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SPECIAL ISSUE NUMBER TWO

THE ST QUARTERLY
STARTTM
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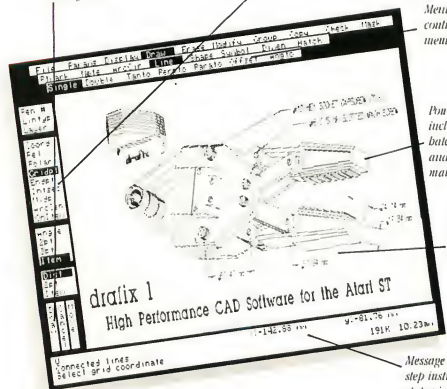
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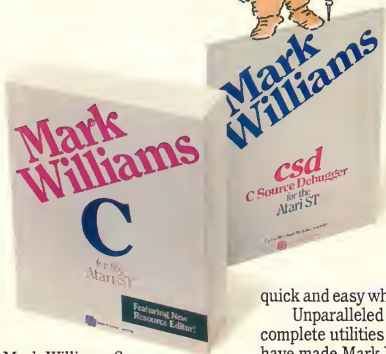
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THE ST QUARTERLY START™



Blues master B. B. King and bis ST, page 68



Blues master B. B. King and bis ST, page 68

22 ART: CAVE WALLS TO GLOWING PHOSPHOR

Drawing and painting programs by Marcus Badgley

37 THE ELECTRONIC T-SQUARE

Computer-aided drafting by Dave Edwards

46 DESKTOP VIDEO!

Personal computer animation comes of age by Matthew N. Shelly

53 PIXELS ON PAPER

Creating banners, posters and cards by Tom Hudson

67 MIDI SPELLED OUT *A glossary of terms*

68 ROCK 'N' ROLL WITH ATARI

Music stars and your favorite computer by Mard Naman

79 HOME RECORDING ON A BUDGET

Setting up your own MIDI studio by Jim Pierson-Perry

82 SYNTHS, SAMPLERS AND DRUMS

A shopping list of music hardware by Jan Paul Moorhead

COLUMNS:

- 14 News, Notes and Quotes
- 19 Online
- 62 For The Fun of It

REVIEWS:

- 90 Catch the Waveforms, Save A Thousand Sounds
Compu-mates' Synth-Droid and Beam Team's Xsyn patch editors
- 111 Music Made Easy *The Music Studio and Music Construction Set*

PROGRAM ARTICLES:

- 32 The Cartoonist *Animation the easy way*
- 75 MIDI View *Take the hex off your data*
- 103 Ear Trainer *Your personal music teacher*

SECTIONS:


- 6 Editorial
- 8 Dialog Box
- 57 Clipboard
- 58 Products Update
- 66 Disk Instructions
- 114 Advertisers' Index



Learn to play by ear, page 103



ST animation programs, page 46

 Indicates programs included on START Disk. See order card on page 66 if you did not buy the disk version.

February 1988, Volume 2 Number 4. START, The ST Quarterly (ISSN #0889-6216), is published eight times per year: February, March, April, June, August, September, November, and December, by Antic Publishing Inc., 544 Second St., San Francisco, CA 94107. Application to mail at second-class rates is pending at San Francisco, CA and at additional mailing offices. Subscriptions: U.S. \$39.95 (8 issues with disk) Canada and Mexico \$47.95 (8 issues with disk). Other Foreign \$51.95 (4 issues with disk). POSTMASTER: Please send address changes to START, The ST Quarterly, P.O. Box 2370, San Francisco, CA 94126-2370.

THE ST QUARTERLY **START**

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EDITORIAL

Why, you may ask, an entire issue devoted to music and graphics? The reason is that because the ST shines so in these areas we felt it important to give you as much information as possible. And—as a bonus. The bonus is that this year START will come out eight times, our four regular quarterly issues and four special issues. Subscribers will be receiving eight issues for the price of four.

So, what's in this issue? You've probably noticed B.B. King on the cover. Yes, he uses an ST as many other music celebrities do, and you'll read about them in "Rock 'n' Roll with Atari," by Mard Naman. Jim Pierson-Perry tells you how to set up your own home MIDI recording studio and professional musician Jan Moorhead reviews some new Compu-mates software and gives a thorough run-down of music equipment in "Synths, Samplers and Drums." For those of you just introducing yourself to music on the ST be sure to read the comparison review of the Music Studio and Music Construction Set.

In the art department, there is something for everyone too. Professional artist Marcus Badgley compares nine different paint and sprite editor programs in "From Cave Walls to Glowing Phosphor." You don't, however, have to be a professional artist to use the programs—be sure to read all about it. Some fine CADD software packages for the ST are now on the market, and Dave Edwards compares them for you in "The Electronic T-Square." Also, be sure to read "Desktop Video!" You'll be surprised and delighted. Clearly, the ST is coming into its own in the graphics and music spheres, and we're making it our business to give you all the details.

But the power of the ST doesn't stop with music and graphics. Senior Editor Frank Hayes in his "News, Notes and Quotes" talks about new products from Atari, products designed to serve business people. The Abaq workstation (not on the market yet) offers tremendous potential to the business and scientific community. We'll keep you posted on its development. There's also software now on the market that lets the STs do multi-user, multi-tasking functions, a LAN network is available, and the CD-ROM hardware is due out in February. Atari means business! And our next special issue will be devoted to that topic.

In Spring START we'll be helping you with your taxes, telling you how STs are used to study earthquakes and reviewing some Macintosh and IBM PC software—that's right. You now can have three computers in one.

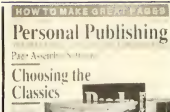
Let us know what you think of this special issue. We're always looking to hear from you.

Anita Malnig
Anita Malnig
Editor

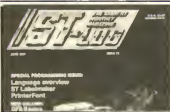


Erik Weber

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I've owned an Atari 520 ST with ROM update for 20 months and am very pleased with it. However, it's been a problem finding good information about the machine, as well as good software. That is, until I found (for the first time) your magazine. That happened last Saturday in Spokane at the computer store "Bits, Bytes & Nibbles." Thanks to them and you I think the 520 ST will be an even better tool and friend.

