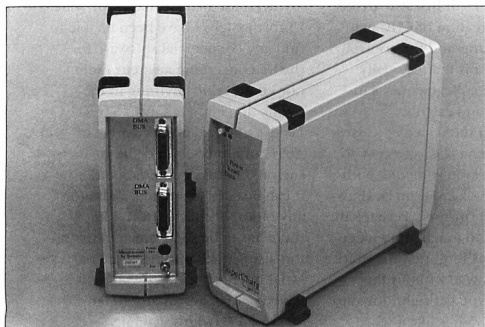
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OUTSTANDING IN THE FIELD

ble to read from a word processor. When you LOAD a program, GFA BASIC expects it to be tokenized, and tokenized programs are expected to have a .BAS extension. The listing we provided was saved with SAVE,A, which saves a program as a normal ASCII text file. To load such a text file into BASIC, you must use MERGE, not LOAD. When you attempted to load your modified program by using LOAD, GFA BASIC got confused because it expected a tokenized program.

The error message "NOT A V1.0 PROGRAM" is simply a mistake on the part of GFA. They failed to update the error message when they came out with version 2.0. — START Ed.

To Each Their Own?

This letter is in regards to "Designing Programs," the CAD comparison you ran in your November 1990 issue. I have been using Athena II for many years. I think it would have been better not to have included version 2.0 of the program in the comparison than to say with such finality that the program is not recommended for drafting but is recommended for engineering sketches — and that's only if the bugs with the DXF converter can be worked out. This seems to be a very harsh statement when you realize that its foundation rests on a beta copy with no manual or prior knowledge of the product.

One of the big gripes the reviewer has with Athena II is that it is unable to select by window. If he had had a manual or called Iliad he would have found out that by pressing [A] on his keyboard he could initiate the area-select command and the standard GEM rubber band, and then lasso the entities he wanted. Entities can be selected or deselected by single, area or magnetic. By using what is available from DynaCADD as the basis of what should

be available to all CAD programs makes it look as if Athena II is very anemic and contains only 51 separate CAD functions. The fact is that Athena II has over 100 unique drawing commands.

With Athena II our company has helped design rocket motors, medical implants and inspection fixtures for nuclear, aerospace, automotive and defense jobs. It has also greatly aided in the creation of CNC machining programs and the control sketches for tools that normally would require college courses in trigonometry and calculus.

I agree with the reviewer's assessment that Athena II is very easy to learn and that even someone with no knowledge of CAD can be drawing in a very short time. Perhaps the reviewer has too much knowledge of CAD and has forgotten the Atari war cry of "power without the price." When you get right down to it, a CAD program is like a word processor: Even though WordPerfect is the best around doesn't mean a program such as ST Writer shouldn't be used except to make notes. For most Atari users I believe that Athena II could very well be all the CAD they would ever need or want.

James A. Rinner
Howland Industries
Stanton, CA

Good Eye

In scanning over the cover of the October 1990 issue, I noticed that the SM124 monochrome monitor is shown displaying a gold star with a blue background. Very nice — do you plan to publish the program that let you do this any time soon?

Carl W. Flach
Alameda, CA

This amazing back was submitted to START by contributing writer Dave Gregg, who claims he wrote it while "contemplating the sun." We'd be happy to publish the pro-

gram — which automatically calls up the now-famous gold star and blue background on a monochrome monitor — but we feel our readers would find it too limited. — START Ed.

CQ, CQ — Calling All Hams

Although I use my ST for all my computer needs, it does not satisfy my need for amateur-radio software. Unfortunately, I have been unable to find any commercial software for the ST concerning amateur radio, nor could I find anything in the public domain. Perhaps if START needs to cover another aspect of Atari computers, you could do an issue on the Atari computer and how it can be used in amateur radio (or any radio for that matter). I know there has to be some amateur operators using the ST just as there are MIDI operators using the ST. But I haven't come across any so far.

Adrian Hawkins, KB5MNS
Bedford, TX

We agree that amateur radio is a subject worth pursuing. In the February 1989 issue, START published Dab-Ditter, a program that helps would-be ham-radio enthusiasts pass the rigorous FCC test requirements for attaining a license to transmit. Back issues can be ordered by calling 1-800-234-7001. Other than Dab-Ditter, we are unaware of ST software specifically developed for amateur radio. Readers? — START Ed.

ALERT BOX

Galactic Merchant, published in the November 1990 issue of START, requires 1MB of RAM in order to run. The article states that it will run on a 520ST, but this is not the case. Our apologies for any inconvenience this may have caused our readers.

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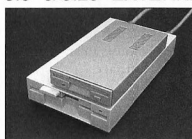
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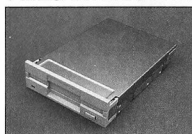
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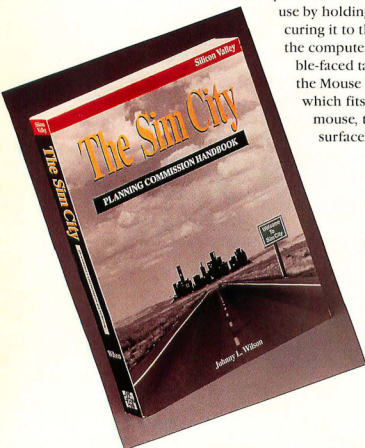
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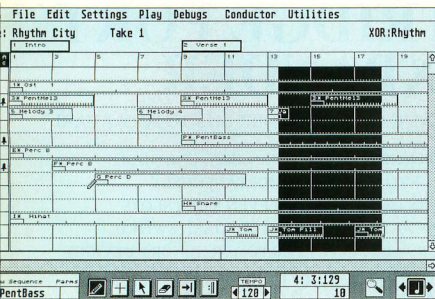
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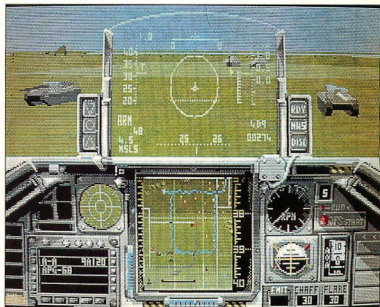
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Atari At Fall Comdex 1990

By John Nagy

Fall Comdex (Las Vegas, Nov. 12-17) played host to over 120,000 dealers and developers on some 2.2 million square feet of exhibition space. The predominantly IBM show found the Atari booth away from the main traffic in the newly built Sands Exposition and Convention Center.

The Atari Booth

Atari's exhibit, their largest floor area ever for a Comdex, sported a mixed color scheme that clearly illustrated the differentiation of Atari personal/home computer products from Atari business products.

The Home Computing area of the Atari booth was accented by rainbow-colored banners, while the Business area was a dignified black and white. The Home Computing section comprised about 20 percent of the booth and was separated by a wide aisle of burgundy carpet. In keeping with the business flavor of Comdex, this section was intentionally small. From a

marketing standpoint, it appears that the only computer that Atari considers a home unit is the 1040STE. Oddly, the MIDI area, featuring the Stacy portable, was attached to the Home Computing section.

Portfolios were all over the place, with hookups to a couple "alien" computers: an Apple Macintosh SE and an IBM PS/2. They were there to demonstrate connectivity with the palmtop Portfolio.

The new Atari SLM605 laser printer produced some fast and flawless copies.

Though the "605" prints six instead of eight copies per minute (as the old SLM804 was rated) the first copy is significantly faster.

Mega STE A Reality

The Mega STE is real (this report was written on one). The configuration is as predicted months ago: A casing identical to the TT, although in grey rather than off-white, with 4MB RAM, an internal 40MB hard disk, LAN and VME ports, a 16MHz clock speed and the new TT-style Desktop. The Mega STE is not in production yet, but may see distribution in early 1991 with retail base price of around \$1,200. At least five Mega STEs were set up in the Atari booth along with several TTs.

All the Mega STEs on display were hooked to the new Phillips 14-inch color monitors, model SC1435. This is a large-screen unit that will replace the

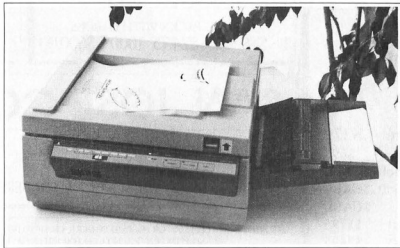
SC1224 monitors, and is expected to retail at around \$399.

TT 030: Old News, Great Machine

Over a year has passed since the TT's introduction at Fall Comdex in 1989. The TTs on display this year ran the new TTC1434 color monitors that offer two of the new TT resolutions (suggested retail: \$450). At least two TTs were displayed with the new TTM194 19-inch monochrome monitor (suggested retail: \$995).

The latest TT configuration, running at 32 MHz with 4MB RAM, a 50MB hard disk and the new TOS and GEM Desktop, is expected to be priced at around \$3,000, sans monitor. Many developers expressed concern that this price point is too high to compete with the Apple Macintosh IIx, available in similar (albeit slower) configurations for as little as \$2,500. They feel that while the "street price" of the TT may well match or barely beat the Mac II there must be some additional incentive for buyers to select against the Mac name and software base.

The really bad news is that the TT did not pass FCC testing, and is therefore not ready for U.S. distribution. Atari had promised that the TT would ship right after Comdex. Atari is now making no promises as to



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- #991 - Label Printing for HP Deskjet and Avery 5260 Labels, Desktop Formatter, Disk Sector Editor
- #1008 - **Icodecsk** - Set up different looking icons for different file types.
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- #1009 - Diamond Back II w/Cache Demo

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Desktop Publishing

- #500/600 - Publishing Partner Fonts
- #599 - PagesStream V3.0
Binner, Futura Black, Hal Lubalin, Futura Extra Bold Condensed
Condensed Futura Medium Demo - Fully functional except for Save (Mono/1 Meg RAM/DBL)
- #758/759/944 - Calamus Fonts
- #870 - Simply Math, Picture Puzzle
- Atari, Baby Teeth, Lucida Old English, Revised
- #895 - PagesStream V18 Demo (DBL)
- #935 - Desktop Publishing Utilities
Convert to IGC V12.0 - Converts Degas, Neochrome, Spectrum, Art Director, Mac Paint and TNY pics to IGC format
- Demos from Mac Works
Fontverter Demo - Convert fonts between PagesStream and Calamus

- PageStream File to 300 DPI .JMG file conversion
- #1028 - **PageStream Font Editor V0.8**
Now you can edit and touch up those PageStream Fonts. 20 page manual included on disk. Also included: Improved Postscript Screen Fonts: Book, Chansery, New Century Schoolbook, Palatino and Times

Applications

- #810 - SHEET V2.5P - Very well polished Shareware Spreadsheet.
- #811 - Documentation and sample files for Sheet V2.5
- #907 - Wordfinder V1.01 Demo (DBL)
- #965 - Checkbook V1.09, Almanac (Color)
- #989 - Paperless Accountant
- #999 - **ST Writer V3.8** - Simple easy to use word processor with extensive documentation on disk.
- Spell V2.8 - Stand Alone Spelling Program
- #1026 - B-VSTAT V2.36 - Powerful graphics and statistics program. (DBL)

Children's Programs

- All Children's Programs Require a Color Monitor
- #551 - Kid Shapes
Shape/design program patterned after a magnetic set. For ages 2-8
- #552 - Kid Shapes Plus
As above, but for older children. Larger number of choices for more complex pictures. For ages 8 & up.
- #667 - Benjamin's ABC's
Teaches young children the letters of the alphabet with digitized speech. (DBL)
- #699 - Kid Adder - Uses pictures to teach addition.
- Kid Color - Learning game for 3-7 year olds. Uses the mouse to point to boxes with a certain color.
- Kid Paint V1.4 - A silly version of the Little Red Riding Hood. Allows children to create a story.
- #726 - Wolf & The 7 Kids - Adventure for children ages 5-9, based on the Grimm's fairy tale with several possible endings to the story.
- Numerical Go Round - Quizzes children on Addition, Subtraction, Multiplication and Division in a game setting.
- #920 - Simple Math, Picture Puzzle
- #982 - Body Shop: Human Anatomy Tutor

MIDI

- #666 - MIDI Music Maker. Plays numerous music formats (EZ Track, Music Studio, etc.). Also converts to MIDI File format
- #697 - **Sequent** - 16 Voice MIDI Recorder V2.1. From Europa. This is the one everyone is talking about

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when TT will ship.

New GDOS To Feature Scalable And Rotatable Fonts

Also at Fall Comdex, Atari debuted their Font Scaling Module (FSM) GDOS, to be released this winter, perhaps as a free-ware update, perhaps as a bundle with every new machine sold with a nominal fee to everyone else. This outline font technology updates the old and limited GDOS to provide completely scalable and rotatable GDOS fonts. The outlines will be standard Ultrascript outlines from the IBM family of fonts rather than the ST Ultrascript family. (The added interchangeability is worth the inconvenience to existing ST Ultrascript users.)

Third-Party Highlights

Third-party developers were again the focus of much of the Atari booth.

Gadgets by Small's Spectre, running version 3.0 software, "flies" on the TT030. Dave Small estimates that it runs about four times the speed of the GCR on a ST, clocking in right at about Mac II performance.

Goldleaf demoed the beta version of Wordflair 2, scheduled to ship at the end of 1990. Included in this latest version is an integrated spell checker. Wordflair 2 will be available as an upgrade to existing WordFlair users for only \$25, with a suggested retail of \$149.95.

Gribnif of NeoDesk fame showed a new command line interpreter (still in beta

testing) that will run any TOS program in a GEM window.

Zephyr showed the ST-Fax machine, a combination scanner, printer, fax and copier for under \$1,000. Zephyr also showed their Sherlock optical character recognition software for the ST. Scheduled for a Christmas 1990 release, this German import examines an IMG file of text and in about a minute per page, will deliver an ASCII file at 95 percent or better interpretation. Two versions will be available: Sherlock Jr. (\$189) will handle one font at a time; Sherlock Professional can interpret as many as seven fonts or sizes at one time (\$789, software only).

Transport, a program that lets you move data from the Portfolio to the ST

and back, was shown by Artisan Software.

PageStream 2.0 was almost there, with SoftLogik promising that the ST version will be out in January 1991. A beta version was offering fast, clean color desktop publishing on a TT. Suggested retail will be \$299.

On hand was Migraph with a new version of Touch-Up that offers additional features such as grey-scale that saves in TIFF format. They also announced a new color hand scanner for the ST and TT. Scheduled for a first-quarter 1991 release, the color scanner requires at least 2MB RAM. Migraph is making color DTP a reality on the Atari, with full graphics, for \$800 suggested retail.

Atari Announces ST Hardware/Software Bundles

Atari Corp. at last approved hardware/software bundles for fourth-quarter 1990 distribution and promotion. At press time there were still several to be approved, mostly including games and leisure software, but the following are the ones that are a go so far. All prices listed are suggested retail.

- 520STFM Home Entertainment Pack (\$579.85);

520STFM, Missile Command, Star Raiders, Crack'd, Moon Patrol, NEOChrome, Joust;

- 520STFM Communications Pack (\$529.85): 520STFM, SX212 modem, Stalker and Steno telecommunication software;

- 1040STE Home Print-Shop Pack (\$1,398.90): 1040STE, Migraph Hand Scanner, Touch-Up, Easy Draw 3.0;

- 1040STE Deluxe Paint Pack (\$799.90): 1040STE, Electronic Arts Deluxe Paint Animator;

- DTP Pack #1 (\$2,099): Mega 2, SM124 monochrome monitor, Megafile 30 hard drive, SLM605 Laser Printer, Calamus;

- DTP Pack #2 (\$2,099): Mega 2, SM124 monochrome monitor, Megafile 30 hard drive, SLM605 Laser Printer, Deskset II;

- Portfolio PC Traveler (\$500): Portfolio, File Manager ROM card, PC Card Drive, 128K memory card.

Atari Re-Signs With Marken Communications

After a less-than-dramatic stay with the public-relations firm of Bob Thomas and Associates, Atari Corp. has re-signed with Marken Communications. Andy Marken was on hand at Fall Comdex throughout the show to promote the Atari product line. Marken Communications, 3600 Pruneridge Ave., Santa Clara, CA 95051 (408) 296-3600.

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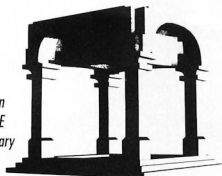
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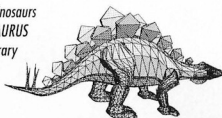
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TTERRIFIC!

Atari Guru Dave Small Guides You On A Tour Through The Power And Speed Of The New TT030

Author's Disclaimer: In my work at Gadgets by Small, I've come into close contact with many of the new features of the TT in Gadgets' new products, such as the SCC chip, LocalTalk (formerly Appletalk) and the 68030 and its burst-mode RAM ability. While this gives me an informed viewpoint from which to review the TT, I've refrained from commenting about areas of the TT where Gadgets could be perceived as competing with Atari.

Long awaited by ST users, the TT030 represents Atari's latest effort in their computer line based on the Motorola 68000-series microchip. The TT made its "official" debut in the United States at Fall Comdex last November; projected availability, which depends on FCC approval, is in early 1991.

The TT can be perceived as many different machines rolled into one. It is intended as a faster ST with more memory and capabilities; a Unix-compatible workstation; a LocalTalk- (formerly Appletalk) equipped, hence networkable, computer as a network server; and a VME-bus expandable computer.

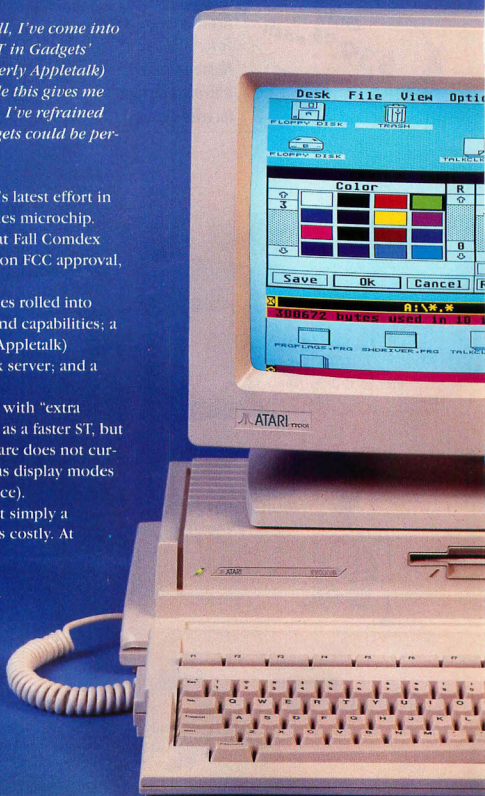
The TT fits into these categories, but each ends up with "extra parts" from its other functions. For instance, it works as a faster ST, but has a VME slot and LocalTalk connector that ST software does not currently support. It works as a Unix workstation, but has display modes that are nearly useless for Unix (ST low-res, for instance).

This is good, in that the TT is multifunction; it isn't simply a souped-up ST. It's bad, in that all the extra hardware is costly. At \$2,995 announced retail base, the machine is pricey to an ST audience wanting only a more powerful ST.

Market trends will affect the TT as well. Atari's slogan of "Power Without The Price" is going to be affected by the price competition entering the compu-

ter market. The market is no longer in the same place it was when the 1040ST broke records by offering a megabyte of memory for under \$1,000.

For instance, the Next Unix workstation selling at \$4,995 offers a next-generation, object-oriented software-development system (Next-Step), that will tempt users facing a \$3,000 TT. Sun's Sparc (RISC-based) Unix workstations, in the same price range as Next, offer considerably more raw performance than the (68030-based) TT — or almost anything else. The new Macintoshes, par-



BY DAVE SMALL
PHOTOGRAPHY BY CHLOE ATKINS

ticularly the "low cost" LC, offer performance and the vast Mac software base. And finally, the endless 80386 and 80486 clones available around \$3,000, with the largest software base of all, will prove to be the stiffest competition for the TT.

Hence, it may be that Atari should have specialized with a line of machines, each dedicated to one function (faster ST; Unix workstation; network server; VME bus station), to remove the expensive parts not needed for the particular function. However, the TT represents Atari's marketing choice to roll all

these functions into one box, for good or bad.

Let's examine the TT with an eye toward these different functions. Since the average START reader is ST oriented, you may find some of this equipment unfamiliar; these may be pieces relating to other functions (for instance, VME). I'll try to explain these parts in familiar terms.

(I'm not qualified to review the VME board. Hence I'll simply note that the TT's VME slot is capable of accepting half-height VME boards [called 3U boards].)

Unix Anyone?

TT Unix was not released nor otherwise available to me by the time this review was written. Specifications on it seem to vary from month to month, as to which release of the AT&T Unix operating system it will support (version 3.0 or 4.0), if X-windows will be supported, which Desktop "look" might be included, and whether or not Berkeley extensions will be supported. I feel Unix requires a 50MB hard disk just to begin with, with more being far preferable — particularly if you join data-intensive areas such as ►



Usernet or other networks — and the more RAM the better; more RAM helps prevent bogging down due to disk paging. SMB seems to work well; the TT gives you the option of four or 16 in TT RAM, where I assume Unix will be located, for speed.

Walk-Around

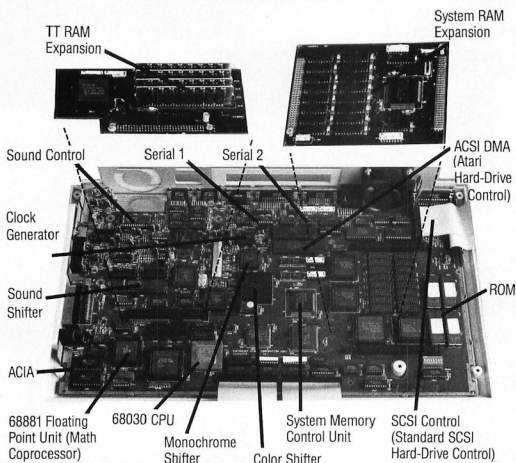
Let's begin with a quick walkaround of the TT, going clockwise from the front.