Thank you, and in deep appreciation,

E. Lloyd Thompson
Boise, ID

HOORAY FOR MR. KOFSKY

I've been a home computer owner for over four years now and have just recently sold my beast (an Apple II+).

The decision to sell has not been an easy one, as I would have to take a kicking on my investment. I thought I could cut my losses by either just upgrading or buying a compatible machine.

The town I live in has only one computer store, which is where two friends and I purchased our machines. Our "dealer," after we all spent close to \$9,000 (Canadian), refuses to support us, saying he has gone over to business machines.

Needless to say we've tried taking our business elsewhere, and that is where Mr. Kofsky's column (START, Fall 1987) comes in. There wasn't one experience that he related that I haven't experienced, most of which in one outing! Four dealers told me that I was "stuck" with a dinosaur, a fact I already knew, and in fact was the reason I was talking to them. When I asked about upgrading my II+, two dealers actually had to

stifle chuckles.

I was also told that there was no "apparent need to stock" or "maintain contacts" for Apple II+ parts, but they would be glad to show me the IIGS! I asked him what I was supposed to do with my "dinosaur." I was told at one place "put it out if its misery!"

Seeing as how this letter is handwritten you can probably guess what I haven't bought yet. No, not through dealers, but through magazines. That's how I came to pick up START. I'm seriously looking at the 1040 ST, or the Amiga 500. I plan to take my time, and to shop mail order, in the States.

Hip hip! for Mr. Kofsky!

Wesley Watts
Banff
Alberta, Canada

Naturally we recommend the ST—good luck with your purchase. You might also inform Apple Computer of your trials and tribulations with the Apple II+.

PRINTER WOES

I recently bought an NEC P6 color printer. I have DEGAS Elite and a copy of your article on printer drivers in the Spring 1987 issue of START. I used the disk and made a driver, but it doesn't work in color. I assume that the drivers in the magazine are only for black and white. I was wondering where I could get a 24-pin color driver for my printer or how I could modify the driver in the magazine to work in color. The JX80C driver that comes with DEGAS Elite works but only in the 9-pin mode, and the results aren't very satisfying.

Thank you for any help you can give me.

Michael Lavender
Pleasant Hill, CA

There is a public domain printer driver for DEGAS Elite that will work with your printer. The file name is NECPSC.PRT, and at this writing it can be found in Data Library 12 of the ATARI16 SIG on CompuServe. If you can't find it in that Data Library, ask a Sysop. This driver was designed for the NEC P5, but will also work with the P6 and P7. You might also be able to get it from your local Atari users group or, at the very least, have one of its members download it for you if you don't have a modem.

ALERT BOX

In the START Buyer's Guide, STAccounts was listed as \$249.95. The actual price is \$149.95. STAccounts is available from ISD Marketing, 2651 John St., Unit 3, Markham Industrial Park, Markham, Ontario, L3R 6G4, Canada. (416) 479-1880.

Also, the IMG SCAN image scanner is \$99.95, not \$59.95. The IMG SCAN is available from Seymour-Radix, P.O. Box 166055, Irving, TX 75016. (214) 255-7490.

The Buyer's Guide Word Processing Chart indicated that ST Writer does not include mail-merge, an outline and the ability to insert a page wait command. Current versions of ST Writer (1.75 and above) do include these features.

Finally, DX-Heaven (reviewed in START, Fall 1987) does allow you to click on a patch parameter and type in a new value. DX-Heaven is available from Dr. T's Music Software, 66 Louise Road, Chestnut Hill, MA 02167. (617) 244-6954. ■

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MIDI IN MINNEAPOLIS

Can you help me find some information on programming MIDI in Atari, True or GFA BASIC? I've tried to access the MIDI ports in ST BASIC and had absolutely no luck. What I want is to be able to do is send and receive data (from the ESQ's onboard sequencer) and patch data (known as system exclusive data) to the 1040's internal disk drive. If this is a difficult operation in BASIC (since I do not have much experience programming) might you refer me to some literature on the subject and/or recommend some program(s) that would do the same thing?

I just read about CAD-3D 2.0 and Cybermate. They look awesome, but I'm wondering if I'll be able to synchronize animated graphics with my MIDI in-

strument. Can you tell me if this is possible, and if so, how difficult is it?

Also, which do you think is the best BASIC language to learn and then transfer to C or Forth?

I would really appreciate some help since most people around Minneapolis have never even heard of MIDI.

Jeff Jewson
Minneapolis, MN

You can access the MIDI ports from ST BASIC by using the INP and OUT commands; the syntax for receiving data from the MIDI port is:

A = INP(3)

In this way, you can receive data a byte at a time from your synthesizer and manipulate it in your program. The real trick, of course, is interpreting the data as it comes

in. Each instrument has its own system exclusive commands, and you will need to refer to your Ensoniq's owner's manual to see how your machine "speaks MIDI."

Fortunately, there is a commercial program that will do what you want. It's called ESQ-APADE and is available from Dr. T's Music Software, 220 Boylston St., Suite 306, Chestnut Hill, MA 02167, (617) 244-6954. ESQ-APADE is priced at \$129.

At this time the only way to add sound effects to Cybermate animations is by using the program G.I.S.T. (available from The Catalog, Antic Software, 544 Second St., San Francisco, CA 94107, (800) 234-7001, \$34.95); however, this program does not currently work with MIDI. Cybermate author Mark Kimball is working on an upgrade to Cybermate that will let you enter sound effects directly from a synthesizer.

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If you plan to eventually learn a modular language like C or Forth, but want to use BASIC in the meantime, your best bet is probably to use a structured, modular version of BASIC to make the transition easier. You may want to look into either the new, USA version of Fast BASIC (Eidersoft USA, Inc., PO. Box 288, Burgettstown, PA, 15021, (412) 947-3739, \$89.95) or GFA BASIC (MichTron, 576 S. Telegraph, Pontiac, MI, 48053, (313) 334-5700, \$79.95). Another choice is the LDW BASIC Compiler Ver. 2.0 (Logical Design Works, Inc., 780 Montague Expy., Suite 403, San Jose, CA 95131, (408) 435-1445, \$89.95), which is very close to C in its structure and even lets you use some C calls so your programs would be easy to translate. ■

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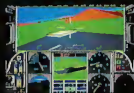
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NEWS, NOTES & QUOTES

New From Atari

At the annual Fall Comdex trade show in Las Vegas, the Atari booth was one of the hottest places to be. Atari's goal was to demonstrate that the ST is a serious business computer that can compete with the IBM PC and Apple's Macintosh.

The most exciting thing at Atari's booth was undoubtedly the Abaq, Atari's first high-performance personal workstation. It's a spectacularly powerful graphics computer that offers up to 1280-by-960 pixels in 16 colors—or a phenomenal 1024-by-786 in 256 colors! The Abaq is based on the Immos Transputer parallel processor that can run at ten times the speed of an IBM PC/AT (Tom Hudson described the Transputer for START readers in the Fall 1987 issue). The prototype that Atari showed was built around the new Mega 4, using the Mega's expansion connector to tap the Transputer's tremendous power.



Super model meets super modeling: Cheryl Tieg and roy-tracing on Atari's Abaq.

Atari also introduced the long-awaited Atari CD-ROM disk drive (How long awaited? Atari demonstrated a CD-



Atari's Abaq workstation, on display at the 1987 Fall Comdex.

ROM drive connected to a 520 ST way back in 1985!) The new Atari CD-ROM player can store more than 500 megabytes of files—that's the equivalent of more than 1,000 single-sided floppy disks—like the CD-ROM drives for the IBM PC. But the Atari player also plays music on compact disks through your stereo system. It should be available in

February for \$599.

Atari's SLM804 Laser Printer was at Comdex, too—and it was joined by Deskset and Microsoft Write. Deskset is a desktop publishing and typesetting program from G.O. Graphics, and Microsoft Write is the popular word processor that was previously available only for the Macintosh.

But for business users, the biggest news of all may be Idris from Whitesmiths, Ltd., a multi-user, multi-tasking operating system that's now available for STs and Megs. No, it's not GEM compatible—it's Unix-like, opening a wide range of business and scientific software to ST users.

And Atari announced that STs and Megs are now compatible with PromiseLAN, a local-area network that can also connect IBMs and Apples, letting them communicate at up to 1 million bits per second.

Atari also announced new computers that are compatible with IBM's XT and AT at Comdex. But it was clear at the show that the IBM world took a back seat to the ST.

Word Im-Perfect?

The first release of WordPerfect for the ST arrived in time for Comdex, too. Unfortunately, it's not quite perfect yet. START's technical staff ran WordPerfect through its paces, but had a hard time keeping the program running for more than a few minutes without crashing.

Fortunately, help is on the way. According to Jeffrey R. Wilson, WordPerfect's manager for Atari development, his team has been hard at work tracking down bugs and making fixes to the program. Just four weeks after the program was originally released, there was a new version—and by the time you read this, there will be yet another version.

continued on page 16



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The most common problems, Wilson explains, show up when different parts of the WordPerfect program have difficulty communicating with each other or with the ST's operating system. There was also a fairly spectacular problem with early versions of WordPerfect running with GDOS: "When you leave WordPerfect, you return to the desktop, but nothing works—you have to reset the machine," says Wilson. He says they've solved that problem in the new version of the program.

START will be reviewing that new version of WordPerfect soon. In the meantime, if your copy of WordPerfect is giving you problems, call WordPerfect Corp.'s toll-free support number: (800) 321-5906. They'll replace a version that doesn't work with one that does. They also want to hear about any bugs you discover. WordPerfect is \$395 from WordPerfect Corporation, 288 West Center St., Orem, UT 84057; phone (801) 225-5000.

Desktop Publishing Update

Atari's introduction of Deskset from G.O. Graphics (see above) wasn't the only exciting Atari desktop publishing news at Comdex. Three other companies also announced new ways of turning your ST into a publishing house.

Publishing Partner, the original ST desktop publishing program, now has a new big brother: Publishing Partner Professional. New features include automatic text flow around graphics, auto-hyphenation and kerning, and the ability to import formatted 1st Word, Word Writer and WordPerfect files. Professional is \$14995—and the original Publishing Partner is now only \$8995. They're both from Soft Logik Corp., 11137 South Towne Square, Ste. C, Saint Louis, MO 63123; phone (314) 894-8608.

Timeworks is jumping into the fray with Desktop Publisher ST,

which offers word-processing features, a graphics toolbox, automatic text flow, plenty of line and fill patterns, and kerning and adjustable leading. It can also import text from word processors and pictures from drawing programs. The program is \$9995 from Timeworks, Inc., 444 Lake Cook Rd., Deerfield, IL 60015; phone (800) 535-9497.

And on the high end there's now Calamus for the Mega—it offers an integrated word processor and paint program, 16 simultaneous typefaces in 249 sizes, macro commands, and a sophisticated font editor. There's also a special zoom feature that lets you see every dot that will appear on a laser-printed page. Calamus is \$34995 and requires a Mega—it's from ISD Marketing, 2651 John St., Unit #3, Markham, Ontario L3R 2W5 Canada; phone (416) 479-1880.

That's Show Biz

Desktop video on the ST is being seen in all the right places these days! For example, Tom Hudson's Ray-Tracing Construction Set from the Spring 1987 issue of START has been put to good use by KTEH-TV, the public television station



The KTEH Video Box logo.

in San Jose, California—the heart of Silicon Valley. Dann Parks, art director for Channel 54, has used it to create an animated logo for the station's public-service announcements. Dann's also using Animator ST and DEGAS Elite to create opening credits for several other locally produced shows.