The Keyboard: The detachable TT keyboard is familiar to ST users; everything's the same. The one exception is that the function keys are now unslanted and stand far above the other keys. Since the slanted function keys on the ST series often resulted in missed keypresses, this is probably a good change. The keyboard has a good feel to me; however, the feel of a keyboard is completely subjective, from those preferring an IBM-style "click" board to those preferring an utterly soft "mush" board, so you'll have to form your own opinions of this one. The keyboard does offer "positive action"; in other words, the keyboard lets you know when you've pressed the key far enough to activate it.

The right side of the keyboard sports the normal mouse (or Joystick 0) DB-9 connector, the left side the Joystick 1 connector.

The keyboard cable connects from the right side of the keyboard to the left side of the TT computer, unfortunately, via a coiled cable. The keyboard can be locked to the TT if you desire, with some fina-

THE TT MOTHERBOARD



ling of the keyboard cable.

The Case: Connected to the keyboard cable, of course, is the case. Opinions on the case are heated and diverse; it is certainly a unique design, something between a wedding cake and a toaster in appearance.

The contortions required of the shielding inside the TT to fit within this case mean there is almost no free room available inside for any aftermarket expansions. Don't disassemble the TT unless you absolutely have to; this is not an easy machine to take apart.

The Floppy Drive: In the front is a double-sided floppy disk drive. It is presently 720K, the same density as ST floppy drives. Atari reportedly was going to offer 1.44MB drives (high density), much like the IBM and Macintosh; however, the 1772 controller chip Atari uses cannot consistently operate at this rate.

The Monitors: The normal monochrome (SM124) or color (SC1224) ST monitors will not run off the TT, and there's no place to plug them in. Instead, Atari uses a

VGA-style monitor for output, and will market an Atari-brand monitor with stereo speakers. I did not have the opportunity to use this monitor; instead, I used a PanaSync C1331 monitor, which I feel offers fine video performance at a fair price. Any multisync monitor with a 15-pin connection should work fine.

The TT supports the old ST video-resolution modes, if not the old ST monitors.

This is part of a deliberate decision permeating the TT's design to remain as compatible as possible with ST software. This effort is as successful as it could have been. Atari claims that 75 percent of the ST software in their extensive library of third-party products works fine on the TT; I had somewhat lesser luck with the TT, but in my usage I was not using many popular ST applications.

The TT also has its own video modes, which provide higher resolution and more colors. More on these later; we're still touring the machine.

A two-page monochrome monitor (designated the TTM194), may be connected to the TT. This provides excellent-quality video for applications compatible with it, very comparable to the Moniterm for the Mega. (Unconfirmable rumor has Moniterm manufacturing these monitors for Atari; in a comparison with our Moniterm, they appeared very similar.) However, a key point: old Moniterms will not connect to

the TT. Apparently Monitorm and Atari chose incompatible video frequencies and video-cable transmission methods; so far, no third-party developer has been able to provide an adapter.

Incidentally, with any monitor, be careful of sitting it on top of the TT. We have had frequent experience with crashes caused by apparent circuit-board flexing due to monitor weight. We can't isolate the problem. If your TT experiences frequent weird crashes, try moving the monitor off and behind it. (*Editor's Note:* This problem may also be caused by a lack of effective radio-frequency shielding on the bottom of the TTC1434 monitor which apparently can disrupt floppy-disk action. The solution the author suggests should help.)

Internal SCSI Hard Disk: The right side of the machine offers no connectors, and only one interest-

ing point. The internal 3.5 inch hard disk, which is connected via SCSI (rather than the "normal" Atari ACIS), sits in the right-hand portion of the case, isolated from the rest of the unit by a slice taken out of the case.

Because the internal hard drive is standard SCSI, there is no need for an "Atari Host Adaptor" to connect the usual hard disks to the Atari. In addition, other popular SCSI peripherals, from hand scanners to EtherNet adaptors, can be directly connected to the DB-25 SCSI connector on the back of the Atari. (SCSI is normally 50 pins, but half of those are ground for noise suppression, and thus SCSI can easily be wired to a 25-pin connector.)

This internal hard disk can be easily removed — it takes just one screw to pop the cover, then unplug the drive from its 50-pin SCSI con-

necter — and replaced with another. Given the plethora of 3.5 inch SCSI units, this gives you the option of going to a much larger hard disk. Also, you can add more storage on the SCSI or ACIS daisy-chains should the internal hard disk not give you enough room.

Out Back

Moving around to the back of the TT, the DB-25 SCSI connector is the first thing you see. Atari has persisted in its policy of moving the Power and Reset buttons around on different machines.

The DB-25 connector appears to be wired identically to a Macintosh DB-25, which is very good news for those of you searching for peripherals; Mac SCSI equipment should be able to plug right in. Note that software is required. For instance, a Mac hard disk with a DB-25 connector will still require formatting-software ►



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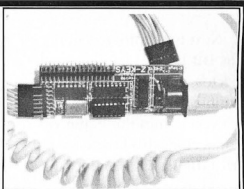
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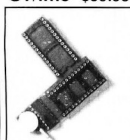
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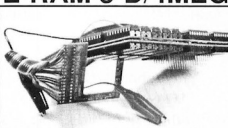
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and a driver to use on the TT. Atari provides software to initialize and use some drives.

Atari must be commended for sticking to industry standards for its connectors in the TT. By making the TT SCSI connector Mac compatible, users do not have to purchase or make kludgy adapter cables.

Moving across the back of the machine, you'll find two cooling fans. The TT has twin fans, a move I highly approve of, since many STs I

have encountered are sensitive to heat, and since the many components in the TT put out quite a bit of heat.

Next, we find the familiar 14-pin DIN floppy connector; as with the recent STs, there is one internal and one external drive supported by the TT.

Next to the floppy connector is the DB-19 ACSI hard-disk connector; you can hook ST compatible peripherals here.

Next comes the 15-pin video connector. This is a pretty standard IBM-style VGA hookup used on many monitors.

Next, we have four built-in serial ports, labeled Modem 1, Modem 2, Serial 1 and Serial 2. There's really a fifth serial port, the LocalTalk connector, as we'll learn in a moment.

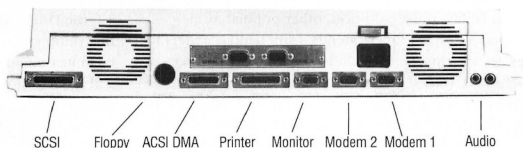
You may be asking why the machine has five ports. There are several good reasons. First, when used as a Unix box, four terminals can be connected to the TT easily for multi-user applications. Or, when used as a multi-user BBS, the TT can easily hook to four modems.

Second, this allows connection of serial printers and other serial peripherals without the cable-chang-

ing or switchboxes needed on the (single serial port) ST.

Third, the serial ports basically come free of charge once some necessary hardware was added, so why not make them available? Here's the situation. Motorola makes a chip

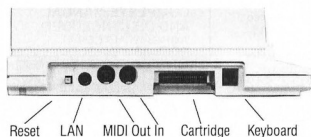
TT BACK PANEL PORTS



called an MFP (Multi-Function Peripheral). The MFP does many neat things, among them interrupt controlling, giving an easy-to-use programmable I/O port, and provides a single serial port. Atari used the MFP in the ST and thus replaced many chips with one chip, a good move.

In the TT, more interrupt han-

TT SIDE PANEL PORTS



dling was required, so two MFP's are onboard (they are designed to daisy-chain like this), and we get another "free" serial port — so why not let the user plug into it? Atari did so. The connectors Modem 1 and Serial 1 are the two MFP ports.

Two things to keep in mind: Modem 1 is the fully ST compatible port, with all the strange RS-232C handshaking wiring. Modem 2 and Serial 1 are "three-wire" ports, featuring only input and output,

without strange wiring; Serial 2 features full handshaking. It gets a little confusing.

Also note that these are DB-9 connectors, not the DB-25 connectors you're used to on the back of your ST. You'll require an adaptor cable. Fortunately, the wiring is the same as the IBM AT serial port, so you can pick up these adaptors at nearly any computer shop.

The Modem 2 and Serial 2 ports come from an SCC chip. This Zilog

chip is the absolute cat's meow for serial communications; which it can do at incredibly fast rates. For instance, the ST's serial chips "max" out at 19,200 baud, or roughly 1,920 characters per second; the SCC "maxes out" at over 900,000 baud, or 90,000 characters per second!

At 90,000 characters per second, you begin to push the ability of the processor to feed the chip. As fast as a 680x0 processor is, stuffing nearly 100,000 characters per second into a port begins to push it. So, the Atari engineers built in DMA, or Direct Memory Access which just means that something can access memory directly, without the processor's help.

Video can access memory directly. That's DMA. (We'll discuss this at length shortly). The disk drive can access memory directly. That's also DMA. That's why your ST, back in 1985, could run disk drives flat-out whereas the Mac Plus could only handle them at 1/3 speed; the CPU wasn't needed for the actual transfer. Sound can be driven directly from memory; DMA. And finally, the SCC serial chip can be driven from memory with DMA.

Thus, you can set up DMA, tell the SCC to "Go!", and go do other things with your CPU while the SCC and DMA work together to pull bytes from memory and send them out, or gather in bytes and store them. This is really neat stuff as opposed to tying up the 68030 to handle serial work; a good analogy would be a printer buffer.

Atari wisely used the SCC chip because they wanted to build in a network connector to the TT. One of the most popular networks I have seen it reported as the largest installed base of any network) is LocalTalk, which used to be called AppleTalk, originally for the Macintosh. The SCC chip is used in the Mac to generate much of the LocalTalk talk, and the information is sent differentially, with RS442, instead of RS232. Finally, it all has a different connector, a DIN-8, (with a circular pattern of pins) instead of

the familiar DB-25 or DB-9 with two rows of pins.

Atari does not at present offer any software to run LocalTalk. In other words, it has the hardware, not the software. Without the very complex AppleTalk Protocol software (it's a 10-layer deep protocol), the ST simply cannot work on a LocalTalk network.

As with Modem 1/Serial 1, Modem 2 is a three-wire, no handshake interface; Serial 2 is full handshake.

Now, of course ST software hasn't really been written to handle more than one modem port, with few exceptions (Double Click's multiport expander for one). So Atari's given you the option of hooking up what the ST software will consider "the serial port" to any of these ports through "Bconmap," in software, or even through a new Control Panel option. Hopefully new software will use these multiple

ports.

And yes, nearing the left side of the Atari, right where it's least accessible (directly centered under the monitor), is the power switch.

Continuing on with no comment, we encounter the second fan, and the two stereo sound ports; the TT has the STE's DMA-driven stereo sound options.

To The Left

On the left we find:

The Reset switch, hidden at the far back behind any LocalTalk cabling, to prevent accidental or intentional presses; the LocalTalk DIN-8 circular connector; the two MIDI ports; and the cartridge connector, which is fully ST compatible. In terms of physical room, even the large Spectre GCR cartridge fits fine, so most ST cartridges should work okay. And last, the keyboard connector cable, which should have ▶

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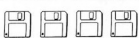
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been on the other side to match the keyboard.

It's time for a look inside the TT now; there's a lot of new stuff inside, from the new MC68030 on down.

Inside the TT: Video

Because I've already mentioned a good deal of what's inside the TT, I don't have to say much about, for instance, the serial ports. The TT's central design, in my opinion, revolves around this: speeding up a computer and video system that is very difficult to speed up.

Few people appreciate how incredibly difficult it is to get a video display up on a TV screen and keep it there rock-steady. The problem is that the display is generated by only one dot. It starts at the top left of the screen, streaks across horizontally, moves down a line, streaks across again, and so forth, "painting" the screen. The dot gets brighter or softer to control intensity at any point, and is aimed slightly differently to generate color dots on a color monitor.

However, the image rapidly begins to fade out. The computer must redraw that image around 60 times a second, or better, to keep the image up there. (If it's under 60 times a second, the user will perceive "flicker" and begin to get a headache. Some countries, by law, require over 70 times a second on monitors.)

Let me give you some details here on just the ST's monochrome monitor. It has 400 scan lines horizontally, each about a foot long, with 640 dots on each. This whole thing is redrawn every 1/60th of a second.

One "refresh" is thus 400 feet of scan line, done 60 times a second, or 24,000 thousand feet per second. That's 4.5 miles! In an hour, your video beam has traced 16,363 miles across your screen, over and over.

The computer is beating itself to death generating that video beam. Doing video is so hard for a computer, requiring so much very fast stuff, that computers are designed around doing video! The Atari ST shares a basic design with many other computers, such as the Apple II. The basic video image is stored in memory. Memory speed is twice what the processor requires; half of the memory's speed is used feeding the processor, the other half is used feeding video. Doing video is so difficult that 16MHz (eight-million access/second) memory is used on the ST, shared between the 8MHz CPU and the 8MHz video; they get alternating memory accesses. The ST ends up pumping out 32K of video information each 1/60th of a second to generate the screen image.

Enter the TT. It does the "old, slow" video modes the ST did, as well as new modes that require much more memory (158K, instead of 32K). Yet it still has to get that video out in 1/60th of a second! A quick check with a calculator will show you that this would completely max out even 32MHz memory, leaving no time for a CPU to access it. So Atari had to do something.

Memory is organized with a certain number of "bits across"; this means that every access to memory gives back a certain number of bits. On the 8-bit Atari, it was eight. On the ST, it was 16. On the TT, it's 32. Thus, for each of your cycles, you get much more information, adding a hidden speed-up to everything.

But the TT video circuit fetches 64 bits per access! It does this with a special latching system. With this 64-bit fetch, the TT is capable of giving half of system memory to the 68030 processor, and half to video once again — but now the video is much, much better.

Here's a summary of the TT's video modes.

ST Modes:

320x200	16 colors	ST Low Res (Color)
640x200	four colors	ST Med Res (Color)
640x400	one color	ST High Res (Mono)

New TT Modes:

320x200	16 colors	
640x200	four colors	
640x400	two colors	(Duochrome)
640x480	16 colors	
1280x960	one color	TTM194 monitor required
320x480	256 colors	Many-color-mode from a palette of 4,096

There are also some interesting modes on top of these, like "smear mode." In this mode, the computer generates the first color on the screen that it finds in memory (again, starting at the top left), then continues making that color until it is specifically told a new color. (Techies: 0 in display memory means don't change colors). Why is this important? With very little processor time you can "fill" entire areas with color — without doing the customary fill to the corresponding display memory. This should allow some spectacular animation work.

There's also a way to change the machine into grey-scale mode, where instead of 256 colors, you get 256 shades of grey.

Incidentally, there is no Blitter in the TT. It was the opinion of the engineers that the 68030 processor is so fast that there was little to be gained by a Blitter. Even the two faster-video programs, Turbo-ST and Quick ST, have been updated for the TT, and yield very high-speed improvements.

The video appears extremely stable, without flicker or jitter. For instance, the Desktop simply appears sharper and more colorful, the result of higher resolution, in normal TT color mode. If only the ST's Monterm monitor would plug into the TT; users who could afford Moniterms are likely TT buyers, but may be reticent to purchase another monitor that differs so slightly.

A New Type Of Memory

You'll recall that in the ST and TT both, we have main memory (ST memory), shared evenly between video and the CPU, which cuts down machine performance — there are times the CPU could use memory that video has. In the ST, the 68000 microprocessor very often hit memory just as its "time slot" opened up, so there wasn't much speed degradation; the TT has a much faster 68030, hitting memory much more often, and is thus more likely to be slowed down.

The TT's designers knew that the up to 4MB of ST memory would likely bottleneck the 68030, which is capable of awesome speed; the 68030 is the heart of many hot workstations (Sun-3 and HP equipment, for instance). So they added another space for "TT memory." This memory has nothing to do with video; for instance, you can't have a video image in TT memory and display it. However, this opens up TT memory to full-throttle access from the 68030; it about doubles the speed of programs running within it.

The 68000 processor in the ST was capable of addressing 16MB of memory. The 68030 in the TT is capable of addressing 256 times as much memory, or up in the gigabytes (billions of bytes). In the TT, the first 4MB of memory are ST memory. Then there's an open space reserved by Atari for other things. Starting at the 16MB border, there is TT RAM, which comes in either 4MB or 16MB sizes, depending on which chips you use. (The 1MB DRAM SIMMS so common today yield 4MB; the more expensive, but becoming affordable, 4MB DRAM SIMMS yield 16MB of TT RAM.)

This is also memory that's 32-bits wide, so everytime the 68030 hits it, it gets four bytes (eight bits each).

But there's something better. The 68030's designers built in a tur-

bocharger if you design your hardware to use it, called "burst mode." And the TT uses it in TT RAM.

Burst Mode

Normally, the 68030 goes through a number of gyrations to "fetch" the instructions it's going to execute out of memory. All these gyrations end up taking many memory cycles, and even at millions per second, that ends up slowing things down.

In burst mode, the 68030 pulls in 16 bytes, or four "longs" (a long is

32 bits, the size of TT memory) in just five cycles; one to set things up, one to fetch the first, the remaining three to fetch the other three. This is far, far better than the normal instruction-fetch mechanism. The 16 bytes are fed into the "instruction cache," a place inside the 68030 I'll talk about more later, and executed at top speed.

Adding burst mode is really warp-drive stuff! The type of RAM the TT (and every other modern computer) uses mostly is "dynamic ▶



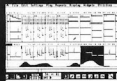
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RAM" (DRAM); DRAM must periodically halt and see to its own needs ("precharge"), during which times it's off limits to the CPU. There is also a "refresh" time, where the DRAM keeps its memory contents from fading. This all boils down to TT memory not being always ready for the 68030. With burst mode, there's no need for the 68030 to go main

memory for the next 16 bytes of program: it's pulled inside the 68030. Thus the 68030 can execute at maximum efficiency.

By the way, it's the nature of DRAMs to be slow to access; for instance, after accessing one location, the RAM must rebuild up the electrical charge in that location which was used up by you reading it.

Otherwise, repeated accesses would literally drain that RAM location to zero! (This is called "precharge" and I am simplifying a highly complicated subject.) In order for burst mode to work, you need to have "nybble mode" RAM chips, which are definitely not run-of-the-mill SIMMs as they're advertised in many maga-

continued on page 64

THE MEGA STE

A Sneak Peek At Atari's Middle Child

by John Nagy

Atari Corp. surprised even their own developers by announcing the Mega STE at last fall's Comdex. Scheduled for an early 1991 release, the Mega STE is identical in appearance to the TT, but in ST grey rather than off-white. The base configuration was not set at press time, but it will most likely include 2MB RAM, a 40MB internal hard drive and run TOS 2.2 or higher with the Atari NewDesk enhanced GEM Desktop and Extensible Control Panel. The Mega STE's central processing unit is a Motorola 68000 running at 16MHz, which is switchable (with or without static RAM cache or down to 8MHz for compatibility with "problem" software, such as Spectrum 512).

The Mega STE is, above all else, an STE and you may assume that any feature on the new machine is the same as on the 1040STE unless specifically mentioned here. The Mega STE does not include the new TT resolutions, larger on-screen color scheme or video outputs. The Mega STE does include the STE's standard 4,096-color palette with the same monochrome high resolution, four-color medium resolution and 16-color low resolution modes with hardware scrolling. Also like the STE, genlock is available without modification, but requires JRI's external hardware. The internal floppy is 720K.

Ports include the full complement of the 1040STE minus the analog joystick ports. Additional ports are: LAN (Appletalk compatible, same as the TT); two modem in the new smaller connector configuration that is becoming stan-

dard (although the second port shares internal hardware with the LAN port that may make simultaneous use with the LAN impractical); and a VME Bus Card (same as the TT and accessible from the rear of the machine). The Mega STE does not include the true SCSI external hard-drive port featured on the TT. Instead it features the Atari DMA port, now labeled ACSII (Atari Computer Special Interface). Internally, the Mega STE includes a 68881 math co-processor socket.

All other ports are the same as the STE, including an RF output jack to run a TV or VCR, and composite video available on the monitor line just like the older ST standard. The MIDI- and cartridge-port locations remain unchanged. The power switch for the Mega STE is placed in the center of the back panel. The reset button is within easy reach,

on the left side of the machine.

The Mega STE keyboard is the same as the TT. The function keys are now much more distinguishable due to better spacing, clearer markings and finger-stops at the left edge of each button. The mouse port is on the right edge of the keyboard; the keyboard cord exits to the right.

At press time, pricing for the Mega STE was still to be determined. Sources at Atari say that the base Mega STE with a monochrome monitor will retail for less than a similarly outfitted Apple Mac Classic, but at double the speed. The street price for a Mega STE without monitor is rumored to be around \$1,200.