Animator ST is \$79.95 from Aegis Development, 2115 Pico Blvd., Santa Monica, CA 90405; phone (213) 392-9972. DEGAS Elite is \$59.95 from Batteries Included, whose products are distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404; phone (415) 571-7171. You'll also find more animation and desktop video products in this special issue of START.

If you'd like to see more articles like this, circle 235 on the Reader Service Card. ■

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Graphics And Music: Where to Get Them

by Gregg Pearlman

When it comes to ST graphics and music, the best place to look is online, on such services as CompuServe and GENIE, or local bulletin board systems. You'll find a wealth of professional-looking sights and amazing sounds. Users frequently upload their own graphics and music files, but often they upload files found elsewhere, such as a BBS. Someone digitizes Donna Rice with Color Computereyes, edits the picture in DEGAS Elite and uploads it to a BBS; someone else downloads it, then uploads it to a graphics library in the Atari 16-bit hardware forum on CompuServe—where perhaps *hundreds* of people download it and then upload it to other boards, GENIE, Delphi or other online services.

The online service most familiar to the START staff, of course, is CompuServe, home of ANTIC ONLINE, Antic Publishing's electronic magazine.

GO ATARI16

You've logged onto CompuServe. At the TOP Page, type GO ATARI16 for the Atari 16-Bit Forum. Once in ATARI16, wait for a "Function:" prompt. Then type "ln" for a list of data libraries available. At the next Function prompt, enter the number of a graphics or music library. (About the only way to know

which download libraries have music or graphics is to look for yourself, as these change frequently.) At the "DL n!" prompt, type "bro" to browse the files—to see what there is to download. If you want a particular type of file, be it DEGAS, NEOchrome, Spectrum, MIDI, etc., then at that DL prompt type



Rito Hayworth, digitized with Novorone Industries' ST Scan, converted to RLE format, and uploaded by Antic Online to the Atari 16-bit forum on CompuServe.

"bro/key xxxx," where xxxx is a keyword to search on.

After the file information, keywords and brief description of each file is the following prompt: (R D M) ! Enter R to Read a text or RLE (Run Length Encoded) file, D to Download the file, or M to return to the previous Menu.

If you log onto GENIE, at the TOP page enter 5 for Computing. Then enter 2 for the Atari RoundTables, and 2 for the ST RoundTable. Then enter 3 for the ST libraries, and 8 to set the library, which gives you a list. For graphics, choose 5 (Graphics & Art), 10 (Demos) or 12 (Adult Library). For music, choose 11 (Music). On the library page, enter 2 for a file directory, 3 to search the directory, or 4 to browse the files. Then just follow the prompts.

GRAPHICS FILES

Here's just some of what you'll find in the graphics libraries:

- DEGAS or DEGAS Elite pictures: converted from Amiga, Macintosh or even Atari 8-bit formats, or made with CAD-3D 2.0. Or videotape, laserdisk or still life images digitized with Computereyes, MichIron's Realizer or Hippovision. Or freehand drawings of all kinds. Often these files have been archived, meaning that several files have been compressed and strung together, thus saving you download time (and money).
- Images created or to be viewed with Spectrum 512.
- Images scanned with Navarone's ST Scan.
- Animations done with the Cyber Studio, Animator ST or Make It Move.
- Pictures in Graphics Interchange Format (GIF), found only on CompuServe. GIF lets you exchange high-resolution graphics between your ST ▶

and several other types of personal computer.

- Program and utility files, such as data library listings, graphics conversion programs, documentation and printer drivers.

What are all these pictures of? Everything. Spaceships. Digitized Renoirs and Gainsboroughs. Fractal landscapes. Celebrities such as Christie Brinkley, Sheena Easton, Jessica Hahn and Darryl Hannah's sister, not to mention Charlie Chaplin, Rita Hayworth, Max Headroom and Bugs Bunny.

MUSIC FILES

Music files include voice/configuration editor/librarians in compiled GFA BASIC, songs done with Electronic Arts' Music Construction Set and Activision's Music Studio, digitized sound effects (including voices for the Star Trek game) and archived files containing songs that play while you run other programs. Many songs are specifically for particu-

lar synthesizers, such as the Casio CZ-101.

As with the graphics, the choice of songs covers all the bases. If you're not interested in Bach or Mozart, there's always St. Elmo's Fire's love theme, Rick Wakeman's Six Wives of Henry VIII, the Beatles, or original compositions.

There's plenty of MIDI and other music files for the downloading in the Atari Base BBS, the ST Programs area on the Delphi information service and such MIDI-specific systems as Hybrid Arts' MIDI World Network BBS and the TACE BBS in Temple, Texas, which serves the Temple Area Computer Enthusiasts. But don't forget your local BBS, either.

If you'd like to see more articles like this, circle 226 on the Reader Service Card. *Gregg Pearlman is Assistant Editor of Antic.*

REFERENCES

- CompuServe, Inc., 5000 Arlington Centre Blvd., P.O. Box 20212,

Columbus, OH 43220. Voice phones: (614) 457-0802; (800) 848-8199.

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- GEnie (General Electric Network for Information Exchange), General Electric Information Services Co., 401 N. Washington St., Rockville, MD 20850. Voice phone: (800) 638-9636.

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- Delphi, General Videotex Corp., 3 Blackstone St., Cambridge, MA 02139. Voice phones: (800) 544-4005; (617) 491-3393.

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ART:

CAVE WALLS TO GLOWING PHOSPHOR

DRAWING AND PAINTING PROGRAMS

by **Marcus Badgley**

While it's not a Pixar supercomputer, it is the Atari ST, a sophisticated graphics tool. Let professional artist Marcus Badgley show you the best art programs for the ST—software to help you make the transition from cave daubing to pixel painting.



"Way Back When" by Marcus Badgley. Artwork done with DEGAS Elite.

It's amazing how much art has changed in 15,000 years. Dozens of styles and techniques have evolved through the ages, all joined by a continuous thread of progression. We've come a great distance in our understanding of light, shadow, color, form and perspective. From the cave paintings of Lascaux in France to the ray-traced computer images of today, our creative expression has evolved greatly.

Today, powerful computer systems such as the Cray, the Pixar, the Quantel Paintbox and Cubicomp are capable of

very complex imaging. Lighting, shading, reflections, the tonal qualities of different materials, movement—all these aspects of nature have been deciphered and coded.

Where our ancestors perceived and drew light, we *create* light.

Enter The ST

When I first played with Atari ST graphics, I was amazed. The colors were so brilliant, it was like painting with neon. Coming from a semi-traditional artistic background, I found drawing on

the ST was challenging, exciting and rebellious. How dare it be so easy—no brushes to clean, no running out of paint!

Recently, I've explored many ST art programs, and have found all add something unique to our artistic progress. There are many different kinds of art programs available—from straight paint packages to sprite designers. Some packages combine these features. But whatever their differences, you can find an ST program to fulfill your artistic needs. ▶

ART: CAVE WALLS TO..

NEOchrome

When the Atari ST was first released, every ST computer sold included NEOchrome, a simple, easy-to-use paint program.

NEOchrome has been enhanced considerably since its debut, and is now



NEOchrome

being sold by Atari's software division. NEOchrome is fast and still easy to use, although not as chockful of features as some other ST paint programs. (It works only in low-res color, for instance.) It has a nice array of drawing and painting tools, eraser and K-line functions. (K-line lets you place a point anywhere on your screen, stretch a line from it to another point on your screen, and then set it.) You can define a brush by "grabbing" a portion of your screen and then drawing with it as a block. Geometric shapes come in a generous variety, including rounded rectangles and polygons, with or without borders.

NEOchrome includes text features that are also very easy to use. The one font available has several styles (bold, italic, underline and outline) and can be right- and left-justified as well as centered. NEOchrome also makes use of the ST's extended character set, which remains untapped by the other programs reviewed here.

Among NEOchrome's most notable features are the Jack Knife, the Block functions and Color Cycling. With the Jack Knife you can cut out unwanted portions of an image or create a free-hand block, and then position it behind

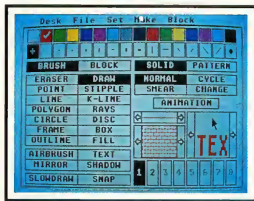
another image. The Block functions can do simple manipulations of blocks (flipping and rotation) besides just cutting and pasting. You can select colors from the Color Map (a 512-color palette which doubles as a magnifier), or by adjusting the RGB palette. NEOchrome also has simple color cycling controls, used to create the illusion of movement or simple animation.

Though the manual is quite clear, NEOchrome is so self-explanatory that you'll be drawing in no time, even if you're a beginning artist. Included on disk with the NEOchrome program are several sample pictures and a separate slideshow program to show them.

This is an excellent program for doodlers and those sharpening their skills. The serious artist might find NEOchrome a bit too simple, lacking in additional work screens and more powerful functions.

DEGAS Elite

DEGAS was the first full-featured drawing program for the Atari ST. The original (now no longer available) worked in all three ST resolutions—low- and medium-res color, high-res monochrome—and included many var-



DEGAS Elite

ied drawing features. Now it has been supplanted by DEGAS Elite, which includes all of DEGAS' original features, but which adds many new ones as well.

DEGAS Elite retains the original DEGAS look and feel while expanding in almost every area. It also makes use of GEM (desk accessories can be loaded

from the root directory) and GDOS (which lets you output to peripherals with greater resolution than your actual



Paintworks

ST screen). It also allows you to have multiple workscreens, depending on memory; on a one-megabyte ST you can have up to eight.

DEGAS Elite features freehand lines, points, K-lines, rays, boxes and circles, all with user-definable brushes. It also has an airbrush with multiple flow and dispersion settings, ten different magnify windows, mirror effects and shadow. Its text features include a separate font editor with which you can create new fonts or even foreign character sets. And, like NEOchrome, it includes a slideshow program.

Some of the other features Elite has that the original DEGAS didn't are Stipple (similar to Airbrush, except it uses your current brush), Snap (an invisible grid allowing you to align images or blocks), Outline, and Smear, letting you blend colors. The Fill option has been enhanced by the addition of multicolor fills. You can choose a preset fill, create your own or grab a pattern from your image.

DEGAS Elite's Block functions are where the program really shines. You can grab a portion or all of an image and manipulate it as a block, skewing, inverting and stretching it, as well as moving it from screen to screen. You can work on several drawings simultaneously, cutting and pasting among them, although your colors are limited to the same palette. Elite also features

sophisticated color cycling and multiple text styles, and lets you load new fonts.

DEGAS Elite can load either compressed or uncompressed images drawn in any resolution (low, medium, high) into the current resolution. Color images drawn in low- or medium-res will be converted to high-contrast black and white when loaded into high resolution. It can load files from DEGAS, NEOchrome, Koala Pad (Atari 8-bit) and Amiga .IFF formats. Separate files for blocks, brushes and fills can be saved and retrieved.

My only complaint with the program lies in the overly complex method needed to load new fonts in order to work with the GDOS configuration. Overall, though, DEGAS Elite is an excellent general-purpose program. It's powerful but simple to use, requiring a rare visit now and again to the manual for the more complex functions. For complex artwork, DEGAS Elite is a must.

Paintworks

When it first appeared, Paintworks, formerly N-Vision, filled in some of the gaps left by NEOchrome and DEGAS. It's a fairly powerful program, although it's been superseded by some of the new paint programs on the market.

Paintworks does offer a nice array of drawing features—freehand lines, brush, K-lines, radiating lines and many geometric shapes such as concentric circles, ovals, squares and rectangles. Five different modes (Replace, See-through, Reverse, Mask and Cycle) govern most of the drawing functions, such as line, text and copy. These modes indicate how certain drawing tools will affect the image. You can create your own brushes by capturing blocks. The Block functions, which basically encompass Move and Copy, can be used to transfer images between the main screen and the clipboard. Color controls offer options like Blend (which computes an intermediate shade between two colors), Swap (which exchanges order or se-



"Moo and Bazoo on Parade" by Marcus Badgley. Artwork done with Spectrum 512.

quence of colors) and Copy (which replaces one color with another). There is also a sophisticated color cycling feature, though it's fairly complex to use.