Product Information

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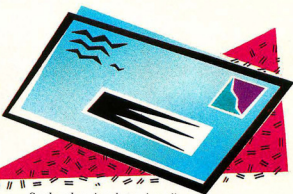
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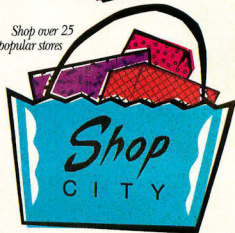
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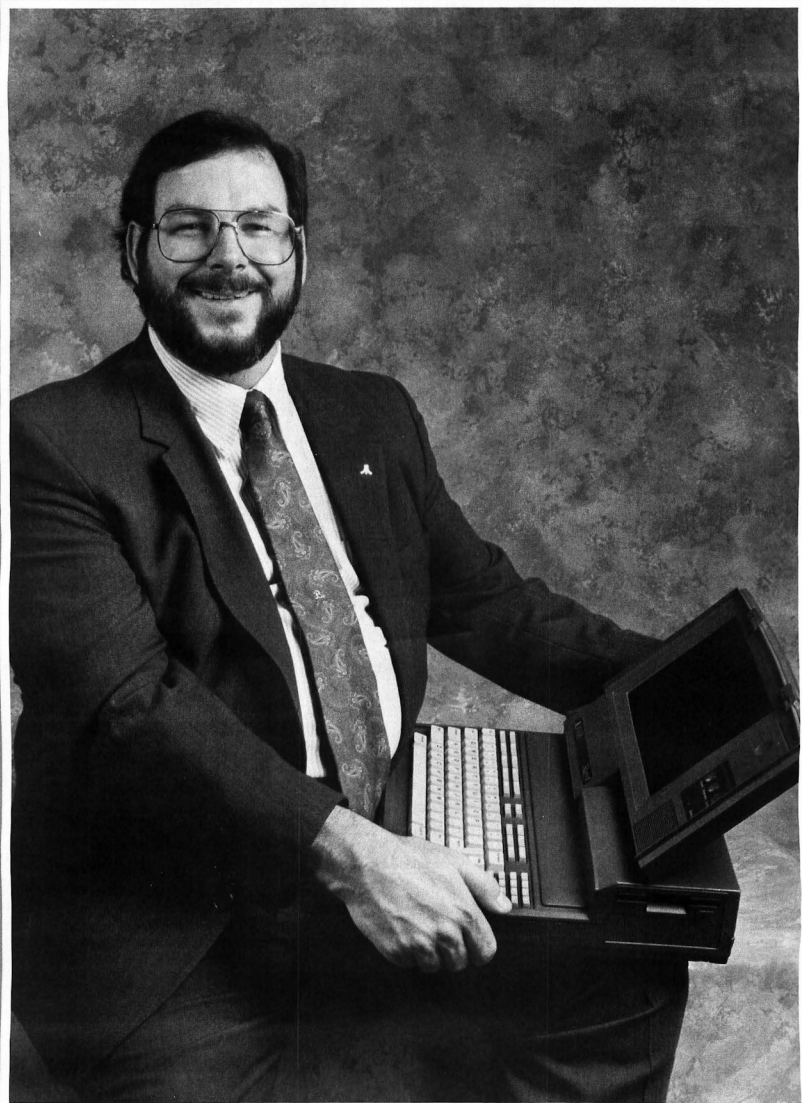
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TRAVELIN' MAN

*With Honesty And A
Coach-Class Ticket,
Bob Brodie Becomes
An Atari Celebrity*

There was a time early last year when the editors of START magazine considered creating a "Bob Watch" column, complete with a map pinpointing the cities in which Bob Brodie, Atari Corp.'s manager of User Group Services, had alighted during the month. Each visit would be described in detail by an on-the-spot freelance correspondent: what user-group meetings Bob attended, what Bob wore, what rumors Bob squashed, what equipment Bob brought, what Bob ate, what questions Bob answered, what programs Bob demonstrated, what Bob said about Atari's plans for the STE, the TT, advertising, the Portfolio, the Lynx, the again-vacant presidency. For a published photo of the peripatetic Bob START would pay \$25. The model for this flirtation with the cult of personality was *Tiger Beat*, a magazine pandering to pubescent lust with lavish pictorials of teen-age male celebrities. The would-be inhabitant of START's fishbowl chuckled upon hearing the idea. So did START's editor. Frivolous, however, was not every staff member's opinion of it.

It seemed that half the user-group newsletters received by the magazine that spring featured a front- ▶

BY AMY H. JOHNSON
ASSOCIATE EDITOR

page story on Bob Brodie's recent visit or an excited announcement of an upcoming one. During his first year at Atari Brodie met with user groups in over three dozen cities: Chicago; Detroit; Dallas; Houston; Washington, D.C.; Milwaukee; San Diego; Toronto; Boston; Los Angeles; Pittsburgh; Spokane, Wash.; Newark, N.J.; Rochester, N.Y.; Sacramento, Calif.; Santa Rosa, Calif.; Fresno, Calif.; Modesto, Calif. and Asheville, N.C., to name a few. He attended about a dozen trade shows. He maintained accounts on two online services, CompuServe and GENie. In a company notorious for the unanswered letter and the unreturned phone call, Brodie responded. He earned trust. A reputation for fairness. So when users had questions or concerns, they asked for the gospel according to Bob. Brodie had achieved a local following worthy of a *Tiger Beat* star.

"We Thank You"

Brodie's popularity remains high during his second year with Atari, but his novelty has declined. No banner headlines trumpet his arrival, but hundreds of Atari computer owners appear at his demonstrations. By the sheer volume of his appearances Brodie's presence has become commonplace. *START* magazine no longer discusses plans for a paper trail marking his travels.

Mementos marking his travels stand on his office shelf. A plaque from the STAR user group of Belleville, Ill., reads, "Presented to Bob Brodie for your devoted support to the Atari user groups. We thank you." A wedding photo and pictures of his three children, usually in a soccer uniform, fill the opposite shelf. An avalanche of user-group mail tumbles across the desk. He says he reads every piece. Cards and letters decorate the walls. A stack of phone messages sits atop his Mega 4 keyboard.

USER GROUPS ON DISK

Joining a user group has never been easier — Bob Brodie's official list of over 250 registered user groups is on your *START* disk! You need to un-ARC *GROUPARC.PR*G from your backup *START* disk, then load the file *USERGRUP.LST* into your favorite word processor or text editor. It's an ASCII file, so any word processor can load it. Within your word processor you can read the list, print it (be warned: it's long!) or use your program's Search function to locate a particular state. For example, searching for *MONTANA* will put the cursor at the begin-

ning of the section of the list with Montana's user groups. Be sure to type in all-caps.

The list is organized by state. Each entry contains the group's name, address, and other information. If an item is empty, then that information is not available or not applicable. The list is accurate as of Dec. 1, 1990. If you want to update or add your user group to Brodie's list, write to him at: User Group Update, Bob Brodie, Atari Corp., 1196 Borregas Ave., Sunnyvale CA 94089.

Did you know there's a user group in Kwajalein? Fascinating.

A Megafile 60 hard drive, a Megafile 44 removable drive and a laser printer complete his computer system. A briefcase and a Stacy portable fight for floor space with boxes of newsletters from past years. He's in the process of moving into a real office, with a door he can close on the clutter, but for now he works in a 5-foot-long alcove within a rat's maze of freestanding partitions. Standing, Brodie easily sees over the top of the partitions. He wears glasses and an analog watch. His beard is close-trimmed, his shirt is

button-down, his suit and tie are muted and conservative. He is even-spoken, but not soft-spoken. He chooses his words carefully, and quickly corrects you if you mistake his meaning. The gospel according to Bob is not subject to interpretation.

Bob Brodie rejects my description of him as a cautious man. He prefers words like honest and realistic. He also admits to being visible and accessible. Adjectives of which he has expressed no opinion include friendly, sincere, unruffled and persistent. All nine latter traits serve him well as manager of User Group Services, a job which makes him the instant friend and ally of hundreds of strangers. The first adjective, cautious, is perhaps best replaced by deliberate, because his actions do not demonstrate an avoidance of danger, but, instead, careful planning.

General Brodie

When he applied for the job at Atari, Brodie marshalled his forces like a battlefield general. He pointed out to company executives that he was an Atari user; was, in fact, for three years president of his local user's group in Orange County, Calif. He reminded them that he had demonstrated ►

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Atari products in their booth at the National Association of Music Manufacturers' trade show in January 1989.

Speaking before large groups didn't bother him, this self-described high-school "speech and debate stud" told Atari. He asked his friends among the independent Atari product developers to call and sing his praises. And when the choice hovered between himself and two marketing professionals, Brodie hauled out the big guns and asked a friend then employed by Atari for a recommendation. "If I really want something I'll fight for it," he says. Atari hired him, figuring it was easier to teach Brodie the basics of marketing than it was to teach the other candidates to love Atari computers.

The Road To Atari

In August 1989, Brodie headed north to Atari headquarters in Silicon Valley, the high-tech capital about 40 miles south of San Francisco. It was a homecoming of sorts; Brodie was born 36 years ago in Oakland, on the east side of the San Francisco Bay. He waited six months before selling his L.A.-area house and moving his family to Northern California. Protestations to the contrary, such deliberation borders on caution.

Brodie's love of Atari computers landed him his previous, as well as his present, job. Before joining Atari he managed the computer network at Brink's, the armored car company. His transition from armored-car driver to technical wizard, however, was not deliberate. With a multimillion-dollar network languishing for lack of skilled operators, the company sent a vice president on a nationwide hunt for any employees with a computer background. By the time the vice president arrived in Los Angeles from his starting point on the East Coast, he was discouragingly empty-handed. "There were guys more afraid of the computer than going out on the street and facing the possibility of a robbery," Brodie recalls. Spotting Brodie leafing through *Computer Shopper* in the break room, the vice president immediately transferred him to the fledgling

BRODIE TO WRITE START COLUMN

A regular column by Bob Brodie will appear monthly in *START*, beginning with the March 1991 issue. Brodie, Atari's manager of User Group Services, will answer user's questions, discuss important issues within the user-group community and keep readers abreast of Atari's plans and policies.

If you have questions or concerns that you would like Brodie to address in his column, please send a letter to Bob Brodie, Manager of User Group Services, Atari Corp., 1196 Borregas Ave., Sunnyvale, CA 94089. Brodie maintains two online accounts. On CompuServe send mail to 70007,3240; on GEnie his address is BOB-BRODIE.

Watch for Bob Brodie, appearing monthly in *START*!

MIS division.

Brodie's background as an Atari hobbyist partially explains his popularity.

"There's a real sense of he's one of us," says the president of Michigan's Capitol Hill Atari Owners Society, Leo Sell. He's the guy who turned his hobby into a job. To the users, Brodie serves as "the common man's voice in the corporation," explains John Nagy, editor of *Z*Net Monthly*.

Despite his mounting frequent-flyer miles, not every Atarian knows of Bob Brodie, especially those who avoid user groups and

online services. I asked my friend Greg, an Atari devotee, what he thought of Brodie's accomplishments this past year. "Never heard of him," he answered. "He's got a name like a superhero, though. Clark Kent, Peter Parker, Bob Brodie — fighting for truth, justice and the American way."

Truth, Justice And the Atari Way

Not exactly a superhero to millions, Bob Brodie is nonetheless a hero to thousands of Atarians, appreciated for his fight for the Atari way. The users say thank you in ways both ceremonial and silly. In addition to the plaque, Brodie keeps a small stash of gold "I Met Bob Brodie" buttons in his office. When he spoke before the Sacramento (Calif.) ST Users club, everyone in the audience wore one of these buttons, courtesy of their local Atari dealer, Jay Pierstorff of Computer Safari. It is experiences like this that has made Brodie possessive of these people, calling them "my" users. In return for their coming, Brodie mounts a real dog-and-pony show during his visits. He takes with him a Stacy, an STE and a Lynx, which were in short supply at the beginning of last year, as well as a Megafile 44 removable hard drive, a Spectre GCR Macintosh emulator, a SuperCharger IBM emulator, a Portfolio and speakers for the sound-enhanced STE. For 1991 he plans to retire the STE, maybe the Stacy, and add a Mega STE and a TT. "I have to tip the baggage guys a lot," Brodie laughs.

He tries to arrive in town ►

BRODIE SERVES AS "THE
COMMON MAN'S VOICE IN
THE CORPORATION."

early and meet the user group's officers, maybe over pizza and beer. At the meeting, he usually runs a few demos on the Stacy and the STE, then shows off the Atari's Macintosh emulation. Recently he's been appearing before Macintosh user groups interested in Spectre and the DOS-based Portfolio, which is capable of transferring data to Macintosh machines. No matter what group he's visiting, he leaves a lot of time for questions. This is when his job as manager of User Group Services blurs into his unofficial role as official Atari spokesperson. His audience regards his answers as the gospel. It is during the question period that the qualities of honest, unfruffled and sincere serve him well. "I don't get the feeling I'm being BSed," CHAOS President Sell says. Brodie isn't afraid to say he doesn't know, Sell explains, or to say that he's forbidden to answer a question. Brodie gives the best information he has at the moment, according to Sell, and if Atari changes its mind two weeks later, well, at least Brodie dealt with you honestly. Sometimes Brodie catches a lot of flak during his visits from people unhappy with company policy. He can usually make them see the corporate point of view, says Z*Net's Nagy. Sometimes the complaining turns into heckling; if it persists, Nagy says, Brodie can be outright harsh. Re-

gardless, he stays until he has answered everyone's questions, even if they're kicked out of their meeting place and have to move to a restaurant or someone's home. The point of his visit, Brodie says, is to spend as much time with people as possible.

So while he's in town, Brodie also spends time with people at the local Atari dealer, performing his second unofficial role as public relations person. It is in this role that he earns the adjectives visible and accessible. He'll give anyone a few minutes of his time, and plenty of people want to meet him. When Computer Studio of Asheville, N.C., hosted the "Blue Ridge Atarifest," starring Bob Brodie, people came from North Carolina, South Carolina, Georgia and Tennessee. For most Atarians, Brodie is the only company employee they'll ever meet.

The Gospel According To Bob

In describing his first year at Atari, Bob Brodie agrees to my adjectives of happy and fun. "The fun's been going to the shows and meeting the people," he says, giving me the gospel according to Bob. I flash him a skeptical look. He appears unfruffled by my response. He nods his head deliberately, stroking his beard. "Yes," he says sincerely. I believe him. ■

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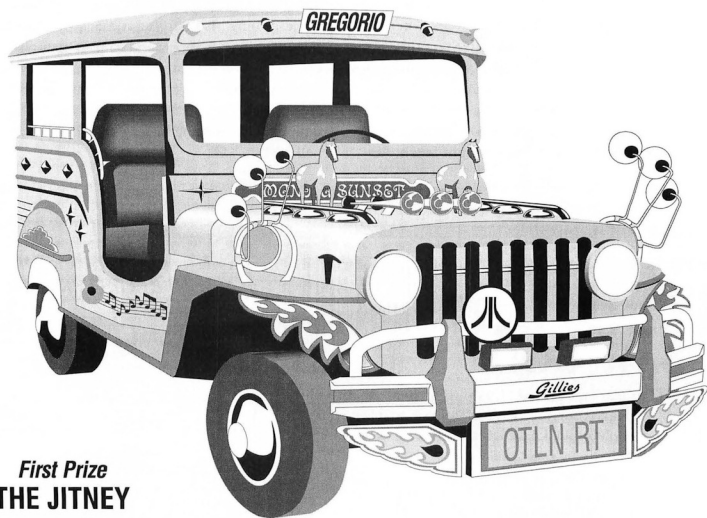
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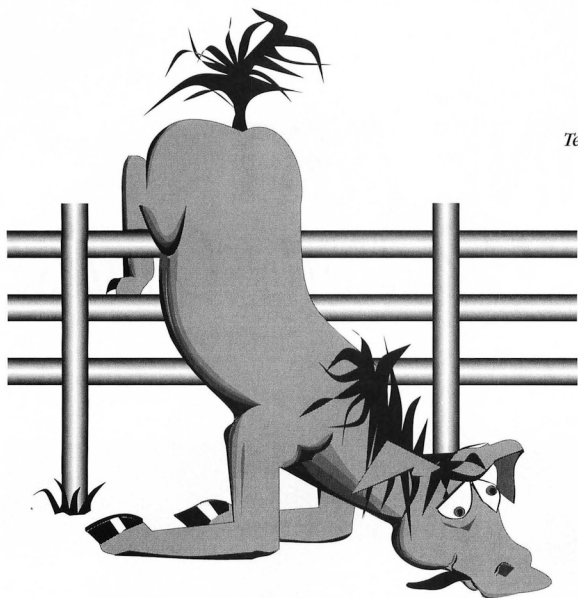
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Berger is a value-added reseller of Calamus for ISD Marketing. Even though he was not so employed at the time of the contest, ISD has agreed that his entry is withdrawn. However, in the opinion of the judges, Berger's F16 deserves recognition.

**Third Prize
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*created by
Teresa McMahon*



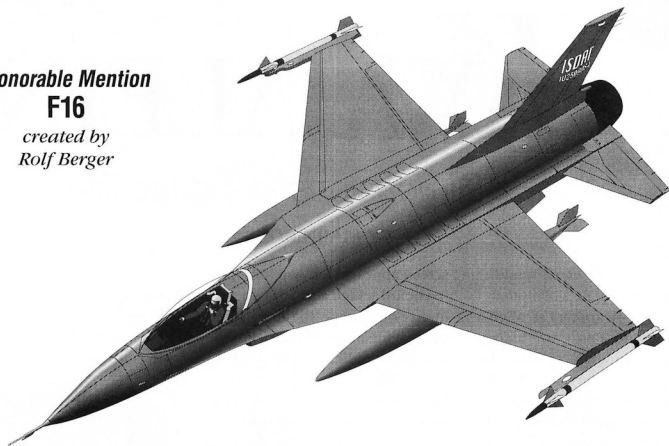
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KWAJALEIN

New Dimensions In Tic-Tac-Toe

BY MARK ROSS

Not too long ago, I found myself taking a computer class — learning Pascal on a VAX mainframe. One of the assignments was to program a Tic-Tac-Toe game. That made me think of a 3D Tic-Tac-Toe I played on a computer while in high school, so I adapted that idea for my assignment. Later, I couldn't resist the temptation to port my VAX Pascal program to my favorite computer and favorite language: the Atari ST using Laser C. Kwajalein is the result of that effort. With the ST's slick graphics, sound and GEM interface, Kwajalein is a far cry from the old matrix of X's and O's on a data terminal!

Playing Kwajalein

UnARC the file KWAJARC.PRG by following the instructions in the file READ_ME. Kwajalein can be run in either high or low resolution. To play in low resolution, copy the files BOARD.PI1, KWAJLEIN.PRG and TITLESOCR.PI1 from your START disk to a play disk. Monochrome users will need BOARD.PI3, KWAJLEIN.PRG and TITLESOCR.PI3 on their play disk.

To start the game, double-click on KWAJLEIN.PRG, then hit a key or mouse button after the title

screen appears. You will see a playing board which consists of a 4x4x4 matrix of squares. To the right of the playing board is a scoreboard and a turn indicator. The scoreboard keeps track of your wins, losses and ties, and the turn indicator shows a blue disk (grey in monochrome) when it's your turn to play or a red disk (black in monochrome) while the computer makes its move.

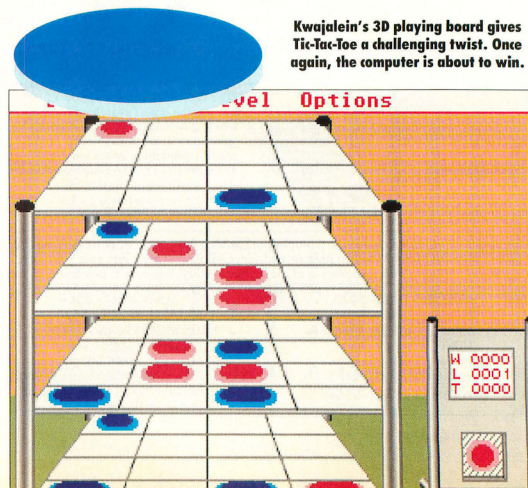
For the first game, you get to go first. You can claim an unoccupied square by placing the mouse pointer on it, then pressing the left mouse button. You and the computer take turns until the game ends.

The object of the game is the same as regular Tic-Tac-Toe, except you need four in a row instead of three, and you have three dimensions to worry about instead of one.



Any straight line of four wins, whether it is up, down, across, or diagonal (corner to corner). It may take you a few games to fully comprehend what constitutes a "straight line" within the perspective-view playing cube! The game ends when

Kwajalein's 3D playing board gives Tic-Tac-Toe a challenging twist. Once again, the computer is about to win.



one player places four in a row or when all 64 squares are occupied without a winning line (a tie game).



Menu Options

Desk

Choose **About** to look at the credits. Any desk accessories you have installed will appear here, too.

File

Quit: Takes you back to the Desktop.

Level

Choose the game's difficulty level here. The default is **Amateur**. You should select the **Beginner** level while you are learning the game. You may change levels at any time, even during play. Expect the computer to take a little longer to think at the higher levels. Believe it or not, even the highest level, **Pro**, is beatable. After all, what's fun about playing an invincible opponent?

Options

Show last: Flashes the computer's last move in case you missed it.

Sound: Toggles the sound effects.

Take back: You may take back as

many moves as you like, even after the game is over.

New game: You will have to select this option after each game if you wish to clear the board and play again. You may also select New game during play to abort the current game and start over. When you start a new game keep in mind that the computer gets the first move on alternate games, so wait for the turn indicator to change to blue (grey in mono) before attempting to move.

Kwajalein?

I chose the game's title from the name of a tiny Pacific island that I once visited. It is pronounced "quad-ya-line," which makes it kind of a bad pun on the object of the game! (Quad-your-line, get it?)

Mark Ross bails from Miami Lakes, Fla., where he enjoys the sun and programming in FORTRAN, Pascal and C. This is his first appearance in START.

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AT A GLANCE

Program:	Kwajalein
Type:	Game
Requirements:	512K, low or high rez
Arctype:	KWAJARC.PRQ
Files:	BOARD.P11 BOARD.P13 KWAJLEIN.PRQ TITLESOCR.P11 TITLESOCR.P13
Language:	Laser C



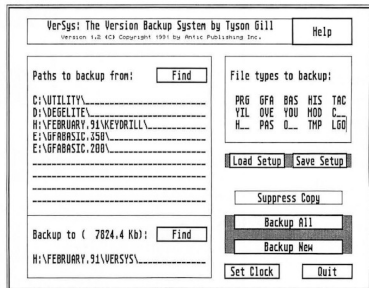
VerSys

The Programmer's Version-Backup Utility

BY TYSON GILL

Pretend you work for Really Big Software developing a Cray emulator for the ST. You made a lot of changes to your SPEEDUP routine so that it was compatible with the new ZOOOOM code. Today, your supervisor comes in and tells you that the emulator has crashed, and the culprit is SPEEDUP. They've decided to go back to the original code and unless you can find your old SPEEDUP, you'll have to rewrite the whole thing! Luckily you use VerSys and know exactly which backup disk contains SPEEDUP version 8.34, revision G.

VerSys is not just another backup utility. It was designed by a prolific programmer who's aware of the importance of backups and keeping track of all those versions floating around. Some programmers simply copy all their files to backup disks. After several versions, these disks easily get mixed up. Some programmers actually create numbered program names (like SPEED123.C) for each version to help document the backup sequence. This gets difficult when you have a large number of modules, include files and resource



The VerSys Main Menu

files to worry about. Some live dangerously and never or rarely back up.

Both of the first two methods back up all files, not just those that have changed. That makes it an inefficient use of backup time and disk space. The most critical problem, however, is that since all files are copied each time, the programmer does not have an audit trail.

Without an audit trail, it is extremely difficult to determine which changes in your code caused a problem. A typical incremental-file backup program solves the problem of efficiency, but it is not useful for programmers since it copies all files over the

previous versions and does not maintain a running archive and audit. Some professional programming groups use commercial version-control and code-documentation systems designed to manage multi-programmer projects. VerSys was designed to provide ST pro-

grammers the security of a simple backup system without going to the expense and effort of a full version-control system. VerSys is a must for programmers of any language. Once you start to use it, you will wonder how you ever managed without it. ▶

AT A GLANCE

Program:	VerSys
Type:	Backup utility
Requirements:	512K, medium or high rez
Archive:	VERSARC.PRG
File:	VERSYS.PRG

Using VerSys

VerSys is on your START disk in the file VERSARC.PRG. It is ARCed, so you need to follow the disk instructions in READ__ME to extract the file VERYSYS.PRG.

VerSys is simple to use. It copies files to a new folder which has a name reflecting the time and date of the backup. It allows the programmer to specify the file types requiring backup. If a problem occurs, the programmer can look back to any date and time to see which files had changed or restore a previous version completely. VerSys is useful to anyone who needs to maintain sequential versions of files.

Here's a description of the program's options. The Help key also gives you an explanation.

Paths to backup from: Enter up to nine source paths. Type in the paths or select them by using the Find option. Examples are A:\FUNCTIONS, C:\C__SOURCE\ and D:\MYPROG\RESOURCE\.

Backup to: Enter the destination path. Type it in or use the Find option. Examples are B:\ and E:\BACKUPS. After choosing a backup path using the FIND option, the amount of free disk space is displayed.

File types to backup: Enter all the file-extension types you wish to back up. Examples are C, H, RSC, DEF, BAS, and DOC. The wildcards ? and * are available. For example, B?S means that BAS files would be backed up, as would files with the extenders of BBS, BCS, BDS, etc. Using * copies all files.

Load Setup: The Load Setup option allows you to load a custom setup. A setup consists of your entries in the previous three options. You may want several setups, such as one for BASIC code and one for C code. You may also have individual setups for different projects. The file VERSYS.SET is the default setup. If this file is in the same folder as

VERSYS.PRG, it is automatically loaded when the program starts.

Save Setup: Saves the current setup to a file.

Backup All: This option backs up all files specified in the current setup. It copies the files whether or not they have been changed since

VerSys won't do any good if it's not used on a regular basis.

the last backup. To tell you that the backup folder contains all files, its name ends with an A.

Backup New: This option copies only those folders that have been changed since the last backup. The folder name ends with a C. VerSys decides if a file has been changed by checking the archive bit of the file. When VerSys backs up a file it sets the archive bit to 1. If the file is changed and then saved, the archive bit is cleared. During a Backup New operation, VerSys copies only those files with a 0 archive bit.

However, TOS 1.4 uses the reverse of this method. It sets the archive bit to 1 to indicate that the file has been changed. VerSys recognizes this difference and backs up correctly regardless of TOS version. But be careful not to mix files from machines having different versions of TOS. If you move your hard drive from a 1.2 machine to a 1.4 machine or vice versa, do a full backup to make sure that the archive-bit logic is correct.

Suppress Copy: Click on this box to suppress copying. Use this to preview the planned backup. The program will proceed exactly as if an actual backup is taking place, except no files are actually copied or archive bits modified. Suppression is used to see exactly which files will be backed up and to find out how much disk space you need — VerSys will report the amount. This

is especially important for floppy-drive users.

Set Clock: Backups are stored in a folder named with a time and date code, YYMMDDHH.mm?. YY indicates the year, such as 89. MM indicates the month, 01-12. DD indicates the day from 1-31. HH represents the hour, 01-24. mm represents the minutes, 00-59. The last character, ?, is replaced with A if all files have been copied or C if only changed files are in the folder. Obviously, the date and time on your ST clock must be accurate in order to name the backup folders correctly. The Set Clock option allows the clock to be checked and set. For example, say that it is June 17, 1991 at 10:20 and you wish to back up all programs from the folders D:\PROJECT\ and D:\BOB\WHITE\ to E:\. VerSys would copy all files of the specified types to the new folders E:\91061710.20A\PROJECT\ and E:\91061710.20A\BOB\WHITE\.

Quit: Returns to Desktop.

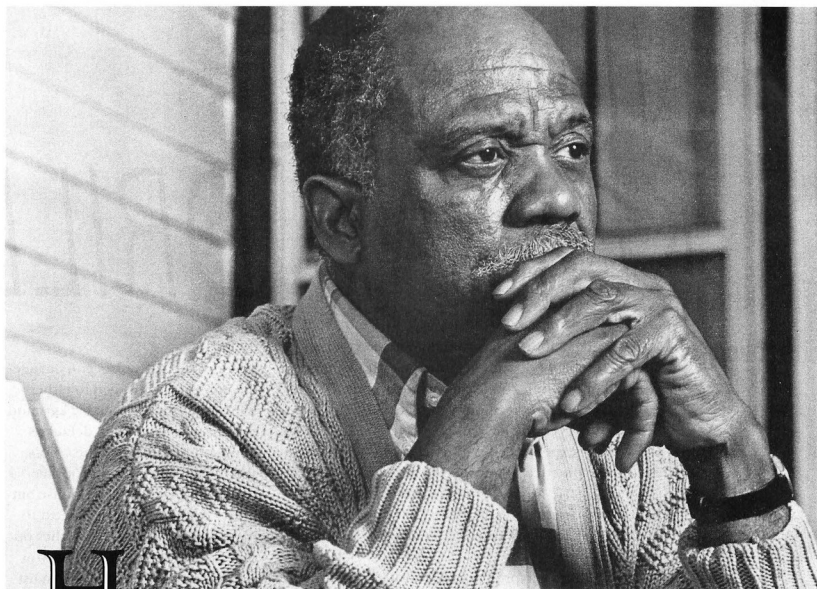
Program Specifications

VerSys is less than 40K and can be installed as a tool under the Megamax Laser C Shell. It can copy files up to 300K long and can back up 400 files in one operation. VerSys does not require any support files.

Use It!

Of course, VerSys won't do any good if it's not used on a regular basis. Back up your code after each programming session. If you have very long sessions (which is not uncommon!) you should do a backup every couple of hours, or when you make a significant change to the code. If you use it, VerSys will save you from those programmer's tension headaches!

Tyson Gill owns and operates GT Software. Over the past five years he has developed over a dozen Atari ST-based applications.



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NUMERIC KEYPAD DRILL

Practice
Makes
Perfect

BY
ROBERT
BERRY

If you are like a lot of users, the numeric keypad on your ST probably doesn't get much use. It likely gets touched only when you use a spreadsheet or database program to enter a lot of numeric data. When you do need it, however, the keypad proves its worth. But unless you are experienced with data entry, you probably need some practice to improve your accuracy and speed. Numeric Keypad Drill is a program that can help. It was written in GFA BASIC 2.0 (the source code is NUMERIC.LST) and can be used in color or monochrome.

You will find the program NUMERIC.PRG in the arcfile KEYARC.PRG. Follow the disk instructions to un-ARC it. When you start the program, you will be presented with a menu bar with the following headings: Desk, Options, Test, Upper-Limit and Lower-Limit. Click on Desk to read the usual copyright information.

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	0		78412.72
00		0	3348274.58
		0	
0 0 0	0	0141.30	28863237.06
0 0 0		7247376.65	80351657.78
0 0 0		5778.49	41567.65
00	0	84228.51	988172.12
0 00		1604.47	9786.78
00 0		4789.42	6819.30

This is a drill in progress. As you can tell from the error marks, START's technical editor needs practice.

Options

The Options menu lets you change the colors of the screen to either white letters on a black background or black-on-white. The default is white-on-black. To set the colors, simply highlight the appropriate choice and click the left mouse button. A checkmark appears next to your current choice. The other option is Include Enter; this lets you select whether or not [Enter] must be pressed after typing each entry. To toggle this option, just click on it. A checkmark beside Include Enter means it's active.

Testing

The next menu item is Test. There are only two choices here, Test and Quit. Selecting Test starts the keypad drill, while Quit takes you back to the Desktop.

Setting Limits

The menu items Low-Limit and High-Limit allow you to choose the low and high bounds, respectively, of the number of digits in the quiz entries. The minimum number of digits is four, the maximum is 10. The defaults are six and 10, meaning that the numbers generated are between six and 10 digits, inclusive. A checkmark is placed beside the current low and high boundaries, so you can always check the status of the limits.

Speed Drill

When you test yourself, the screen displays three columns of 10 entries each. A pair of arrows points to the first digit of the first number, indicating your next entry. When you are ready to begin, type that digit to start the clock (to avoid distracting you, the time does not appear on the screen). As you type each digit, it is erased and the arrows advance to the next digit. If you press the wrong key, an error mark replaces that digit and the arrows advance. This process repeats until you reach the end of the entry, then the arrows move to the next entry.

All the entries have two decimal places, but you don't need to type the decimal point. If the Include Enter option in the Options menu is disabled, you don't have to press [Enter]. Otherwise, a CR (Carriage Return) symbol will appear as a final

AT A GLANCE

Program:	Numeric Keypad Drill
Type:	Typing tutor
Requirements:	512K, medium or high rez
Artfile:	KEYARC.PRG
Files:	NUMERIC.LST NUMERIC.PRG
Language:	GFA BASIC 2.0

digit in the entry, indicating that you must press [Enter]. If you want to quit in the middle of a drill, press [Esc].

Accuracy

When you reach the end of the third column, the clock stops and your score appears. Your accuracy is calculated by dividing the number of digits you typed correctly by the total number of digits in the quiz. The formula for keystrokes-per-hour uses your total number of key-

strokes, right or wrong, divided by your time. Your total time, number of correct keystrokes, accuracy and keystrokes-per-hour are displayed in an alert box to let you know how well you perform 10-key data entry.

Last Entry

Note that this program is for practicing 10-key data entry, and is not an official evaluation program. It estimates keystrokes-per-hour, without taking into account real-world situations such as juggling papers.

Nonetheless, I am sure you will find that Numeric Keypad Drill is an excellent way to sharpen your 10-key skills.

Robert Berry has published several 8-bit Atari programs and articles in Analog and Compute! This is his first program for START.

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- R. Blakely

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PRINTED CIRCUIT SCHEMATICS

Design PC Boards With DEGAS

BY THOMAS J. LYNCH, Ph.D.

If you've ever spent time soldering or wire wrapping a one-of-a-kind circuit, you know the sinking feeling I get when someone asks, "How about building me one of those gadgets, too?" I recently built a device for an Army research institute. After months of wiring and troubleshooting, I swore that joining the circus and working without a net would be easier than building another one. Duplicates are sheer tedium, and with each one you run the risk of making wiring mistakes.

Take heart. Any high-rez graphics program that can read and print the DEGAS-compatible .PI3 files on your START disk can make printed-circuit (PC) design fun and eliminate the woes of duplication. (Follow the instructions in the READ ME file on your START disk

AT A GLANCE

Name:	Printed Circuit Templates
Requirements:	512K, high rez, DEGAS
Arcfile:	SCHEMARC.PRG
Files:	PCFORM1.PI3 PCFORM2.PI3 PCFORM3.PI3 VCLAMP.PI3

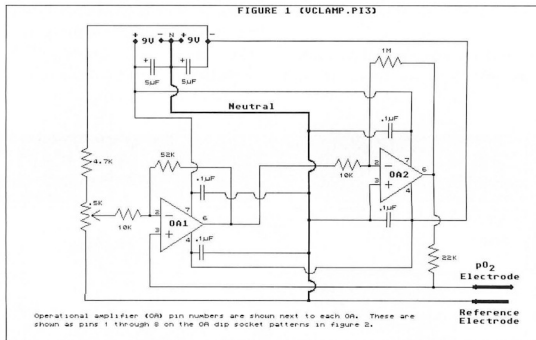


Figure 1: This is an example of a symbolic circuit design which will be turned into a printed circuit. The symbols represent various electronic components which will be soldered onto the final product.

to un-ARC the picture files.) The ST does a fine job of drawing and printing a PC schematic, which is then used as the photo template for any of the commercial photographic-exposure methods of PC-board construction.

The Art Of Etching

Electronics magazines routinely dedicate a full page to one or more PC schematics. If you want to make

the schematic into a PC board, you would do the following (this is a general description of the process, there are variations). First, a picture is taken of the schematic to produce a positive (the reverse of a traditional photographic negative) on a special film. The film is then laid on top of a photosensitive, copper-plated PC board, which is exposed to light for a precise period of time. Light which passes through the

Even if you don't have the background to draw the initial symbolic schematic, you can take an existing one and translate it into the PC format. However, if you have never done this before, start with a schematic containing no more than one or two integrated circuits.

Before tackling your own project, practice. Use DEGAS Elite or a compatible graphics program to load PCFORM3.PI3 from the START disk and start translating the symbolic schematic in VCLAMP.PI3 into PC format. After a few hours practice, you will find it easier to handle your own circuits.

PCFORM3.PI3 is a blank picture, with PC pictures for resistors, capacitors and dip sockets lining the margin. Move them into the center of the screen, erase their labels and connect the solder tabs to each other with the line-drawing function. You can compare your version with mine in Figure 2, or just try to copy it for practice. If yours looks different, that's fine, as long as all components are accounted for. There is no single solution to the puzzle. After doing several PC schematics of increasing complexity, you should find some amusement in examining PCs designed by professionals. Notice that they too get stuck and sneak in an occasional

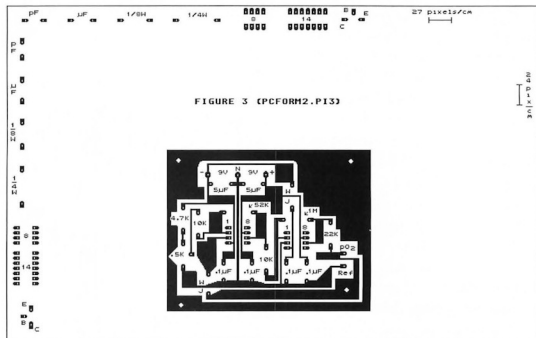


Figure 3: This circuit is the same as Figure 2 except that selected areas have been filled in so that less copper will be etched from the board, making the process faster and less wasteful.

wire jump.

When the schematic is printed on paper (using 8.5- by 11-inch standard printer drivers), you should find that the pattern elements are spaced properly for the wire leads of standard-sized resistors, capacitors and dip sockets, and should therefore serve as a good photo template. Since DEGAS has additional text capability, it's easy to annotate the PC schematic so that the solder tabs on the final etched board will be labelled with the respective component. Such labeling makes the solder/assembly process easier

and adds a professional touch to the final board.

Making Adjustments

In Figure 2 and the corresponding disk file, notice that the margins contain both horizontally- and vertically-oriented PC spacing patterns for the same electrical components. These are for the two ways that components are generally soldered into a PC board. For any particular PC pattern, the pixel spacing for the horizontal and vertical versions is slightly different. This is because the same number of pixels printed horizontally takes up less paper space than when printed vertically.

In addition to resistor and capacitor spacing patterns, the margins of the disk files contain patterns for 8- and 14-pin dip sockets, and for a standard-size transistor (labelled E, B, C for emitter, base and collector). There are also millimeter rulers for horizontal and vertical measurement. These can be used to make your own patterns for other electrical components of different sizes. To do this, for example, for a large capacitor, measure the distance between the leads with a real millimeter ruler, and add up the total num-

WHERE TO BUY PC-BOARD ETCHING KITS

If you have never etched a PC board, please read the kit instructions thoroughly, and follow them exactly. Better yet, find someone experienced in PC-board making and have them help you. Using acids and other toxic chemicals is dangerous. Finally, send for catalogs and do some comparison shopping before ordering. A typical kit costs about \$40.

Bishop Graphics, 5388 Sterling Center Drive, Westlake Village, CA 91359

The DATAK Corporation, 3117 Pater-son Plank Road, North Bergen, NJ 07047

Kepron Circuit Systems, 630 Axminster Drive, Fenton, MO 63026-2992

Vector Electronic Co., 12460 Gladstone Ave., PO Box 4336, Sylmar, CA 91342-0336

ber of pixels this equals on the bottom (horizontal) or left (vertical) side of the appropriate screen ruler. When you have the total for the desired orientation, magnify a blank part of the PCFORM3.P13 screen. Now use the mouse to draw an assembly of pixels forming one solder tab, then draw a straight line away from this tab, counting the pixels as you go. When you reach the required distance, draw the second solder point. Print the screen and hold the capacitor up to your new pattern. If the spacing is correct, go back to your screen and erase the counting pixels from between the solder tabs, then copy the new pattern to the margin. The particular pattern spacings shown here are customized for a Panasonic i091i printer. If you have a different printer, you may have to adjust the pixel spacing.

For Best Results. . .

In printing a PC schematic for photo-exposing a copper board, the schematic ink should be as dark as possible. Use a new ribbon. A worn out ribbon whose print is too light may result in gray areas on the film and partial exposure of parts of the board intended to be conductors. Since the exposure time of photosensitive boards is critical to within three seconds, it's wise to dedicate a ribbon to PC schematics.

Also, when you print, examine the printed figure for white lines in areas that are supposed to be black. Sometimes the printer will roll the paper a little bit too far, leaving a thin white streak. Fill in any such area by hand with black pen ink.

Figure 3 (PCFORM2.P13) is the same PC schematic as Figure 2 but with many of the separate conductors widened. This is optional, but it results in less of the copper board being exposed, and therefore less copper being etched away when you put the board into the ferric chloride solution. Why should you be concerned with this? If you minimize the copper etched per board, you will be able to etch more boards per solution. Many commercial, digital boards are not filled in like Figure 3 because they are just too complicated.

To widen the conductors as in Figure 3, use DEGAS' line-drawing function to enclose an area, choose a solid black fill pattern, then fill the selected area. Be careful that widening the conductors does not create an electrical short between any conductors which must be isolated from each other. Also, remember that if you try to fill an area that is not completely pixel enclosed, it will leak out and fill much of the screen. If this happens, hit the UNDO key in DEGAS and your mistake will be undone.

Thomas Lynch holds a doctorate in neurophysiology, and is a professor at Temple University in Philadelphia.

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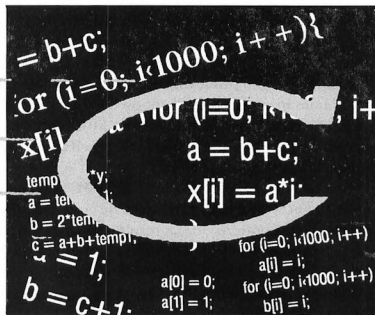


C FOR SPEED!

Techniques To Transform Your Turtle Code

BY JOHN ALLEN

The C programming language is famous for its ability to produce speedy and efficient code, but it still can't beat assembly, right? Wrong! If you optimize your code using these techniques, you can get assembly-fast results without losing the power of C.



I have three categories for measuring the speed of a computer program: the first one is the programming time, the time it takes you to write the code; the second is the time it takes to modify the program if the user's requirements change; and the third is the actual time required for the program to execute. Many of the programmer's decisions speed up one category at the expense of another. For example, you can save time by not commenting the program, but that slows down subsequent modifica-

tions. If, on the other hand, you spend enormous quantities of time documenting a program and squeezing every cycle out of it, you may not finish before your competitor does. Obviously, you must balance your efforts.

Competing With Assembly

Because they dictate every detail of execution, the very best assembly-language programmers will always produce faster-than-C code. However, good programming tech-

niques combined with exploitation of the power of the C language enables you to write code that is easy to understand and modify, yet runs as fast as stuff written by all but the most experienced assembly programmers. They may have the edge on execution time, but you'll probably spend much less time in the development stage than they do.

There are two phases of code optimization. The first is to eliminate unnecessary run-time cycles by using efficient algorithms. The second is to accomplish each of the neces-

sary operations in as little time as possible without sacrificing too much development time or code clarity.

Watch Your Algorithms

The algorithmic methods of code optimization can be used in any language, and you probably already use them to some extent. Here's an example:

```
for (i=0; i<1000; i++){
    a = b+c;
    x[i] = a*i;
}
```

The values stored in the variables **b** and **c** do not change, therefore the value stored in the variable **a** does not change after the first iteration. Consequently, the variable **a** only needs to be set once:

```
a = b+c;
for (i=0; i<1000; i++){
    x[i] = a*i;
}
```

Be careful not to use unnecessary variables. For example:

```
j = 0;
for (i=0; i<1000; i++){
    x[i] = i;
    y[i] = j++;
}
```

Why increment two variables each loop iteration when one will do?

Try this instead:

```
for (i=0; i<1000; i++){
    x[i] = i;
    y[i] = i;
}
```

Another technique is to eliminate common sub-expressions, for example:

```
a = (x*y)+1;
b = 2*(x*y)+3;
c = a+b+(x*y);
```

See how **x** and **y** are multiplied each time. Looking up the value of a variable is faster than re-multiplying!

```
temp1 = x*y;
a = temp1+1;
b = 2*temp1+3;
c = a+b+temp1;
```

Also, beware of using variables

Read your favorite C reference book and familiarize yourself with the #define macros.

which are really constants.

```
a = 1;
b = c+a;
d = a+1;
```

Use a constant instead.

```
a = 1;
b = c+1;
d = 2;
```

This rule also applies for the following:

```
a = 1+2;
```

which, of course should be

```
a = 3;
```

Most compilers will catch this simple case, but you might as well do it yourself, in case the compiler doesn't.