The text feature offers two fonts (serif and sans serif) which come in various styles and sizes, although this bare-bones feature could be enhanced and the individual characters designed with a little more finesse. Activation has mentioned that more fonts will be available, although none have appeared as yet. Other details, such as X- and Y-coordinates, cursor movement from the keyboard, a three-level zoom and four fill modes add zest to Paintworks.

Paintworks includes strong support for printed output, letting you produce both screen-sized or full-page images. The latter must be scrolled up and down in order to be worked on, the advantage being a full 8.5 x 11-inch print-out. There is also a clipboard to experiment on ideas, the contents of which may be saved or printed.

Paintworks's disk options enable Page, Screen and Clipboard files to be saved or retrieved in compressed or un-

compressed formats, the latter being NEOchrome-compatible. Also of interest is Activation's Music Studio, which you can tie into Paintworks and create musical slideshows. (A review of The Music Studio appears elsewhere in this issue.)

Paintworks is an ambitious program, having some powerful and unique features. However, the program could be enhanced by adding more workscreens, block functions and new text features. If we're lucky, perhaps Activation will release an updated version.

Paint Pro

Paint Pro is very similar to the other programs reviewed here, but with its own special touches here and there. Paint Pro works in all three resolutions and makes considerable use of GEM, and it even uses the GEM Control Panel desk accessory for selecting and adjusting the color palette. You use GEM windows to contain your artwork, with up to three windows available. A wonderful asset here is Paint Pro's provision to let you work on three images, each with a

ART: CAVE WALLS TO . .

different color palette. Paint Pro also has several Block functions whereby you can flip blocks, mirror, copy and move them, or invert colors on them. You can also save blocks for later use.

Other goodies include zoom, text with loadable fonts, a choice of line thicknesses and ends (square, arrow or round), the ability to edit and save fill patterns and a separate program to convert Macintosh drawings into something an ST can digest.

There's not a lot more to say about Paint Pro—it's simple, well-rounded, and you can draw with it!

Easy Draw

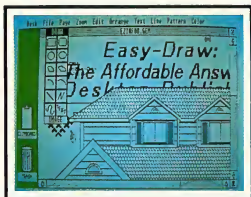
Easy Draw differs from the other packages reviewed here, as it has more in common with drafting and desktop publishing than with painting. Easy Draw, though not as powerful as true computer-aided design (CAD) packages, is very efficient for creating simple drafting and design work. It makes extensive use of GEM, GDOS and metafiles, a way GEM has of storing graphics primitives to disk. The inclusion of these three items ensures ease of use and high quality printout. In fact,



Paint Pro

Atari uses Easy Draw to demonstrate the capabilities of their laser printer.

Easy Draw starts you off with an ample toolbox, containing items for freehand drawing, geometric shapes and text. As each object drawn exists on its own "sheet," or layer, whole drawings are made of composites of one or more sheets. The approximate maximum



Easy Draw

number of objects (layers) per drawing depends on memory size: 4,000 with 512K; 12,000 with one megabyte. You can make the layers transparent or opaque, and can edit them as needed—you can modify or delete any layer. As regular paint programs, Easy Draw treats layers as blocks which can be copied, flipped, and stretched. Easy Draw also offers two drawing windows and a clipboard for transferring and storing ideas.

Other options include numerous paper sizes, rulers, grids, zoom, shadow and patterns (40 preset or user definable). Lines come in different types, widths and ends. The text feature lies somewhere between those of DEGAS and Publishing Partner. Newsletters, posters and other graphic items can be created by combining text and drawings. Up to six fonts can be loaded into memory and used in a variety of styles and point sizes. As stated earlier, by using GDOS and metafiles, Easy Draw can output to a variety of printers and plotters, for extremely high quality printouts. Both this feature and Easy Draw's method of drawing are its greatest assets. Also of note are the excellent manual and additional disks of clip art and fonts available for use with Easy Draw.

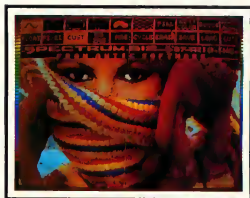
On the down side, I find Easy Draw's freehand drawing mode difficult to control. Yet Easy Draw is not about freehand drawing, it's about design, and I find it a welcome addition to the Atari family of paint programs. By omitting the more powerful functions in true

CAD and desktop publishing packages, it makes both available to those who desire to create simple designs. I like Easy Draw quite a bit, and find it balances the other paint packages I use for my own work.

(Editor's note: Migraph has just released *The Supercharger*, an add-on product for Easy Draw designed especially for page layout work. It lets you load images, either from a drawing program or a scanner, onto your Easy Draw page. The package includes two programs—an image converter and a snapshot utility—and comes with its own copy of Easy Draw. It also includes several fonts, including Times Roman, Courier and international characters. *The Supercharger* requires one megabyte of memory.)

Spectrum 512

And now for something completely different—and mind-boggling! Spectrum 512 lets you draw with all 512 colors available on your ST screen simultane-



Spectrum 512

ously. Your only limitation is that you're limited to 48 colors on each scan line of your screen. (Spectrum also only works in low-res.)

Spectrum 512 includes pencil, brush (38 types), polyline (lets you define points, then draws lines between them), circle, airbrush (four sizes, with nine flow rates), and fill. In addition, it has magnify and block functions, and patterns (preset and user definable). You can store blocks in a buffer capable of storing 12 full screens on a one-megabyte machine. Though Spectrum's

block functions are not as varied as DEGAS Elite's, it can flip and resize them, and you can save and load them.

In Spectrum 512 you pick your colors from several hexagonal palettes in a "pop-on" menu bar. You can alter one or all of the colors in your artwork (changing the hue and luminosity) with the Edit Color option. Speaking as a fine artist who's studied color, I find the processes within Spectrum very realistic. There is a satisfying sense of mixing



The Advanced OCP Art Studio

paint and not just changing RGB settings.