Another thing to look for is code like this:

```
#define MAXSIZE 5
a = MAXSIZE+b-1;
```

It would be faster to do:

```
#define MAXSIZE 5
#define MAXSIZEMINUSONE 4
a = MAXSIZEMINUSONE+b;
```

However, this makes it harder to modify later, because if **MAXSIZE** is changed you also must change **MAXSIZEMINUSONE**. It would probably not be a good trade-off if that line is executed only once, but if it is inside a loop that executes 10,000 times, it can really make a difference.

Unrolling Loops

If you are trying to squeeze every last ounce of speed, you can unroll your loops, but this may cost you development or modification time if the number of times the loop is executed has to change. Also, it is more difficult to do this when the loop is controlled by user input. Here is an

example of unrolling:

```
for (i=0; i<3; i++)
    a[i] = i;
becomes
a[0] = 0;
a[1] = 1;
a[2] = 2;
```

This eliminates the

increment for each loop iteration, and substitutes an explicit operation for the memory accesses on the variable **i**.

If unrolling of loops is not practical, perhaps you can combine two or more loops like this:

```
for (i=0; i<1000; i++)
    a[i] = i;
for (i=0; i<1000; i++)
    b[i] = i;
```

into a single loop:

```
for (i=0; i<1000; i++)
    a[i] = b[i] = i;
```

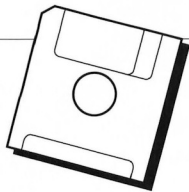
You just eliminated one increment and one test instruction for each loop iteration.

All of the optimizations I have shown so far are programming techniques that, for the most part, work in any language. Now we will explore two C-specific techniques, which may also be adapted, with some effort, to other languages.

Using Macros

In many cases a piece of code is broken up into functions to eliminate typing duplicate code and to make things easily modifiable and readable. However, the use of macros will do the same thing, and, since they are resolved at compile time, they require absolutely no run-time overhead! There is one thing to remember about using **#define** macros. When passing arguments to macros, whatever you give as an argument will be literally replaced when the macro is expanded. For example:

```
#define squared(x) (x*x)
a = 2;
b = squared(a++);
```



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is replaced with

```
a = 2;
b = a++*a++;
```

This may not be what you intended!

The most common use of macros

is single-line macros, but C does not limit you to that. Lines that end

with the backslash character (\) are combined with the next line, then both the backslash character and the following line feed are deleted during pre-processing:

```
#define test_macro(a,b,c,array) \
    int i; \
    for (i=0; i<c; i++) \
        a+ = array[i,b]; \
```

will become

```
#define test_macro(a,b,c,array) int i; for
(i=0; i<c; i++) a+ = array[i,b];
```

Remember that macros are substituted directly into the source file by the pre-processor. You cannot call a macro from itself, or from another macro that it calls, because recursion is not possible. Read your favorite C reference book a couple of times to familiarize yourself with **#define** macros. Once you understand how macro substitution works, you can avoid the run-time overhead of some function calls.

Shifty Bits

Another way to speed up execution is to take a trick from assembly programmers and fake your powers-of-two division and multiplication:

5*2 = 10 is, in binary, 0101 * 0010 = 1010;

12/2 = 6 is, in binary, 1100 / 0010 = 0110.

Notice that 10 in binary (1010) is just five shifted to the left by one bit (0101). Also, six is just 12 shifted to the right by one bit. A shift operation is very fast compared to mathematical operations such as multiplication and division. Of course, this only works for powers of two, but it can still help considerably. Here is a

straightforward way to divide or multiply integers by two:

```
#define divide__2(a)    (a>>1)
#define mult__2(a)      (a<<1)
```

The first technique is to use efficient algorithms.

For division or multiplication by four it would be:

```
#define divide__4(a)    (a>>2)
#define mult__4(a)      (a<<2)
```

In a more general fashion, you can write macros to divide or multiply by powers of two, where the first argument is the number and the second is the divisor (2, 4, 8, etc.):

```
#define divide__2p(a,p) (a>>p)
#define mult__2p(a,p)   (a<<p)
```

If you divide an odd integer such as five by two using mathematical division, you will get the real number 2.5. If you use the shifting method you will get the integer two; the remainder is lost. This is the same as the DIV operation in Pascal. Remember that shifting numbers in lieu of multiplication or division only works for integers, not for floating point numbers.

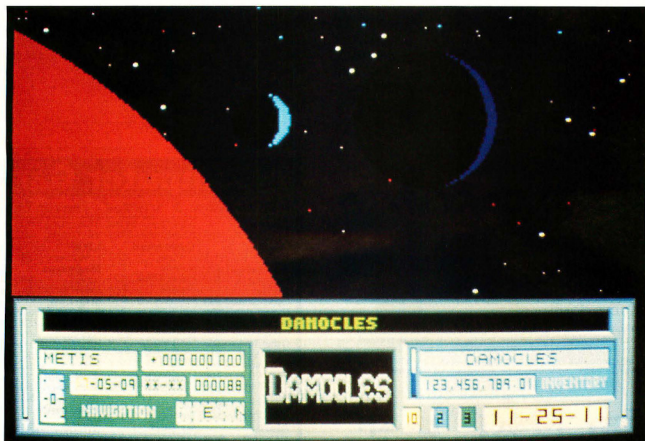
Power Tools

These tools can be very powerful when used properly, but like all tools, they are only as efficient as the person using them. Being efficient takes some skill and a lot of practice — so practice! This is certainly not a complete discussion on how to optimize programs; the art of programming is too complex to allow such a thing in one article. But that same complexity leaves a lot of room for improvement, and I hope that the presentation of these techniques encourages you to further develop your own skills.

John Allen started programming in C when he got an original 520ST with TOS-on-disk back in 1985.

OF PERIL, PULCHRITUDE, PACING AND PUZZLES

In Which Perez Finds Success A Hairbreadth
Away, Knauss Finds Success Isn't Sexy and
Gregg Finds No Success



Bethesda Softworks' *Damocles*

Damocles

BY GREG PEREZ

The planet Eris has a problem.

In less than three hours the comet Damocles will collide with the planet, unless, by some miracle, it is stopped.

That miracle will have to be you.

In this sequel to *Mercenary*, the

State President of Eris has called upon you, a traveling mercenary, to prevent that imminent collision. Delayed by another mission, you arrive on Eris after its inhabitants have evacuated and three hours before the comet hits. You are invited to the President's office, where the details of the dilemma are presented, and the game begins.

Endless Exploration

The *Damocles* environment is not set in just one city or planet, but an entire solar system! This vast play area contains nine planets and 19 moons, 37 cities, 3000 multiroom buildings and 200 moveable objects. The possibilities for exploration are nearly endless, but saving Eris from destruction keeps you from making

trips to every city in the Gamma system. However, if you fail in your mission, you can still roam the system and search for hidden secrets on each planet.

The stunning graphics in *Damocles* scroll seamlessly, making the Gamma System brim with realism. Doors open for you Star Trek style. Windows overlook the outer landscapes. Street lamps and signs line the highways. The only thing missing from the total *Damocles* environment is people. (Of course, *Eris* is supposed to be deserted, but the other planets seem to be as well.) Each planet and city has its own charm. For instance, the moon of *Bacchus* contains working gambling halls where you can win and lose your money! I was held prisoner in a jail (at least until *Mercenary III* is published, said the message in the room).

There are vehicles which take you anywhere you want to go in *Damocles*. You begin with a VIP limousine which you drive to the President's house. Later you fly an Eagle spacecraft; each vehicle requires a key to use it. Just like real life, nothing is accomplished without the right tools.

Winning Objects

Objects like fax machines and memo pads all have uses to the game. I even found a functioning TV remote control. Everything can



Miles Computing's *The Fool's Errand*

be handled, and, if put to good use, is essential to winning the game.

The game itself is intriguing. The road to success is marked by a series of well-placed clues which, if tackled correctly, will yield salvation for *Eris*. The manual states that although this scenario is gratifying to complete, there are at least five different methods of success, each

with grander rewards than the first. But each has the same deciding factor for success: the decay of real time.

The massively-detailed environment that surrounds you in the Gamma system is an innovation in game design. *Damocles* is definitely a challenging race against time, to be tackled by all. ▶

Free Spirit's *Bride of the Robot*



AT A GLANCE

Game:	<i>Damocles</i>
Type:	Graphic adventure
Company:	Bethesda Softworks 15235 Shady Grove Road Suite 100 Rockville, MD 20850 (301) 926-8300
Price:	\$44.95
Requirements:	512K, joystick, color monitor
Summary:	Realism and attention to detail make this an innovation in game design.

Bride of the Robot

BY GREG KNAUSS

Bride of the Robot, a mostly mouse-driven graphic adventure, isn't bad because it's sexist, or because it's immature, or because it's a 14-year-old's idea of a good time. Bride of the Robot is bad because it's not fun to play; it's dumb, it's frustrating, it's just plain stupid.

In Bride, you play Brad Stallion, a galactic hero/playboy, who has been called on to rescue the new Miss Galaxy, Allura. It seems that she was kidnapped by the sex-crazed and unimaginatively named Robot, the first machine with a sex drive. As dramatic as that sounds, the program goes downhill from there.

The majority of the input for Bride is handled with the mouse, clicking on objects on the screen. However, the objects you can click on aren't distinguished in any way from the background clutter, so when you enter a room, you must slide the mouse around, pretty much randomly, until you happen across something with which the program will let you interact.

The sentence parser, if it can be called that, has trouble with the simplest input and doesn't even recognize the same verb when it's used with different objects. "Throw stone" works, "throw gloves" doesn't. If you don't type exactly what the program expects, it chok-

ingly responds "Can't. . ." Most of the puzzles are simplistic, the difficult ones resulting not so much from clever situations as from sheer ridiculousness. Why do the doors suddenly unlock? Why is the ship's entrance blocked unless the note's been read? I finished Bride in a few hours, the majority of which was spent wrestling with totally illogical situations or trying to get the parser to understand what I wanted to do. Knowing all the puzzles, this exceptionally short program can be finished in under 10 minutes.

And the sex, the whole gimmick without which this program would never have been written? If this is someone's idea of exciting, they live a sad, sad existence. Interaction with Brad's conquests is — what fun! — with the mouse and the consumption of primal lust results in a disinterested "Ooh, Brad..." from the speaker.

If Bride of the Robot has a saving grace, it's the graphics. Though they're not animated and only mediocre when compared to the rest of the ST commercial software market, next to the rest of the program the pictures are high art.

Interestingly enough, the executable file for Bride of the Robot is "BOR.PRg", which I pronounce as "bore program." How appropriate.

Stryx

BY GREG PEREZ

Dateline: A.D. 4516

A race of rebel cyborg workers occupying the massive Dome Cities has been rampaging, destroying any and all human life. The keys to the Lifeforce, a device designed to shut down the robots, have been lost among the five domes. As Stryx, half man, half machine, you must enter the Dome Cities and survive long enough to end the reign of the murderous cyborgs.

Stryx seems to be a mixture of previous *Psygnosis* endeavors. The feel of the game is similar to that of *Barbarian*, while the dark, futuristic tone screams of *Obliterator*. And, of course, it incorporates the stunning graphics that are a hallmark of *Psygnosis* programs.

The action takes place on multi-level platforms within the Dome Cities. Scores of enemies, ranging from cyborg snipers to Robby the Robot, oppose you as your character moves through the complexes. Stryx is controlled with a joystick, and several function keys serve as take/drop object commands. Contrary to several other platform-type arcade games, Stryx lists the objects being carried. Items in the game are difficult to distinguish; only by experimenting could I determine their uses. Weapons, ammunition and bombs abound, yet the manual doesn't mention what the keys to the Lifeforce actually look like!

While the graphics in Stryx are, as mentioned before, stunning, the animation lags, and reaction time is essential. Several situations which call for quick trigger skills are frustratingly slow, and some actions that require a fast-paced change of arms are almost too complex to achieve.

But Stryx makes up for this shortcoming in variety. As Stryx charges onward, it is drawn into the Hive, where a mining craft (reminis-

AT A GLANCE

Game:	Bride of the Robot
Type:	Graphic adventure
Company:	Free Spirit Software P.O. Box 128 58 Noble St. Kutztown, PA 19530 (215) 683-5609
Price:	\$39.95
Requirements:	512K, any rez
Summary:	I can't find enough words to describe this: stupid, sexist, sad, frustrating, immature. . .

AT A GLANCE

Game:	Stryx
Type:	Action adventure
Company:	Psygnosis 29 St. Mary's Court Brookline, MA 02146 (617) 731-3553
Price:	\$34.99
Requirements:	512K, color monitor
Summary:	A traditional <i>Psygnosis</i> game hampered by pedestrian pacing.

cent of the old lunar lander) takes you through the catacombs beneath the Domes. Players are also jolted into the Travel Tubes, and a jet-biking Stryx must speed to the final challenge in the Central Dome City.

Stryx is a traditional Psychosis adventure. But the somewhat pedestrian pace should be avoided by impatient gamers.

The Fool's Errand

BY DAVE GREGG

Okay, I confess. I never finished this game. I'm close, very close, but I pooped out at the end. The brain teasers had tied my synapses into knots. I was tired. I felt like I'd just run, and lost, a mental marathon. The lure of a four-minute animated reward for untwisting the teasers was no match for a brain drained

of ambition.

During my long, intense and ultimately futile quest, I wandered through the 80 chapters of The Fool's Errand, playing the Fool (and feeling like a fool when I discovered an obvious trick to a seemingly impossible puzzle) who searches for the 14 lost treasures. Along the way I gathered hints and clues from most of the Tarot's major arcana

and the royalty in the minor.

I pieced together jigsaw puzzles. I searched for words within jumbles of letters. I stumbled through mazes. I played tarot poker. I unscrambled words three different ways.

But to no avail. It's all or nothing in this game. If you don't solve every part of this convoluted conundrum, you'll never know the whole story.

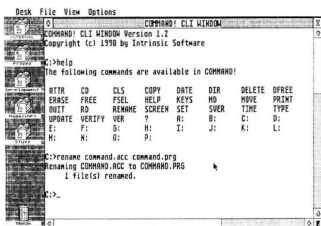
I'm close to winning. Only a few puzzle solutions hover beyond the grasp of my tired brain. If I wasn't so stubborn I'd send for the hint book.

Former pedestrian Greg Perez is searching for his father's car keys. Former dorm rat Greg Knauss is searching for furniture to fill his barren apartment. Former S & L loan officer Dave Gregg is searching for more lucrative employment than that of game reviewer.

AT A GLANCE

Game:	The Fool's Errand
Type:	Brain teaser
Company:	Miles Computing 5115 Douglas Fir Road Suite 1 Calabasas, CA 91302 (800) 245-4525
Price:	\$49.95
Requirements:	512K, color monitor
Summary:	Several days — no, make that weeks — of pleasure for the puzzle buff.

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FOUR MORE FOR THE LYNX COLLECTION

BY CLAYTON WALNUM

In the December 1990 issue, we peeled the plastic from 13 games for your Lynx. As you read this, Atari labors feverishly to push more and more titles out the door. Already four additional games — Rampage, Robo-Squash, Rygar and Shanghai — crowd the output queue. Let's take a look at 'em, shall we?

Rampage

Feeling a little moody? Rather than snapping at loved ones or kicking the dog, load your Lynx with Rampage. Then show the world what you really think of it.

In Rampage, you play a monster whose only purpose in life is to demolish every city on the map. As you climb buildings, punching in their walls and masticating fleshy treats (burp), watch for special items, such as money bags, safes and the all-important potion, which renders you invincible. Don't eat everything, though. Some items are bad for your health. Televisions and light bulbs, for example, produce high-voltage zaps.

Unfortunately, a monster's life isn't all munching and smashing.

The army's snipers, helicopters, tanks and bomb technicians have this crazy idea of ending your rampage. What a bunch of doinks.

Rampage plays great as a solo game, but once you get a few friends together, you can Comlynx your machines and take on the city as a group. Up to four can play, either competitively or cooperatively. Hand me that soldier and pass the salt, will you?

Robo-Squash

What do you get when you mix Pong with Breakout, then whip in a

Unfortunately, a monster's life isn't all munching and smashing.

generous helping of 3D graphics? You get Robo-Squash, a two-player ball-bouncing contest that'll delight even the most jaded gamer.

In Robo-Squash, you gain control of a 4x4 grid of globes by winning Robo-Squash rounds. In each round, you and your opponent (either the Lynx or another human player) bounce a ball back and forth,

knocking out obstacles between you. If you miss the ball, it splatters onto your screen, blocking your view and making returning your opponent's shots tougher than teaching a pig to sing.

Eagle-eyed players score extra powers by hitting special items, including the shooter, which creates shot-camouflaging explosions; the holder, which grabs the ball, giving you time to aim; the expander, which enlarges your paddle; and the spotter, which marks an incoming ball's destination, giving you a chance to position your paddle.

Robo-Squash is highly recommended for all players, but especially for those who can Comlynx with friends.

Rygar

In this arcade contest, you play Rygar the Reclaimer, who hacks and slashes his way through 23 lands loaded with demonic denizens and tricky treasures. Each enemy has its own attack pattern and style, so you must learn to take advantage of enemies' weaknesses if you plan to complete your quest.

Treasures include 1-ups and

AT A GLANCE

Game:	Rampage
Type:	Arcade action
Price:	\$34.95
Summary:	You play a monster that goes on a city-bashing rampage — what could be more fun?

AT A GLANCE

Game:	Robo-Squash
Type:	Arcade action
Price:	\$34.95
Summary:	Super-quick reflexes are all it takes to win this excellent challenge.

AT A GLANCE

Game:	Rygar
Type:	Arcade action
Price:	\$39.95
Summary:	This awesome hack-and-slash suffers only from less-than-awesome sound.

weapons, as well as icons that, when snatched up, boost your score. Some treasure chests are visible; others may pop up from beneath the ground. Still others are deviously hidden. The lands through which Rygar must travel are rendered beautifully on the Lynx: cliffs, waterfalls, sunsets, temples and palm trees — nice place to visit! The simulated 3D display (as Rygar walks, the foreground moves faster than the background) creates a convincing sense of depth. Unfortunately, the sound is not on par with that in most other Lynx titles.

A simple game, Rygar is not recommended for serious adventurers, but rather for jump-and-shoot arcade enthusiasts.

Shanghai

Based on the oriental favorite

AT A GLANCE

Game:	Shanghai
Type:	Puzzle
Price:	\$34.95
Summary:	A challenging computer-game classic with sluggish controls.

Mah-Jongg, the object of Shanghai is to remove pairs of matching tiles in an attempt to clear all 144 tiles from the game board. The Lynx version boasts seven different puzzle formations from which the Mah-Jongg master can choose, each constructed from randomly placed tiles, assuring that a different puzzle is created every time you play.

Although the tile graphics are cruder than on the computer versions of this game, an enlarged view of the currently selected tile is

shown in the corner of the screen, making it possible to view all tiles clearly, even when they are almost obscured by nearby stacks. However, positioning the pointer in order to view a tile is a pain and slows gameplay.

Normally, Shanghai is a single-player game, but if you have a friend with another Lynx and a copy of Shanghai, you can choose from three additional playing modes: two-player alternating competitive, two-player simultaneous competitive and two-player cooperative. Two-player games require you to connect two Lynxes with the Comlynx cable.

Lynx maven Clayton Walnut is the former editor of the defunct ST-Log. He is writing a book of Lynx game bints.

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THE ATARI TT

continued from page 30

zines. A "nybble" is four bits (the name is from a horrid pun: A nybble is half of a byte). When you access regular RAM, you get one bit, and eight of them together gives you a byte (the TT uses 32 together to give you a "long" at once). When you access a nybble-mode RAM, when you access the first bit, it also sets you up to grab the next three bits without much delay at all — which, as you can see, is perfect for burst mode, which has to grab four bits from each of the 32 RAM chips very, very quickly.

Now, because this memory is dedicated to the 68030, you can't do some things from it: remember, we don't want to slow it down by hanging other stuff on to it. Thus, you cannot do DMA to the TT RAM. This means you can't have video memory in it, you can't have a sound buffer being played from it through DMA, you can't have the SCC push/pull bytes with it, and you can't use ASCI hard-disk/floppy-disk DMA with it. (In an odd exception, you can do SCSI DMA to it; I have no idea why this ended up this way. Thus half the hard disk connections to the TT, ACASI [ST hard disks], cannot touch TT RAM; the other half, SCSI [TT hard disks] can touch TT RAM.)

But, and this is key, your program can live in TT RAM and run from there. This means your program, instead of poking along with the video circuits preventing the 68030 from getting to it a lot, suddenly goes into turbocharged mode — and with burst mode, it's like adding a bottle of nitrous oxide (oxygen super-enhancement).

If the program follows the above rules (no DMA to TT RAM), it usually lives and works in TT RAM just fine at far higher speeds. Up to an eight-times performance improve-

ment is possible.

Memory Allocation

Atari has helped you out in this TT RAM business. There's now three "flags" (a flag is just a yes/no switch) stored with any program you use. You're probably already familiar with one such bit: it controls whether or not the area a program is going to be loaded into is zeroed-out (cleared) first. If this is not needed, a program load is much, much faster.

In the TT, a new flag tells the computer whether or not it should even try to load the program into fast RAM. With this, you can tailor programs that break in TT RAM to load to the slower ST RAM.

The next bit tells the TT that if the program requests memory, should it get TT memory or ST memory?

This one is a bit more subtle. Programs request memory for variety of reasons. One such reason is to set up a place to do work from disk, display a picture, or play a sound. If the programs do this, they can't do it with TT RAM, since that's not allowed. So while the main program can run in TT RAM and enjoy that, if it needs to set up video by itself, you can set it up to get that memory from ST RAM.

On the other hand, if the only memory it needs to request are for data tables (say, a spreadsheet that uses regular video), the memory request can come from TT RAM, and zoom along far faster.

If you're wondering, the TT knows how to load programs into TT RAM from disk; it uses ST RAM

as an intermediate stopping place. The program is loaded into ST RAM using disk DMA, then block-moved into TT RAM. This block-move is one thing that the 68030 excels at with its cache; see below for more on the cache.

Caches

The 68030 features both an instruction and data cache. All this means is that the 68030 remembers the last 256 instructions it accessed, and the last 256 places it worked with data from (and the data). When the 68030 goes to get its next instruction, it first looks to the cache, asking, in effect, "Can you give me this instruction fast, or do I have to go to RAM and wait awhile?". If the instruction is in the cache, the 68030 immediately executes it; if the instruction accesses data that's in the data cache, the 68030 doesn't have to worry about RAM at all.

When the 68030 kicks into burst mode and loads 16 bytes at top speed from memory, it's loading this instruction cache. Since 16 bytes are loaded, the 68030 doesn't talk to anything at all for a bit; it just buzzsaws through those instructions at top possible speed.

On the TT Desktop, where the Blitter pull-down menu option once was, there is now a "Cache" option you can turn on or off. When on, the machine displays blistering speed; when off, the machine is still faster than the ST, but not that much faster for the price; that's because video "contention" is forcing the 68030 to wait so much.

32MHz?!

When the TT was originally designed, it was meant to be a 16MHz machine; that means everything in the machine was to be rated to run 16 million machine cycles per second. The ST's hardware chips (say, DMA or video for instance), gasp and die when asked to run any fast-

Product Information

TT030, \$2,995 (4MB RAM,
40MB hard disk). Atari Corp.,
1196 Borregas Ave., Sunnyvale,
CA 94088 (408) 745-2000

er than eight million per second; even the accelerator boards deliberately slow to 8MHz from 16MHz when accessing hardware.

At the last minute, Atari changed out the 16MHz 68030 to a 32MHz 68030, and added enough hardware (a few PAL chips and stuff) to make that work. However, all those other custom chips, from the TT RAM controller to the new video chip to the new DMA chip, were all 16MHz, and redesign would be extremely costly — and this machine was already late to get out the door.

So, only the 68030 runs at 32MHz. The rest of the machine runs at 16MHz. Now you see the importance of those caches. They are onboard the 68030 chip, and run at 32MHz; if the program largely fits inside the cache, it will scream along at 32MHz. If it doesn't, it will run at 16MHz. Certainly, burst mode and TT RAM help at 16MHz as opposed to video RAM, but 32MHz is still a long way from 16MHz. Your speed absolutely will vary depending on what software you run.

Be particularly wary of benchmark programs that claim to measure the machine's speed! If the benchmarker's measuring loop fits into that 256-byte cache, it'll show a 32MHz machine; if it goes even 258 (or more) bytes, it'll show a 16MHz machine, which I assure you will baffle the user.

What's really needed, in my opinion, is for at least a 16K cache board to be made available for the TT. 16K caches show a very high "hit rate" (the percentage of times the processor finds what it wants in the fast cache, rather than in slower RAM); even more cache memory doesn't really help that much more. After-market manufacturers are already showing an interest in such a product. This would be a worthwhile ad-

dition to the TT if properly done.

Conclusion

The computer market moves very rapidly these days. Sun Microsystems considers its primary advantage to be a six-month lead on the

Atari's TT030 packs a powerful punch with five times the resolution and four times the speed of the "old" ST.

market! (Sun is an extremely profitable workstation manufacturer). A 32MHz machine is competitive right now, as I write this, December 1990; in not very long, it will be considered slow, as 50MHz 68030, new generation 68040, and 80486 machines reach the marketplace. Machines dwindle into obsolescence very quickly.

The ST machines were at the leading edge of this curve, and are now far behind it, even for "home computers"; very often a "home computer" is now someone's old office IBM PC or clone. Still, Atari made its reputation, and the cover of *Byte Magazine*, offering "Power Without The Price"; back in 1986, a megabyte of memory and an 8MHz 68000 were very good for \$1000.

Now we're in a market where the TT is not going to remain competitive for long without some new engineering. Memory is ultracheap compared to 1986. Speeds are going up at remarkable rates, and PC clones live or die based on what clock speed they run at; right now, 33MHz 386s and 25MHz's 486s are at the competitive edge. In the Motorola market, 50MHz 68030's are already available, but too costly for any but expensive machines to use.

In my opinion, the TT is uncomfortably close to the trailing edge of saleable curve. Having a 32MHz pro-

cessor and a 16MHz "bus," or the other components, is uncomfortable at best. Atari has its hardware engineering work cut out for it to bring things to a 32MHz or higher spec; clearly they need to aim above even 32MHz to be with or

ahead of the market when the new machine arrives. Call it the "UT" (ST, TT, UT), but it needs to happen.

Atari is also getting behind in software engineering. Virtual memory and multitasking are considered

things that manufacturers are working toward, be it with Windows 3.0 for the IBM & clones, System 7 for the Mac, or whatever. Atari has fine software engineers, in my opinion; what it does not have is enough of them! The TT must be considered as an interim machine until the next machine, my UT, is designed and released. It spent too long in gestation, for a variety of reasons. At a \$3,000 price point, the machine is far too uncomfortably close to such powerhouses as the new Next or Sun Sparcs, and even ahead of very powerful IBM clone boxes. And it is far too far away from the average ST user, comfortable with \$1,500 major hardware purchases.

So my conclusions about the TT really are dependent on what Atari does next. The TT proves that Atari can still turn out hardware that has neat features and speed; remaining to be proven is if the TT can be improved upon, in software and hardware, and priced at a point where the U.S. market can support it.

Dave Small is owner and operator of Gadgets By Small, maker of the legendary Spectre GCR Macintosh emulator for the ST. After nearly a year absent from the pages of START, Dave's original and informed prose is a welcome sight.

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Reviewed: Desktop Publisher ST; SMPTE Track; Softsynth; C Language Overview.

NOVEMBER 88

Features: The ST and MIDI.
On Disk: AVS; Sciplot; Appointment Calendar.
Reviewed: LDW Power; MIDI Power; Superbase Professional.

DECEMBER 88

Features: Hardware
On Disk: Wombats II; Santa BBS; Discovery Construction Set; Five Sort Routines.
Reviewed: Monitem; The Viking Monitor; DynaCAD; Five Hard Drives Compared; Ricoh PC Laser 6000.

JANUARY 89

Features: Editor's Choice.
On Disk: GFA BASIC 2.0; Spanish Mastery, STARTKey Revisited; Slither.
Reviewed: GFA BASIC 3.0; Creator and Notator.

FEBRUARY 89

Features: Thanks for all the Fish; ST: 1999.
On Disk: Dab-Ditter; Moon Calendar; Kamikaze Chess; Killer Chess; VCR Organizer.
Reviewed: Atari's Planetarium; Kobtek's Skyplot; Mirage Sample Editor's.

MARCH 89

Features: Three Artists Who Use the ST; Software Rental.
On Disk: Seurat Draw and Paint Program; Assembled Saucers; ST Coloring Book.
Reviewed: Graphics and Animation Programs Compared; Digigram's Big Band; Overview of Six CAD Programs.

APRIL 89

Features: Jimmy Hotz's MIDI Magic; Dr. T Interview; The New TOS ROM Error Codes.
On Disk: ST Writer Elite 3.0; Poker Solitaire; RAM Baby.
Reviewed: Utilities; R/C Aerocopter; MIDI Draw.

MAY 89

Features: CompuServe's Sports Forum; Atari Goes to College.
On Disk: Space Wars 2400; GFA Object; 1988 Tax Template; SIFT (START's Instant File Translator)
Reviewed: Buyer's Guide to Telecommunications Programs; Calamus.

JUNE 89

Features: Do Anything Business Computer; Arcade Addition.
On Disk: GFA Vector, Match Quiz ST; Screenwriting with WordPerfect; ST Pinocchio; Exploring Spreadsheets; Traveling Mattes.
Reviewed: Juggler II; Switch/Back; Revolver; Graphics Tool from Migraph; MIDI Drummer.

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JULY 89

Features: MIDI in the Future Tense; Making MIDI Affordable
On Disk: Babel; GFA Object; The ST Thremmin; START Arcade
Reviewed: Sound Digitizers; EZ-Score Plus; Pagestream; Turbo STI 4; Hi Soft BASIC and Hi Soft BASIC Professional.

AUGUST 89

Features: Secrets of a Good User Interface; Tools of the Trade
On Disk: POGO; File Search; Splines on Splines; Stumbling Blocks
Reviewed: Ultrascrip; DevpacST; dBMAN V; After-Market Floppy Disk Drives; MIDI Magic

SEPTEMBER 89

Features: Sam Tramiel Interview; Computer Game Violence
On Disk: Avecta I: Ehora; The Seven Skulls; Newspeed; Slither Screen Editor; Cinko
Reviewed: Eight Games; Fleet Street Publisher 3.0; STAC, STOS and TaleSpin; NewScore

OCTOBER 89

Features: STACY and Portfolio Preview
On Disk: CAD-3D-to-DynaCADD Converter; Schedule Maker; ST Softguide; WordPerfect Macros; Boingo
Reviewed: DynaCADD 1.56; Hotwire, NeoDesk 2.0 and VDOS ProQueue; Entry-Level Sequencers; Computer Guide to the Solar System

NOVEMBER 89

Features: The Transputer Connection; Atari and Perihelion; Donny Osmond Interview; The START ST's New Look
On Disk: RezRender; JULIA; Final Approach Controller

DECEMBER 89

Features: The Future of Atari Computing; A Small Tour of UNIX, Pt. I; Elmtech's ParSec Graphic Interface
On Disk: GFA Companion; Attack; Word Puzzle
Reviewed: Accelerator Boards; Beat Box; Mice

JANUARY 90

Features: A Small Tour of UNIX, Pt. II; CD-ROM; Battle of Britain
On Disk: CAD-3D ip DXF Conversion; Mystic Realm; Laserdisc Remote Control; Score ST
Reviewed: Supercharger & Spectre GCR; Diamond Back & Hard Drive Turbo Kit; ST Pictascan; BetaCad

FEBRUARY 90

Features: A Small Tour of UNIX, pt. III; TT-/TOS Secrets
On Disk: Chaos on your ST; Crunch Time
Football; X-10 Controller; AI Doctor
Reviewed: Finex V; Final Cut; The Cuckoo's Egg

MARCH 90

Features: Robert Williams Interview; A Small Tour of UNIX, Pt. IV
On Disk: CAD-3D 1.0 Mountain Solitaire; Spinwheel
Reviewed: Clip-Art Overview; Rmvable Hard Disks; BeckerCAD

APRIL 90

Feature: Word Processor Comparison; PHASAR Tips
On Disk: ST Writer Elite 3.6 PHASAR 3.0; 89 Tax Templates; Super Jackpot Slots
Reviewed: Desktop Publishers Overview; PC Speed

MAY 90

Features: Telecommunications; Sound Designer Scott Gershin Interview
On Disk: InfoBase ST; ST; Styzor's Contest; Computer Viruses
Reviewed: Critical Path; Dr. T's T-BASIC; VIDIST; WordUp 2.0; FAST Tape Backup; Protext

JUNE 90

Features: Alexey Pazhitno Interview: Wayne Gretzky Hockey; Sexist Software Perspective
On Disk: Bugs!; Crossword Creator; Wordle; Warrior STI Fun Pages
Reviewed: For the Fun of It (11 Games); WORDFLAIR

JULY 90

Features: Midi Pros Go ST; Multitasking on the ST; Computer Hazards
On disk: Alter Tune; Midi Master Drummer; Midi Programming Tips; Sampsyn
Reviewed: PC-Ditto II; Videotext; For the Fun of It

AUGUST 90

Features: Playing the Developer's Game; Blitter Basics
On Disk: CardMaster; Metamorph; SBLIT
Reviewed: Deskset II; Cubase; For the Fun of It; DC Utilities

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THE EYES HAVE IT

Layout Tips For Good Looks

BY DAN FRUCHEY

Desktop Publishing/Word Processing Editor

Words on a page. They all have something in common. Whether they are combined to create a single-page flyer, a multipage newsletter, or the great American novel, the words are produced by individuals who wish to share their messages with others.

But in order to share messages, the words have to be read. That, in part, depends on the manner in which they are presented. A report on important environmental issues probably never will be read if it is presented as a mass of small, closely-spaced text on both sides of a single page. Switch to a multipage newsletter format, with larger text sizes, a few supportive graphics and a triple-column layout, and your audience is more likely to read and comprehend the message. The bottom line is that if your message is important enough to be written, you should give it the best possible chance of actually being read.

This month we're going to examine some layout aids that will encourage an audience to read your documents. These ideas will in-

crease comprehension and enhance communication.

Standards

To create a document, begin by establishing layout standards and consistently apply them to each page. It sounds easy, but there are literally dozens of layout decisions you may need to make before producing a single page. (See sidebar.) In order to maintain consistent style, professional publishers typically produce

specification sheets for each job. These spec sheets include information such as page size, margins, column format and font size.

Some programs have the ability to use this information internally as style sheets or templates which can be loaded at the beginning of each session. In addition to a computerized version of your layout standards, a printed sample that clearly describes your specifications is an invaluable tool. You should describe

VISUAL CUES CAN TAKE ON A wide variety of forms. Each has its usefulness but those that attract a readers eye to the beginning of an article are among the most powerful. The Drop Cap and upper case letters in the first sentence are commonly used in many publications.

An example of eye-directing layout

your standards for each page component clearly; Subheads: Bold Triumvirate, 12 point, uppercase letters only, no lines between body text and subheadings.

Fluctuating layout standards are confusing and tend to annoy readers. A standardized document incorporates page elements in such a way that readers don't actively notice the page layout. Standardization is only noted on a subconscious level. However, when page numbers are missing or inconsistent fonts are used in the body text, readers begin to pay attention to the page layout — not the text on the page. This not only distracts readers, it can also damage the credibility of your message.

Cues

Long before I developed a passion

A cue catches the reader's eye and directs their attention.

for computers I was an amateur magician. One of the basic lessons I learned was to direct an audience to observe specific actions while ignoring others. In this way the audience missed the hocus-pocus and beheld the miracle.

Similarly, the desktop publisher can direct an audience to pay attention to important components in a document by using specific graphic and textual devices. Examples include an arrow that indicates that an article continues on the next page, or a bullet at the end of an article that indicates the piece is finished. Some publications capitalize the first few words in an article to draw attention, others enlarge text in the

first paragraph to make it stand out. There are many commonly used variations on this simple theme.

Visual cues should be uniform, just as the rest of a page, but the mechanism that makes a cue invaluable is different from that of standardization. A cue catches the reader's eye and directs their attention. A good cue cries for attention. Correctly used, it can convey valuable information through a minimum of space. Symbols become words, phrases and sentences (this is a new article, turn to the next page, this is an advertisement).

Placement

Where you place text in a document can be as important as the information itself. For years publishers have effectively de-emphasized important stories by burying them in obs-

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cure sections of the newspaper. Stories that have made headlines in major European publications may only be acknowledged with a simple paragraph in U.S. periodicals.

While it seems unfair to produce a document that intentionally buries a message, it is also possible for the desktop publisher to produce a document that buries a message unintentionally.

Within seconds after a reader picks up a document they decide whether or not to continue reading. Where you place your message on a page is as important as the message itself. An eye-catching headline in a strategic location could make the difference between failure and success. A graphic placed strategically above an article could intrigue a reader enough to look at the article below.

Keep the Z pattern in mind when placing items.

In planning your layout strategy consider the following: The first place a reader looks on a page is commonly referred to as the optical center. It's about three-eighths of the way down a page and slightly left of center. Take a look at the cover of a newspaper. Where is the headline? It is in the location where it will receive the maximum attention, the optical center.

Westerners read a document from left to right and from top to bottom. Our eyes routinely follow a Z-shaped pattern as we read. This applies even when we don't actually read a document but simply scan a page. Place your page components where they will take advantage of

the Z pattern. Locating an item on a page is easier when the pattern is followed.

Crowding

One of the most common mistakes desktop publishers make is to crowd too much information on a page. They have a lot to say and the tendency is to try to say it in the smallest amount of space possible.

Crowding is usually justified by claims that it saves paper or makes a page look full. However, it can confuse an audience (lots of little items to look at) and reduce comprehension (closely spaced lines of text make reading difficult). Worse, your audience may decide to skip the page completely and read something that contains more breathing space.

If it doesn't all fit on a page, add another. Don't crowd! Check your standards. If the item you're attempting to add to the page won't fit unless you cheat on your standards, then use it somewhere else. Decreasing the size of margins, reducing leading, or squeezing columns of text together to make another item fit is not the answer.

Some sources recommend that as much as 50 percent of the page should be unused space. Unused space, referred to as white space, should be considered a component of the page, not just space to fill up. To insure enough white space, allow a 1/2- to 1-inch margin around the page.

It's true that publications such as newspapers and magazines use a minimum of white space in the margins, but they compensate for it in the balance of page components. Light fonts, increased leading between lines and space between text and graphics are all combined to increase white space in these publications so that the pages don't appear crowded. ■

PAGE COMPONENTS THAT SHOULD BE STANDARDIZED

- page size
- page orientation (landscape or portrait)
- margins
- number of text columns
- gutters (space between text columns)
- justification (ragged right, fully justified or centered) for body text, subheads, headlines, headers and footers, and captions
- font style for body text, subheads, headlines, headers and footers, and captions
- font size for body text, subheads, headlines, headers and footers, and captions
- emphasis font (bold, italics or different font)
- leading (line spacing)
- bullets (styles, sizes, when to use)
- page numbering
- format and font for articles continuing on non-contiguous pages
- paragraph spacing
- indentation
- white space between graphics and text
- line weights and styles
- shadows (distance from originating object, saturation percent)
- box style (rounded or squared edges, when to use)
- box saturation (grey scale, when to use)
- white space left around box contents

MIDIBOSS

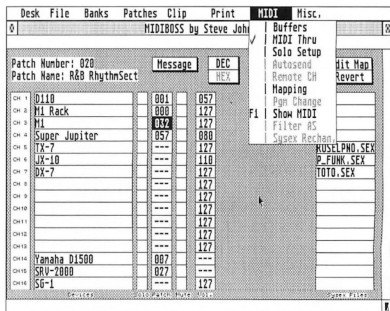
Your Personal MIDI Roadie

BY ROBERT EDSON

With a wealth of inexpensive MIDI modules now available, anybody can afford a setup that would have had Keith Emerson or Rick Wakeman drooling a decade ago. Fortunately for them, roadies tended the keyboards of yesteryear, setting up, patching the sounds, and keeping things running smoothly. Up until now, in the home MIDI world, good MIDI "roadies" have been hard to find.

Enter MIDIBOSS, the MIDI system controller from Johnsware. MIDIBOSS works with banks of MIDI system presets (128 per bank), treating your entire system the way a simple patch-editor program handles its associated synthesizer. Call-

A MIDIBOSS patch screen. Each patch can completely configure your MIDI system, as well as define a different MIDI zone map for your controller keyboard.



ing up a patch sends out program changes, MIDI volume messages and system-exclusive files on all 16 MIDI channels. You can even include a predefined zone map for each patch on your master keyboard, with up to 16 overlapping zones split by note number, velocity or both. MIDIBOSS includes several utilities: a System Exclusive Buffer, MIDI-Thru and an option to view or print current MIDI data (with or without MIDI-to-English translation).

Designing A Patch

Opening the program displays the bank screen, showing 64 patches at

a time on each of two pages. You can select patches with the mouse, cursor keys or a program message from your master keyboard. An autoload option allows your patch to be sent automatically when selected, or you can enter the patch screen, make any necessary changes, then click on SEND.

The left side of the patch screen displays your instruments and their corresponding MIDI channels. This list is stored as a separate file; a new list can easily be loaded from disk or reconfigured from a dialog box. Two columns in the center of the screen display the mute and solo status of each channel. Muting a ▶

AT A GLANCE

Product:	MIDIBOSS version 1.3
Company:	Johnsware 5802 42nd Ave. Hyattsville, MD 20781 (301) 927-1947
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Requirements:	512K, medium or high rez
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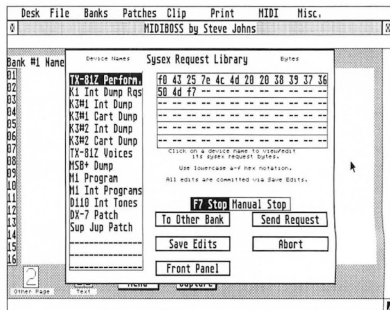
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The MIDI Buffer
Capture screen
accesses libraries
of sysex requests
and captures
sysex data from
your system.



channel prevents MIDI data from being sent out on that channel; soloing a channel mutes every channel except the selected one. A third column assigns an initial program-change message to each channel.

To the right of each instrument is a sysex file box, letting you assign a system-exclusive file to each instrument. Once an instrument has been "tagged" with a sysex file, the program saves the complete pathname for the file (not the actual sysex data itself, which minimizes the MIDI-BOSS bank size). If you use a librarian which saves raw sysex data, you can tag your data directly from your librarian files.

Clicking the EDIT MAP button displays the zone map for the current patch. Up to 16 zones can be defined to map notes, program changes, pitch bend, controllers and aftertouch. Complex zone maps require significant processing and can start to cause timing errors. I had no appreciable timing problems until I started to map eight-way velocity layers, split into three different keyboard zones. If you keep the processed data down to a reasonable amount, this option can turn the dumbest keyboard into a dedicated MIDI controller.

Settings are displayed in either hex or decimal notation, and entered in a variety of ways — typed in, changed using the [+] and [-]

keys, or with the right and left mouse buttons. Keyboard command equivalents are available for many program commands, making the program ergonomic as well as handy for stage use, where there is little room for mouse maneuvering.

Sysex Librarian

An integrated sysex capture mode lets you enter and transmit banks of sysex requests (the MIDI-ese small type in the back of your sequencer manual). When your synth receives a valid sysex request, it will dump the requested data (usually a bank of patches) back to MIDI BOSS, which can save it to disk. These patches can be tagged to be sent back to your synth as part of a MIDI BOSS preset to make sure the expected sounds are available when you need them. Sysex requests can be saved to disk for future use.