Spectrum has an antialiaser (which blends colors between two extremes, reducing the stair-step look of diagonal or curved lines, or "jaggies"), operating in a wide variety of modes varying from subtle to outrageous. Similar to the antialiaser is the No Zag option used with various drawing tools. Drawing an ellipse with No Zag will result in a completely smooth ellipse drawn with scores of colors.

One of Spectrum's most impressive features is Gradient Fill. With it, you can define two (or more) colors in a particular area and have the program interpolate a literal "spectrum" of hues between them—going from deep navy blue to sky-blue, magenta, then brilliant red. (Editor's note: An example of the Gradient Fill function appeared as the background to the cover of the START Buyer's Guide.) The only drawback to Gradient Fill is that it takes some experimentation and practice to control the effect.

Spectrum's disk options are straight-

forward, letting you save compressed or uncompressed picture files. Spectrum can load DEGAS, NEOchrome, .IFF and Amiga HAM (Hold And Modify—4,096-color picture) formats. There's also a separate program to convert Spectrum images (512 colors) down to DEGAS format (16 colors), where you can then print the images. The well-written manual has numerous tutorials, and includes sections on drawing techniques, photographing artwork off the screen and using the slideshow program.

Spectrum 512 is an exciting program capable of many complex functions. But it's not the only 512-color paint program for the ST. At press time, I received a beta copy of GFA Artist, a new paint program from Michlron. The program boasts the ability to display 1,021 colors simultaneously, will let you design sprites, and does color cycling and animation. It should be available by the time you read this. (Editor's note: A review of GFA Artist will appear in a future issue of START. We also heard of an English program called Quantum Paintbox that purports to let you draw with 512 colors. We'll give you more information as we get it.)

By freeing us from the 16-color low-res limit, Spectrum, GFA Artist and the Quantum Paintbox promise to broaden our creative potential and offer computer artists the chance to attain new heights. Thumbs up to more color!

OCP Art Studio

OCP Art Studio is both a full-function paint program and a sprite designer



ST Sprite Factory

with animation capabilities. OCP has many features, and because of its dual nature, takes a little getting used to. The main workspace is split into two areas:

Drawing
on the ST is like
painting with neon.

the sprite grid and the toolbox. Since both the painting and sprite aspects of OCP share the toolbox, extensive use of the mouse is used to select icons and toggle between the workspace/grid area and one of ten full screens on a one-megabyte system. (You have only two on the 520.)

Painting and drawing with OCP are similar to the other packages reviewed here. The major difference is screen style and OCP's use of brushes—you can paint with almost anything. Other tools include block functions (copy, move, rotate, resize, etc.), magnify and an antialiaser. Most of these same drawing tools work to create sprites and fonts, both of which can be 16 colors.

OCP really shines with its sprite features. You can create separate block images to use as brushes, or else animate them. After you've designed your sprites, you can place them in the brush storage, use them in other images or save them to disk.

The animation features let you show a series of sprites in a sequence, similar to a flip book. Whole sequences of sprites can then be placed over a background screen and animated. Color cycling is also available. Of use to programmers is the ability to create maps for use in games. Several options are available in this mode and both maps and sprites can be saved or output as ▶

A COMPUTER GRAPHICS DRAWING AND PAINTING GLOSSARY

Block A "chunk" of a graphics image, either all or a portion of your computer screen. Many drawing programs let you "cut out" areas of your image as blocks, which you can then manipulate.

Brush Any group of pixels—either a line or a portion of your drawing—with which you can draw. See Pixel.

Clipboard A buffer, or storage area, for images.

Color cycling Either all or part of the colors present in your computer palette exchanging places with other colors in the palette in a regular fashion. Depending on the speed of the exchange, color cycling can impart a "sparkling" appearance to your artwork and add the illusion of movement.

Dithered color patterns A dithered color pattern is a group of pixels of different colors, alternating in a regular pattern, creating intermediate hues. For example, a checkerboard pattern of bright red and blue pixels would appear purple.

Extended character set An alternate character set (with foreign symbols, etc.) residing within your ST's memory

Font A typeface; a particular style of lettering (see Serif and Sans Serif).

GDOS Graphics Device Operating System. GEM's device-independent interface for graphics output. GDOS allows your ST to send output to a peripheral (a printer, a plotter) that may actually have a higher resolution than your ST screen.

High-resolution The monochrome mode of your ST. High-res mode is 640 X 400 pixels.

Low-resolution The first color mode of your ST. Low-res mode is 320 X 200 pixels.

Medium-resolution The second color mode of your ST. Medium-res mode is 640 X 200 pixels.

Pixel The smallest defined graphics unit on your ST screen, either monochrome or color.

Ray-tracing A very advanced computer graphics technique whereby a computer calculates how an object should interact visually with its background, and vice versa. Often used to show objects reflecting their surroundings, as if the objects were made of chrome.

RGB Red/Blue/Green. The three color components making up an ST's color composite video image.

Serif and sans serif Two differing types of fonts, or lettering styles. Serif type has small details adorning the ends of the lines comprising the letters; sans serif does not. (The text for this sidebar is a serif font; the title is sans serif).

Slideshow A program that runs a sequence of still-frame computer graphic pictures.

Snapshot A "freeze-frame" of a screen image, which you can save to disk as a picture file.

Sprites Graphics characters made up of groups of pixels.

Stipple An art technique whereby minute details are laid down in patterns, allowing fine shading of light and shadow. In painting, you would stipple a work by lightly touching the end of your brush to the canvas, building up your image through tiny bits of color. In computer graphics, the patterns may be produced by groups of pixels, or individual pixels.