Alternately, MIDI BOSS can accept data dumps triggered from your synth itself. I had a few problems dealing with some of my keyboards with the synth-initiated approach, but each synth has its own MIDI "quirks" that have to be dealt with in their own way. This module of MIDI BOSS is designed to be a general tool, not a dedicated librarian, and it is a welcome feature.

Compatibility And Limitations

I had no problems running MIDI-

BOSS as a desk accessory within Dr. T's KCS sequencer. According to programmer Steve Johns, MIDIBOSS will run as an accessory with most sequencers, including RealTime, Master Tracks, Cubase and Notator; however, not all sequencers will currently allow MIDIBOSS to send out sysex data. Sysex transmission can be disabled from either menu so as not to cause any conflicts. The incompatibility lies with the sequencers, rather than MIDIBOSS. The recently released MIDI-Tasking programming standard from Atari, now being implemented by developers, will allow desk accessories to access MIDI ports from within programs without conflicts. Johns is waiting for final word on this new system software; presumably, a future MIDIBOSS update will clear up this problem.

Available memory permitting, MIDIBOSS can hold two patch

banks. 520ST owners are restricted to a single bank in memory, preferably using the program in stand-alone mode. It works well even with a single floppy-drive system and no hard drive. Just dedicate a floppy disk to sysex files, and pop in the disk before selecting any patches that have tagged sysex data. An extended-format floppy will hold either three full M1 banks (300 programs, 300 combinations, 20 sequences and 3 banks of global data), 16 D110/D10/D20 banks, or 42 DX7 banks (1344 patches). In this case, a little definitely goes a long way.

Superior Support

Johnsware has paid a lot of attention to detail; MIDIBOSS is easy to learn, easy to use and takes a lot of the drudgery out of MIDI use. The screens are well laid out, and movement through the program is logical and intuitive with the mouse or key-

board. I've never received such personal attention from a software company either. Johnsware is a small company, owned and operated by Steve Johns, the programmer. The phone number on the documentation does not connect you to an impersonal (and often underinformed) customer service rep — you talk directly to the programmer. Johnsware also maintains online support through Category 22 of the MIDI Roundtable on the GENIE BBS.

If you are looking for one of the new, full-featured, universal MIDI controller/editor/librarians, MIDIBOSS isn't for you. But for hundreds of dollars less, MIDIBOSS is a versatile program that deserves attention, with powerful realtime keyboard-mapping capabilities that the generic patch editors do not have.

Robert Edson is a freelance musician in Atlantic City, N.J.

#1 Guide To Atari Computing

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Bob Brodie Debuts

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DVT VCR

Fast And Affordable Videotape Backup System

BY LANCE CLUFF

Thanks to Seymor/Radix, you don't have to spend hours doing the "floppy-disk shuffle" to back up your hard disk. With the DVT VCR backup system you now can save all of your hard-disk data directly to video tape.

What You Get

The DVT VCR package contains a 12-page instruction manual, a single-sided disk that includes the backup program and a few utilities, two five-foot RCA cables and a cartridge module. The module plugs into the ST's cartridge port and only needs a couple of inches of clearance from the side of the keyboard

for the cables to connect. These cables plug into the Video In/Out jacks on a VCR.

How It Works

The DVT backup program requires at least 760K of free RAM to run. A small portion of this is used by the program and the rest is set up as a buffer. When you back up your hard disk, files are copied into this buffer until it is full. This group of files, called a bundle, subsequently transfers to the VCR. This process repeats until the backup is complete. Restoration is accomplished in a similar fashion. The video tape plays until a bundle is read into the buffer. The tape then stops while the buffer's contents are written to the hard drive.

Backups and restores are accomplished in one of two ways: partition or individual file. Partitions can be queued so that an entire hard disk backs up in one operation. You can back up individual files by selecting them one at a time and then sending the bundle of file(s) to tape. A bundle with files selected in this way can contain files from any folder and/or partition.

DVT includes a verify function

that checks the integrity of the tape backup and can identify any "audible dropout" areas in a video tape (data written to these areas can be lost because of poor signal retention). In the restore process, the DVT's Audible Dropout Indication will attempt to recover any files that may have been copied to one of these corrupt tape sectors.

Test Run

For an initial test run I chose a 7.2MB partition on my 40MB hard disk. The backup clocked in at a fast 2.4 minutes (20 seconds per megabyte) and was a success — the verify function revealed only one file out of 522 in an audible-dropout area. Fortunately, I was able to recover this file in the restore process.

The VCR speed setting determines the amount of data that can fit on a video tape. According to Seymor/Radix, a common "120" tape holds around 36MB in standard-play mode and up to 108MB in extended-play mode. Always use as high a quality video tape as you can find. Since the backup process is so quick, it can be done every time you power down your computer. This means the tape will be used often.

AT A GLANCE

Product:	DVT VCR
Type:	Hard-disk backup
Company:	Seymor/Radix Inc. P.O. Box 166055 Irving, Texas 75016 (214) 255-7490
Price:	\$99.95
Requirements:	1MB, hard drive
Summary:	A fast, efficient and inexpensive way to perform a hard-disk backup.

Lower quality tape may wear out faster.

I did run into a few problems with the software. First, the Individual File Restore simply would not work, but I later found out that this may have been a quirk of my system (it worked on other systems I tried and Seymour/Radix was not aware of any such problem).

A few minor annoyances also showed up. During the verify and restore routines, keyboard-clicking sounds were generated at random, and the abort option in the program only worked if a signal from the VCR was being received. The verify routine could only be exited by clicking on Abort, instead of automatically returning to the main menu after all bundles in a backup session had been read. Lastly, the Get Partition Info selection did not display the number of bytes used in a partition, as the manual states it should have. Instead, it displayed the number of files in a partition.

A word of warning: If the video tape runs out before the backup is complete, the DVT program continues to run, since the VCR cannot send a signal for "end of tape." Therefore, make sure there is enough tape to back up all your selected data. The same is true for restore: If your hard disk runs out of room before all files are restored, those bundles received after the hard drive is full will not be restored. TOS will probably give you an error message and the program will keep trying to transfer files even though there is no space available. Fortunately, you can press [Esc] to return to the Desktop to get out of this.

Beat The Backup

If you own a VCR and a hard drive, DVT VCR presents an effective and inexpensive alternative to the important but tedious process of back-

DVT is especially useful for backing up a hard disk with a particularly large capacity.

ing up your hard disk (by comparison an ICD FA.ST tape backup costs \$1,000). DVT is especially useful for backing up a hard disk with a particularly large capacity (40MB or more). Of course, there is the convenience factor to consider: If you back up your hard disk on a regular basis, you'll find it a hassle to unhook your VCR from your television every time you want to do a backup.

There are a few features that I would like to see added to DVT in the future. Although the files in each bundle scroll on the screen as they copy to the buffer, no record is kept. An option to print out a hard copy, or ASCII file to a floppy disk,

listing each bundle's contents as it is backed up, would make it easier to locate individual files. It also would be nice if the DVT program could

recognize wild-card characters, rub-berband files with the mouse and select files with [Alt]-right mouse button. Any one of these features would make multiple file selection for backups faster and more efficient.

A final recommendation: Though your hard-disk data is very important to you, others may not share your feelings. On family video nights, suggest something with a little more action.

Lance Cluff lives in Anchorage, Alaska, where he works as a mechanical engineer. This is his first appearance in START.

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BIBLE CONCORDANCE

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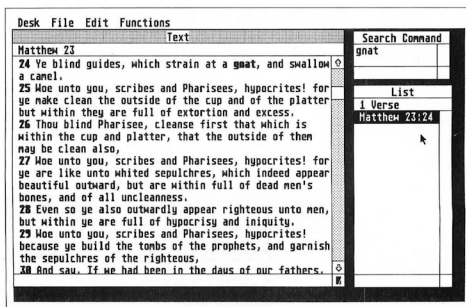
BY TIMOTHY E. RAPSON

After five years of IBM and Macintosh dominating the world of computerized Bible study, a concordance program arrives for the ST. With power, simplicity and a load of special features, Spiritware's Bible Concordance has earned its rightful place in any Bible student's software collection.

(Editor's Note: The version reviewed here is 2.0. The latest version is 2.1 and features the entire Bible in either the King James or New International versions.)

In The Beginning

A concordance is an alphabetical list of the principal words in a book with references to the passages in which they occur. For example, it lists the book, chapter and verse of each appearance of the word "sin." Spiritware's Concordance translates this concept to floppy disk quite



Bible Concordance's search ability is well implemented. Here it has found the only biblical reference of gnat: Matthew 23:24.

handily. It assists a Bible-study project like no other study tool available.

I speak from experience. When I was a seminarian, a concordance was critical for effective study of the Bible. A program like Spiritware's would have been, well, a godsend.

Concordance's effectiveness can be best illustrated with a recent example. The Sunday school class I attend is called the Children of Abraham. I was curious about this name, so I asked Concordance to find the phrase "children of Abraham." Seconds later I had my answer:

"Know ye therefore that they which are of faith, the same are the children of Abraham." — Galatians 3:7

Without Concordance, I would have had to look in a regular Bible concordance and read all the verses in the New Testament on which "Abraham" is referenced until I found the whole phrase.

Seek And You Shall Find

You can run Concordance as is, or from an AUTO folder. Once the program loads, you're ready to work with three friendly, fully functional GEM windows: Search, List and Text.

In the Search window you can type any word or combination of words. The size of the string for which the program searches appears to be unlimited. I actually typed in a whole verse. Type "gnat," for instance, and Concordance will find the following:

"Ye blind guides, which strain at a gnat and swallow a camel." — Matthew 23:24

In the List window, you'll see the verse reference, Matthew 23:24. Normally, several verses are listed and the first occurrence is displayed in the Text window on the right. In fact, the entire text of the Bible is in this window. Use the GEM scroll bar to page through it.

Concordance can also search for several words at once with the "or" and "and" commands. Say you want to find all the verses with the word love, but you know that the word charity is often substituted. Type "love/charity" ([/] = "or") and Concordance automatically finds all verses in which either word appears.

To find a verse that mentions how the poor in spirit are blessed, use the "and" command. Type "poor,blessed,spirit" ([,] = "and") to find any verses that contain all three words. If you can't decide whether the verse you want uses the word blessed, blest, blessing or just bless, a wild-card function looks for all of them just as a word processor would. Simply type "poor, bles+,spirit" ([+] = wild card).

The wild-card function also combines any or all of the "and," "or" or wild cards in a search. Complicated searches take more time (10 to 60 seconds), but imagine how long it would take to look it all up yourself. If this were all Concordance did, it

would be more than worth the price.

All verses can be saved to disk in ASCII text format so you can load them into a word processor or desktop publisher. You can save either the list of verse references (i.e., John 3:16) or the actual text ("For God so loved the world...") of any or all of the verses you search.

Printing involves dumping an ASCII file to the printer, so no special drivers are necessary.

The manual is an unexpected delight, complete with tutorial, illustrations, index and a useful appendix showing some of the various spelling conventions.

The Final Judgment

The Concordance does exactly what it is supposed to do: it uses the power of the computer to make a specialized kind of research tool faster and more efficient. The text is available in English only. It's probably more than wishful thinking to see the Greek and Hebrew texts included, but it would be nice.

The final judgment? Concordance is fast, friendly and inexpensive — no other Bible-study tool on the ST comes close. But though zealots will argue that everyone needs the Bible, clearly not every ST user needs Concordance. This is not to say interest in the Bible should be limited to those religiously inclined. The many books of the Bible are rich in powerful text that has influenced the entire course of world history and, without the religious connotations, makes for a pretty good read. But Concordance was intended as a study tool only. Those with a casual interest would do better to pick up a copy of the Bible at their local bookstore.

Timothy E. Rapson is former seminarian. He has owned his ST since 1985 and is a member of seven computer clubs and organizations.

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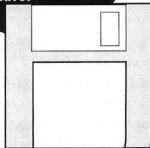
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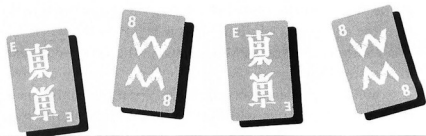
AT A GLANCE

Product:	Bible Concordance version 2.0
Type:	Bible-study program
Company:	Spiritware 15211 15th Ave. NE Seattle, WA 98155 (206) 364-1981
Price:	New International Version: \$40 King James Version: \$30
Requirements:	1MB
Summary:	Bible students will find Concordance invaluable.

Antic

THE ONLY RESOURCE
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Gemini, page 82



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I/O BOARD

MYDOS RAMdisk

I have an 800XL upgraded to 256K of memory and usually use MYDOS to configure a RAMdisk to simulate a physical disk drive. Is there a way, preferably through software, to copy boot programs like your June/July 1990 Miniature Golf Plus to a RAM-disk and make the system think the RAMdisk is the bootable disk drive 1? This would save a lot of wear and tear on my physical disk drives.

Jim Thompson
San Diego, CA

I'm not that familiar with MYDOS, but I do know that you can get around the boot requirement, at least with a lot of the .EXE or .OBJ programs. With AtariDOS 2 or 2.5, you can do a binary load (DOS option L) to load and run most of these programs from any drive, even though the magazine instructions say the file needs to be an AUTORUN.SYS. MYDOS has an

equivalent command L you can use to Load Memory.

Once you get the program running, though, it won't work with the RAMdisk if the program tells it to look specifically at Drive 1 for special files. Some versions of MYDOS have the command S, Set RAMdisk #. If you can get the Atari to recognize the RAMdisk as D1:, you might be able to get around this problem. — ANTIC ED.

Linkline to ST

I'm trying to port the LINKLINE.PRГ file off the Antic monthly disk, from my Atari 800 to my 520 ST, but so far I haven't had any luck. Is there any way to get a copy of LINKLINE.PRГ for my ST?

James DeVerso
Solvay, NY 13209

The August 1986 issue of ANTIC introduced Linkline, a program designed to transfer files between the

8-bit and ST. (Linkline only transfers files; it is not an emulator, and cannot run 8-bit programs on the ST.) The article discusses how to build the null-modem cable you need to link up an ST to the 8-bit modem port on the Atari 850 interface. You need to have the Linkline program running on both machines to get files to transfer — otherwise, you really need two telecommunications programs to transfer the files (see the August 1985 issue for suggestions).

Fortunately, you can get the ST version of Linkline on the ST Compendium Disk III from Antic Software (order number SBO 103). This 3 1/2 inch ST-format disk contains several ST programs that originally appeared in the ST Resource section of ANTIC magazine. Other ST programs from ANTIC are available on Compendium disks I-VII. Call (800) 234-7001 for prices and ordering information. — ANTIC ED.

GEMINI

A Classic Tile-Matching Game Comes To The 8-Bit

BY FRANK KWEDER



Test your solitaire strategy skills with this tricky tile game. This BASIC program runs on 8-bit Ataris with 32K memory and joystick.

Gemini is a solitaire strategy game based originally on the Chinese game of Mah-Jongg, and similar to the game known as Shanghai. Gemini includes three difficulty levels and options to replay the same game, or even to cheat!

The game screen displays a group of randomly mixed tiles, each marked with a number and symbol. Some tiles are piled on top of others, with colors marking the height of any tile. The object is to find pairs of matching tiles and remove them from the screen, but the tiles must be open on either the left or right side to be used. Playing Gemini is

easy, but winning requires some serious strategy and luck.

Getting Started

Type in listing 1, GEMINI.BAS, check it with TYPO II, and SAVE a copy to disk before you RUN it.

If you have trouble typing the special characters in line 16, 7050, 9510-9570, 9700-9720, and 9750, don't type these lines. Instead, type in Listing 2, check it with TYPO II, and SAVE a copy to disk. When RUN, this program creates the hard-to-type lines, and LISTS them to a file on disk called LINES.LST. To merge these lines into your program, type NEW, then LOAD

"D:GEMINI.BAS" and then ENTER "D:LINES.LST". Be sure to SAVE a copy of your finished program.

Rules of Play

When the game begins, tiles are laid out on the board in four levels, indicated by color. The bottom (level 1) tiles are gold, level 2 tiles are blue, level 3 tiles are red, and the top tiles (level 4) are white. The tiles are numbered from 1 to 9 in different suits, with each of the 27 individual tiles repeated four times. In addition, there are four different "wild" suits, used to alter the difficulty factor of the game.

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Antic Music Processor

The Music Never Stops

BY STEVEN LASHOWER

Play a disk full of songs without pressing a single key with this handy player program from the creator of AMP, the Antic Music Processor. This BASIC type-in creates a fast, machine language jukebox that automatically plays all the AMP songs on your disk.

J U K E B O X

First published in our December 1988 issue, the Antic Music Processor (AMP) quickly became one of ANTIC's most popular programs ever. Users enjoyed playing tunes provided on disk, and many entered their own songs. Many readers sent in songs, both as part of our AMP Song Contest (June, 1989) and to share their efforts with other 8-bit Atari users. With all these songs and disks in our offices, we came to realize that what we really needed was a way to play a group of songs, not just one at a time. The suggestion was passed on to AMP programmer Steven Lashower, and the AMP Jukebox was born.

Getting Started

Simply type in Listing 1, JUKEBOX.BAS, check it with TYPO II, and be sure to SAVE a copy to disk before you RUN the program. (You should have a separate disk, freshly formatted with DOS 2.0 or 2.5 on it, ready for the Jukebox.) When RUN, this program will create a new file called JUKEBOX.EXE, and save it on your disk. JUKEBOX.EXE is the actual execut-

ble machine language program for the AMP Jukebox.

To run the program, turn your computer off, then on again, without BASIC (XL/XE users hold down [OPTION]). From DOS, use option L (Binary Load) to load JUKEBOX.EXE, and the program will run. To make AMP Jukebox load and run automatically when you turn the computer on, use DOS option E to rename JUKEBOX.EXE to AUTORUN.SYS. Put the disk in drive one, and turn your computer off and on again, without BASIC. The Jukebox will load and run automatically — but first you need some songs for it to play.

When you run the Jukebox, it looks on the disk in Drive 1 for any files with ".AMP" extenders on their filenames. (If necessary, use DOS command E to rename your AMP files.) The program automatically plays all the songs on the disk, one after another. Press [START] while any song is playing to skip to the next song. Press [OPTION] while a song is playing to change to a different disk or drive. When the loading window appears, press the number (1-8) of the drive.

Just copy your favorite AMP song files to one disk with the Jukebox on it, and the program will find them automatically and play them over and over for you. You can collect disks full of certain types of songs, and use them for background music or long-running demos.

Getting AMP Songs

You can still get ANTIC back issues and disks featuring AMP programs and songs. (See our ads in recent issues, or call (800) 234-7001 to order.) The original AMP appeared on the December 1988 disk, with instructions printed in the magazine. Also on disk is CONVERT.BAS, a program that converts songs from the popular Advanced Music System II (AMS II) into AMP file format. Modem users will find AMS II files on many bulletin boards and online services with Atari 8-bit sections.

The first version of AMP could play lyrics, but there was no way to enter them. Version 2.0 appeared on the June 1989 disk, and added a lyric editor to AMP's many capabilities. Instructions on entering lyrics were printed in the magazine, while the music editor instructions were put on disk. A slightly modified version 2.1 of AMP appeared on the August 1989 disk without instructions, but fixes some minor bugs.

Songs have appeared on a number of Antic Monthly Disks. In addition to the three songs on the December 1988 disk, we ran a collection of 10 Christmas carols and two classical pieces on the January 1989 disk. 12 contest winners appeared on the June 1989 disk, five songs on the July 1989 disk, and four on the August 1989 disk. The June/July 1990 disk had three popular songs plus Ravel's Bolero.

Listing on page 92

Steven Lasbower studies Communications and Computer Science at California State University, Fullerton.

GEMINI

continued from page 82

Matching tile pairs can be removed from the screen if both tiles are open on at least one side. (A tile is open when the space to the left or right does not contain a tile of equal or higher level.) Use your joystick to move the cursor to the first tile you want to move, and press [FIRE]. Move the cursor to the second tile, and press [FIRE] again. If the move is legal, the tiles disappear from the screen, revealing any tiles underneath. Illegal moves will be rejected. You win if you succeed in removing all of the tiles onscreen.

Useful commands appear above the board. If you come to a point where you have no legal matches left, you can either press [X] to exit the current game or go into cheat mode by pressing [H] for help. (The word CHEAT appears next to the word HELP onscreen.) Now you can match pairs even if the pieces aren't open. If you press [U] while in cheat mode, an arrow appears next to the word cheat, and you can remove individual tiles from the board by positioning the cursor and pressing [FIRE]. Press [H] again to return to normal play — but beware! Your cheating has not gone unnoticed.

You change the difficulty factor, or DFAC, by pressing [D] to cycle through the DFAC levels, from 3 (hardest) to 1 (easiest). On levels 1 and 2, the wild tiles come into play. These tiles have no numbers, and use the four special symbols shown at the corners of the screen. At level 3, you can match only identical tiles. On level two, you may also match a symbol at the top of the screen with the symbol directly below it. On level one, you can match any symbol except the one diagonally across the screen.

When no tiles are left (or you exit the game), you go to the Game Options menu. Here you can

choose to play a New Game, Replay the last game, Quit, or play with a New Deck. I added the New Deck option because of an odd effect of the random-shuffling procedure used. With the first game you play, or a New Deck, cards are selected randomly from a string which contains all the cards in order. Subsequent games select cards randomly from the previously randomized deck. This increased randomness seems to make games harder. If you find games becoming more difficult than you care for, try choosing New Deck from the menu.

To save a game, press [CONTROL]-[S]. Gemini does not actually save the moves you've made, only the order of the tiles. The game will be saved to a two-sector file called GEMINI.DAT, and you can only save one per disk. Gemini automatically tries to save your game to RAMdisk (D8:). If you don't use a RAMdisk, be sure to change the designated drive by pressing [CONTROL]-[D], and then the number (1-8) of the drive. Press [RETURN] without entering a number to see the currently designated drive. To load a saved game, set the designated drive, then press [CONTROL]-[L].

Gemini is basically a one-player game, but many players can play the exact same game using the Replay option. A game saved to disk could be passed around, allowing several players to play at once on different computers. Low score — with the same DFAC — wins! Gemini keeps track of your DFAC, remembering the lowest level used, as well as remembering whether or not you cheated.

Listing on page 87

Frank Kuweder is a retired commercial photographer, and author of the "Atari Small Miracles" column in Current Notes. He started in 1981 with an Atari 400 and learned to program by "typing in everything I could find."

TYPING SPECIAL ATARI CHARACTERS

The Atari Special Characters and the keys you must type in order to get them are shown below:

For [CONTROL] key combination, *hold down* [CONTROL] while pressing the next key. For inverse [CONTROL] [A] through [CONTROL] [Z], press the [] key—or [] on the 400/800—then *release* it before pressing the next key. (Press [] or [] again to turn off inverse.) For [ESC] key combinations, press [ESC] and then *release* it before pressing the next key.

Carefully study the chart above and pay close attention to differences between lookalike characters such as the slash key's [/] and the [CONTROL] [F] symbol [].

NORMAL VIDEO			
FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
▼ CTRL ,	▼ CTRL A	▼ CTRL S	▼ CTRL T
▼ CTRL B	▼ CTRL C	▼ CTRL U	▼ CTRL V
▼ CTRL D	▼ CTRL E	▼ CTRL W	▼ CTRL X
▼ CTRL F	▼ CTRL G	▼ CTRL Y	▼ CTRL Z
▼ CTRL H	▼ CTRL I	▼ ESC ESC	▼ ESC CTRL -
▼ CTRL J	▼ CTRL K	▼ ESC CTRL =	▼ ESC CTRL +
▼ CTRL L	▼ CTRL M	▼ ESC CTRL *	▼ CTRL .
▼ CTRL N	▼ CTRL O	▼ CTRL ;	▼ SHIFT =
▼ CTRL P	▼ CTRL Q	▼ ESC SHIFT CLEAR	▼ ESC DELETE
▼ CTRL R		▼ ESC TAB	

INVERSE VIDEO			
FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
▼ ESC	SHIFT DELETE	▼ ESC	SHIFT INSERT
▼ ESC	CTRL TAB	▼ ESC	SHIFT TAB
▼ CTRL .	▼ CTRL ;	▼ CTRL .	▼ CTRL ;
▼ CTRL ;	▼ SHIFT =	▼ ESC CTRL 2	▼ ESC CTRL DELETE
▼ ESC	CTRL DELETE	▼ ESC	CTRL INSERT

TYPO II AUTOMATIC PROOFREADER

TYPO II automatically proofreads **Antic's** type-in BASIC listings. Type in the listing below and **SAVE** a copy to disk or cassette. Now type GOTO 32000. At the prompt, type in a single program line **without the two-letter TYPO II code at the beginning**. Then press [RETURN].

Your line will reappear at the bottom of the screen. If the TYPO II code does not match the code in the magazine, then you've mistyped your line.

To call back a previously typed line, type [*], then the line number, then [RETURN]. When the completed line appears, press [RETURN] again. This is how TYPO II proofreads itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000. To remove TYPO II from your program, type LIST "D:FILENAME",0,31999, then [RETURN], then NEW, then ENTER "D:FILENAME", then [RETURN]. Now you can SAVE or LIST your program to disk or cassette.

Don't type the
TYPO II Codes!

```

32000 REM TYPO II BY ANDY BARTON
32010 UM REM VER. 1.0 FOR ANTIC MAGAZINE
32020 CLR :DIM LINE$(120):CLOSE #2:CL
5E #3
32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
32040 ? "A":POSITION 11,1: ? "
EM 32050 TRAP 32040:POSITION 2,3: ? "Type
in a program line"
H5 32060 POSITION 1,4: ? " ":INPUT #2:LINE
$ :IF LINE$="" THEN POSITION 2,4:LIST B
:GOTO 32060
XH 32070 IF LINE$(1,1)="" THEN B=VAL(LIN
E$(2,LEN(LINE$))) :POSITION 2,4:LIST B
:GOTO 32060
TH 32080 POSITION 2,10: ? "CONT"
MF 32090 B=VAL(LINE$:POSITION 1,3: ? " "

```

```

NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "A":POSITION 11,1: ? "
CE " :POSITION 2,15:LIST B
32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3:LINE$:IF
LINE$="" THEN ? "LINE " :B: " DELETED":G
OTO 32060
UU 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
ANS+C*ASC(LINE$(D,D)):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EN 32180 HCODE=INT(CODE/26)
BN 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16: ? CHR$(HCODE):CHR$
(LCODE)
UG 32220 POSITION 2,13: ? "If CODE does no
t match press and edit line a
bove.:GOTO 32060

```

GEMINI

Classic Tile-Matching Game Comes To The 8-Bit Atari

Article on page 82

LISTING 1

Don't type the
TYPO !! Codes!

```

JI 1 REM GEMINI by Frank Kweder
ZB 2 REM (c)1991, ANTIC PUBLISHING, INC.
SE 10 DIM A$(420),C$(256),I$(248),H$(248)
    CLS(120),DL$(86),MU$(43),RB$(32),SUG
    S(15),H$(14),G$(6),K$(4),N$(4)
IY 12 DIM T$(3),B$(1),PX(81),PY(81),LV(81)
    ,4)=MATCH=800:KEY=83:CSL=53279
LK 14 CLS="":CLS(120)=CLS(5)=CLS(5):SUG
    S="D1:GEMINI.DAT":DU=VAL C$(2,2):DU
    =DU+48
UP 16 N$="":K$="":G$="":B$="":BRE
    AC=100:JOY=410:CB=240:SF=85:TIC=180
UE 20 POKE 106,PEEK(740):G0SUB 9500
CO 25 G0SUB 9000:G0SUB 6000:G0SUB 2000
MY 27 PRIME=0:REM
KB 28 G0SUB 9300:REM
FR 30 GRAPHICS 17:POKE 756,CB$AS:POKE 559
    ,0:G0SUB 9800:REM
TA 35 SCR=PEEK(88)+256*PEEK(89):G0SUB 902
    0:POKE 710,70:POKE 712,CB:G0SUB BREAK
X5 40 J=USR(CADR(MU$),ADR(A$),SCR+40,420):
    TLC=124:DIF=3:LDF=DIF:CH0=0:CHEAT=CH0
    :UNDER=CH0:SPV=CH0
JT 50 G0SUB 95:G0SUB 120:POKE DL,16:POKE
    DL+3,71:POKE DL+6,16:POKE DL+28,7
GC 60 POSITION 1,0:? #6:"!2:GEMINI:
    :MDFAC=Help:
    :GEMINI:
UK 70 POKE 53248,120:POKE CSL-2,2:POKE 54
    286,192:POKE 559,4
YT 72 G0SUB 80:G0SUB 82:G0SUB 90:G0SUB 25
    00:GOTO 200
SB 80 POSITION 7+TLC<10),22:? #6:"!":T$
    :!":RETURN
HN 82 POSITION 12,1:? #6:G$CHEAT*3+1,CHE
    AT*3+3:? IF CHEAT=0 AND UNDER POSIT
    IDN 14,1:? #6:CHR$(167):
UI 83 POKE 764,255:RETURN
SU 85 POKE 77,0:FOR V=-40 TO 80 STEP STP:
    S0UND 1,ABS(U)+6,10,ABS(10-U/10):NEXT
    V:S0UND 1,0,0,0:RETURN
ZW 90 D$=STR$(DIF):TIME=1:G0SUB 140:POSIT
    IDN 5,? #6:CHR$(ASC(D$)+120):POKE 70
    4,20:DIF=49:RETURN
ZT 95 T$=STR$(TLC):FOR N=1 TO LEN(T$):T$(
    N,N)=CHR$(ASC(T$(N,N))+96):NEXT N:RETR
    UN
TU 100 B=PEEK(16)-128:IF B<0 THEN RETURN
WP 110 POKE 16,8:POKE 53774,8:RETURN
KB 120 DL=PEEK(560)+256*PEEK(561):RETURN
DF 130 Z=USR(CADR(RB$),TIME):RETURN
KW 140 RB$(15,15)=CHR$(18):Z=USR(CADR(RB$
    ),TIME):RB$(15,15)=CHR$(22):RETURN
XV 150 COLOR 130:PLOT PX(CP),PY(CP):PLOT PX
    (CP)+1,PY(CP)-1
MJ 152 COLOR 34:PLOT PX(CP),PY(CP)-1:PLOT P
    X(CP)+1,PY(CP):RETURN
QX 170 R=LL=4)+2*LL=36)+4*LL=164)+4*CL
    L=132):RETURN
OD 180 COLOR ASC(SH$Z*2,Z*2)-32:PLOT PX
    (CP),PY(CP)
UE 182 COLOR ASC(N$(LV,LU)):PLOT PX(CP),PY
    (CP)-1
HF 184 COLOR ASC(SH$Z*2-1,Z*2-1)-32:PLO
    T PX(CP)+1,PY(CP)-1
XF 186 COLOR ASC(K$(LV,LU)):PLOT PX(CP)+1,
    PY(CP)
YF 188 POKE CSL,0:RETURN
JM 199 REM
FJ 200 LV=4:FOR P=32 TO 50:Z=LV(CP,LU)
    HM 210 IF Z>0 THEN G0SUB 180
    IO 220 NEXT P
NH 230 LV=3:FOR P=14 TO 68:Z=LV(CP,LU)
    OQ 240 IF Z>0 THEN IF LV(CP,4)=0 THEN G0SU
        B 180
IU 250 NEXT P
SH 260 LV=2:FOR P=5 TO 77:Z=LV(CP,LU)
    H5 270 IF Z>0 THEN IF (LV(CP,3)=0 AND LV(C
        P,4)=0) THEN G0SUB 180
JA 280 NEXT P
LM 290 LV=1:FOR P=1 TO 81:Z=LV(CP,LU)
    KN 300 IF Z>0 THEN IF (LV(CP,2)=0 AND LV(C
        P,3)=0 AND LV(CP,4)=0) THEN G0SUB 180
PK 310 NEXT P:G0SUB KEY
TL 400 P=41:REM
OD 410 ST=STICK(0):IF P<1 THEN P=81
RK 420 IF P>81 THEN P=1
YN 430 LOCATE PX(CP),PY(CP)-1,W:OP=P:PK=PEE
    K(764)
ZA 440 IF CH0=0 THEN M=W
QY 450 IF CH0=1 THEN M1=W
CF 460 IF PK=11 THEN IF CHEAT THEN UNDER=
    1-UNDER:G0SUB 82:REM
SW 470 IF PK=22 THEN 7000:REM
ZD 480 IF PK=58 THEN DIF=DIF-1)+2*CD
    IF 1>G0SUB KEY:G0SUB 90:STP=40:G0SUB
    SFX:IF DIF<LDF THEN LD=DIF:REM
QH 490 IF PK=186 THEN GOTO 6500:REM
DA 500 IF PK=190 OR PK=128 THEN GOTO 8500
    :REM
TZ 510 IF CHEAT=0 THEN UNDER=CHEAT
RD 520 IF PEEK(732)=17 OR PK=57 THEN CHEA
    T=1-CHEAT:G0SUB 82:POKE 732,0:REM
YA 530 COLOR 138:PLOT PX(CP),PY(CP)-1
EG 540 IF CHEAT THEN POSITION 14,1:? #6:C
    HR$(138):G0SUB 82:STP=30:G0SUB 85
JO 550 ON STRIG(0)=0 GOTO 700+10*CH0
RL 560 P=P+ST=7)-<ST=11-9*ST=14)+9*ST
    T=13)
YN 570 IF W<3 AND W>35 AND W>131 AND W
    <163 THEN P=P+ST=15)
PE 580 IF P<1 THEN P=81
RZ 590 IF P>81 THEN P=1
LM 600 COLOR M:LOCATE PX(CP),PY(CP)-1:Z=SQR
    (CSL):GOTO JOY
YL 700 STP=40:G0SUB SFX:LOCATE PX(CP),PY(C
    P),CA1:LOCATE PX(CP)+1,PY(CP)-1,CB1:PC1=P
    :CH0=1:GOTO JOY
TH 710 STP=50:G0SUB SFX:LOCATE PX(CP),PY(C
    P),CA2:LOCATE PX(CP)+1,PY(CP)-1,CB2:PC2=P
PL 712 IF PC1=PC2 AND UNDER=0 THEN GOTO J
    OY
UJ 720 IF CA1=60 OR CA1=130 THEN 750
RT 722 IF CA1=CA2 AND CB1=CB2 THEN GOTO M
    ATCH
UX 730 IF DIF=3 THEN 750
CG 740 IF CA1=6 AND (CA2=14 AND DIF=1) O
    R CA2=8) THEN GOTO MATCH
ZT 742 IF CA1=8 AND (CA2=9 AND DIF=1) O
    R CA2=6) THEN GOTO MATCH
UB 744 IF CA1=9 AND (CA2=8 AND DIF=1) O
    R CA2=14) THEN GOTO MATCH
IB 746 IF CA1=14 AND (CA2=6 AND DIF=1) O
    R CA2=9) THEN GOTO MATCH
DE 750 STP=2:G0SUB SFX:TIME=1:G0SUB 130
VE 760 COLOR M:PLOT PX(CP1),PY(CP1)-1
XI 770 COLOR M1:PLOT PX(CP2),PY(CP2)-1
LR 780 CH0=0:GOTO JOY
SP 800 LOCATE PX(CP1)+1,PY(CP1),CB:G0SUB
    170:R1=R
QJ 810 LOCATE PX(CP2)+1,PY(CP2),LL:G0SUB

```

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```

ZJ 9570 C$<201>="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
9580 X=USR<ADR<MV$>,57344,CHBA5*256,10
ZY 9590 X=USR<ADR<MV$>,ADR<C$>,CHBA5*256+
8,256)
DL 9699 REM *****
RD 9700 AS=CHR$(157):AS<2>="XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX":AS<20>=CHR$(156)
HE 9710 AS<21>="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TN 9720 AS<41>="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
BH 9730 AS<380>=AS<21>:AS<61>=AS<21>
SI 9740 AS<381>=CHR$(158):AS<382>=AS<2,19
:AS<400>=CHR$(159)
OK 9750 AS<401>="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX":RE
TURN
IH 9799 REM *****
ED 9800 NM=CHBA5+1:POKE 54279,N:POKE 53256
,3:PMB=N*256:POKE 53248,0
GC 9810 X=USR<ADR<MV$>,ADR<CL$>,PMB+260,1
20)
BT 9820 FOR N=0 TO 7:POKE PMB+269+N,51:NE
XT N:POKE 623,4
JZ 9830 ALPHA=USR<ADR<CL$>,ADR<CL$>,3,23,
0,C0):RETURN
  
```

LISTING 2

```

VM 10 REM GEMINI, LISTING 2
RD 20 REM BY FRANK KWEDE
GV 30 REM C-1985,1988 ANTIC PUBLISHING
EV 40 REM C-LINES 10-250 MAY BE USED WITH
OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FNS<20>:TEMP$<20>,AS<93>:DPL=P
EEK(10592):POKE 10592,255
W0 70 FNS=0:C-LINES=157:REM THIS IS THE N
AME OF THE DISK FILE TO BE CREATED
RD 80 ? "Disk or Cassette?":POKE 764,25
5
PY 90 IF NOT PEEK(764)=18 OR PEEK(764)=
58) THEN 90
TH 100 IF PEEK(764)=18 THEN FNS="C:"
VB 110 POKE 764,255:GRAPHICS 0:? " AN
TIC'S GENERIC BASIC LOADER"
MY 120 ? "BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? "Creating ";FNS:? "...plea
se stand by."
LM 150 RESTORE:READ LN:LN=LN:DIM AS<LN>:
C=1
BQ 160 AS=====READ AS$
YC 170 FOR X=1 TO LEN(AS$) STEP 3:POKE 75
2,255
DM 180 LM=LN-1:POSITION 10,10:? "Countdo
wn...":INT(LM/10):"
BK 190 AS<C,C>=CHR$(VAL(AS$X,X+2)):C=C+
1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? "GOT0
MANY DATA LINES!":? "CANNOT CREATE FI
LE":END
CM 210 IF C<LN+1 THEN ? :? "GOT0 FEW DATA
LINES!":? "CANNOT CREATE FILE":END
LN2 IF FNS="C:" THEN ? :? "Prepare ca
ssette. Press RETURN"
AR 230 OPEN #1,0,0,FNS
PV 240 POKE 766,1:? #1;AS:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? "XXXXXXXXXXXX
XXXXXXXXXXXX
JD 1000 DATA 860
FU 1010 DATA 0490540320780360610340030351
631310340580075036061034004036164132034
05800710360610340895238239187
LX 1020 DATA 19216503400506060820690650750
610490400480050074070089061052049040050
067064061050052048858883070
  
```

```

RE 1030 DATA 08806105605305800840730670610
103606665505050485050505050505050505050
0840730798063207980440550505
UG 1040 DATA 06303203406331450330000000331
460330000000331470330000000331480330304
0580800798030730804073079807
LU 1050 DATA 0320490440560580630320340781
0111903207109710910109320932082101112
1080071210320320320320320320320320320320
CJ 1060 DATA 1171051160320320320320781011
190320680101099107340591550570530490408
03206807603060610341041738049
EN 1070 DATA 0821332041730480021332031620
10210471001002104024105063141000002144
0832380010021041042010012000
YD 1080 DATA 0821692550241050041681691240
17203145203202208235104104133205104104
13206169000413208896072165
KI 1090 DATA 208208000616520852302082080041
982140123809634155057053051040804434
155057053050048032070060636
CI 1100 DATA 0610341041041332111041332101
04133213104133212104133212104170208002
19821416000041772104154212200
WM 1110 DATA 2080042302112302132022082421
98214012380963415505705305104080432082
066936061034104104104072162
DH 1120 DATA 0571600001730002101010201410
22208141010212136208242202208237104056
2330012082208096034155057053
SF 1130 DATA 05204800320670360610340002552
550800255255080019231219231219231219
231000063127127127127127127127
UK 1140 DATA 2542542542542542542530002240
6407807409408040920000082542381981078
17025422406806080608080808080808080808
HL 1150 DATA 08400802542140341550570530530
40306106106106106106106106106106106106
17025400025421414089170214
XH 1160 DATA 25400014600840021504008041461
1111111111111111111111111111111111111111
16221425424242424242424242424242424242
TS 1170 DATA 2462460002542141301701982382
540082541462021702021462540934155057053
054040032067036040049050809
UZ 1180 DATA 041061810340990730730730730991
27000115099115151515097127000099089121
1151030651270000671210999121
SS 1190 DATA 1210671270001150990750651231
13127000065079067125093099127000099079
067077079099127000065093121
HQ 1200 DATA 1151031031270000990730990730
7309912700009908909079121099127000034
1550570530505048032067036040
UK 1210 DATA 05004804940410610340002541301
06198146170254234170138142138170234080
002482520480623082062308206230820623082
SU 1220 DATA 0310663112094103111111111111
030961120630310002462462300060414252240
000000238170138206138170234
AI 1230 DATA 0341550570550480480320650360
610670720820360400490530505041050605036
04050041061034091291291291291291291291
ED 1240 DATA 129129129129129129129129129129
29129129129129034050605036040050048041
061067072082036040049053054
XG 1250 DATA 0411550570550490480320650360
40850049041061034139002194002194002194
00219400219400219400219400219400219400
NE 1260 DATA 1940021941410341550570550508
48032068036040052049041061034139149002
194002194002194002194002194
IM 1270 DATA 0821940021940021940021940021410341
550570550503400480320650360400520480049041
0619400219400219400219400219400219400
ME 1280 DATA 000000000000000000000000000000
0107300100000340508020690604050802078032
155
  
```

The Music Never Stops

Article on page 84

LISTING 1

Don't type the
TYPO II Codes!

```

MA 10 REM AMP JUKEBOX
BY 20 REM BY STEVEN LASHOVER
GD 30 REM (C) 1985,1988 ANTIC PUBLISHING
ED 40 REM CLINES 10-250 MAY BE USED WITH
    OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINES 70-75 TO NICE55AR.
PR 60 REM FNS(20)=TEMPS(20),ARS(93)=DPL=P
    EEK(10592):POKE 10592,255
    70 FNS="":JUKEBOX.EXE":REM THIS IS THE
    NAME OF THE DISK FILE TO BE CREATED
RD 80 ? "Disk or Cassette?":POKE 764,25
    PY 90 IF NOT (PEEK(764)=18 OR PEEK(764)=
    58) THEN 90
    TH 100 IF PEEK(764)=18 THEN FNS="C:"
    UB 110 POKE 764,255:GRAPHICS 0:? "    AN
    TIC'S GENERIC BASIC LOADER"
    MY 120 ? ",BY CHARLES JACKSON"
    KU 130 POKE 10592,DPL:TRAP 200
    LD 140 ? ? ? "Creating :FNS? "...plea
    se stand by."
    LW 150 RESTORE :READ LN:LN=LN:DIM A$(LN):
    C=1
    YC 160 ARS="":READ ARS:
    BC 170 FOR X=1 TO LEN(ARS) STEP 3:POKE 75
    4,255
    DM 180 LN=LN+1:POSITION 10,10:? "Countdow
    n...T...":INT(LN/10):"    "
    BK 190 A$(C,C)=CHR$(VAL(ARS$(X,X+2))):C=C+
    1:NEXT X:GOTO 160
    MM 200 IF PEEK(195)=5 THEN ? ? ? "GOTO
    NAME DATA LINES!":? "CANNOT CREATE FI
    LE"
    CM 210 IF CLN=1 THEN ? ? ? "GOTO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
    AR 220 IF FNS="C:" THEN ? ? ? "Prepare ca
    ssette, press RETURN!"
    AU 230 OPEN #1:0,0,FNS
    PU 240 POKE 765,17:ARS=POKE 766,0
    PL 250 CLASE #1:GRAPHICS 0:? "Disk or
    Cassette?"

```

[illegible][illegible]

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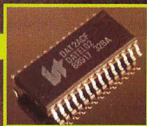
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