Zoom Also Magnify. The zoom or magnify features of drawing programs let you to enlarge a portion of your image, enabling you to make fine changes to your artwork. ■

COMPARISON CHART OF ST DRAWING PROGRAMS

	DEGAS Elite	Easy Draw	NEOchrome	OCP Art Studio	Paint Pro	Paintworks	Spectrum
Version	1.0	2.05	1.0	1.0	2.0	1.0	
Cost	\$59.95	\$79.95	\$29.95	\$44.95	\$49.95	\$69.95	\$69.95
Requires TOS in ROM	N	Y	N	N	N	N	Y
Copy protected	N	N	N	N	N	Y	N
Uses GEM	Y	Y	N	N	Y	Y	N
Uses GDOS	Y	Y	N	N	Y	N	N
Allows desk accessories	Y	Y	N	N	Y	N	N
DEGAS compatible	Y	Y	N	N	Y	N	Y
NEO compatible	Y	N	Y	Y	N	Y	Y
Multiple brushes	16	0	36	SEE NOTE 1	24	30	38
User-definable brushes	Y	Y	Y	Y	Y	Y	Y
Resolution	L,M,H	M,H	L	L	L,M,H	L,M,H	L
Lines	Y	Y	Y	Y	Y	Y	Y
Polygons	Y	Y	Y	Y	Y	Y	Y
Boxes	Y	Y	N	Y	Y	Y	N
Circles	Y	Y	Y	Y	Y	Y	Y
Airbrush	Y	N	Y	Y	Y	Y	Y
Fills	Y	Y	Y	Y	Y	Y	Y
Text	Y	Y	Y	Y	Y	Y	Y
Load fonts	Y	Y	N	N	Y	N	N
Color cycling	Y	N	Y	Y	N	Y	N
Blacks	Y	Y	Y	Y	Y	Y	Y
Manipulate blocks	Y	Y	Y	Y	Y	N	Y
# of work screens	8	2	1	10	1	2	SEE NOTE 2
Color blending	Y	N	N	N	N	Y	Y
Double screen	N	Y	N	N	Y	Y	N
Design sprites	N	N	N	Y	N	N	N
Printout	Y	Y	Y	Y	Y	Y	N

¹ Allows a 40K buffer for brushes.

² Depends on memory. Over a dozen screens are available on a one-megabyte machine.

ASCII text characters. Screen files are NEOchrome-compatible and there's a simple screen dump for printing.

OCP Art Studio is fairly complex, and if you want to do quick sketching you might do better with a general-purpose drawing program. But for me, it opened numerous possibilities for using complex brushes and sprites, and I also liked the ability to create multicolor fonts.

ST Sprite Factory

ST Sprite Factory isn't a paint program, but it allows programmers to create

high-quality sprite animation. (Sprites are small graphics characters.) Features include the ability to design maps, view sprites under joystick control and make use of fine scrolling. You can also view a sprite sequence as a full page, seeing each cel side by side.

Although I'm not a programmer, ST Sprite Factory appears thorough and complete. As an entry-level sprite designer I was able to create simple animated sequences and to see that there was quite a bit more to go in tapping this program's potential.

Conclusion

The art programs reviewed here all offer something of merit. Be it designing houses or sprites, painting in glorious color or sketching in monochrome, the ST has software to satisfy the most discriminating artist's palate—and palette. ■
If you would like more articles like this, circle 168 on Reader Service Card.

Marcus Badgley is a freelance fine artist and graphic designer whose work has appeared in numerous California publications, including START. Marcus lives in San Francisco. ▶

ART: CAVE WALLS TO..

Products Mentioned

- **The Advanced OCP Art Studio**, Rainbird Software, distributed by Firebird Licensees, Inc., P.O. Box 49, Ramsey, NJ 07446, (201) 444-5700, \$44.95.
CIRCLE 150 ON READER SERVICE CARD
- **DEGAS Elite**, Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, (415) 571-7171, \$79.95.
CIRCLE 151 ON READER SERVICE CARD
- **GFA Artist**, MichIron, 576 South Telegraph, Pontiac, MI 48053, (313) 334-5700, \$79.95.
CIRCLE 153 ON READER SERVICE CARD
- **Easy Draw** (\$79.95), **The Super-Charger** (\$49.95), **Font Pack #1** (\$39.95), **Personal Draw Art #1** (\$29.95), **Technical Draw Art #1** (\$29.95), **Migraph**, 720 S. 33rd St., Suite 201, Federal Way, WA 98003, (206) 838-4677.
CIRCLE 152 ON READER SERVICE CARD
- **Paint Pro**, Abacus Software, P.O. Box 7219, Grand Rapids, MI 49510, (616) 241-5510, \$49.95.
CIRCLE 155 ON READER SERVICE CARD
- **Paintworks**, Activision, Inc., P.O. Box 7287, Mountain View, CA 94039, (415) 960-0410, \$69.95.
CIRCLE 156 ON READER SERVICE CARD
- **NEOchrome**, Atari Corporation, P.O. Box 61657, 1196 Borregas Avenue, Sunnyvale, CA 94088, (408) 745-2000, \$29.95.
CIRCLE 154 ON READER SERVICE CARD
- **Spectrum 512**, Trio Engineering, distributed by Antic Software, 544 Second St., San Francisco, CA 94107, (800) 234-7001, \$69.95.
- **ST Sprite Factory**, Future Software Systems, 21125 Chatsworth St., Chatsworth, CA 91311, (818) 341-8681, \$39.95.
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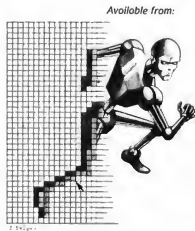
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THE CARTOONIST

ANIMATION THE EASY WAY

by **STEVE BLAIR**

One of the main reasons I purchased an ST was the graphics capability. The ST's special graphics hardware coupled with its 68000 processor should make smooth and flicker-free animation a reality.

Animation is performed by moving an image on the computer screen. That sounds easy, but it's not. Whenever an image is moved, it must be erased and the background restored before it can be repositioned. An image can also have many different frames associated with it; these frames are displayed one after another to create more realistic movement. Imagine a person walking across the screen; in addition to moving the image, the different poses must also be displayed in sequence.

The ST's operating system has routines for animation, but unfortunately they are difficult to use and slow when manipulating more than a few objects. The Cartoonist is a sprite editor that lets anyone with a little artistic talent do low-resolution animation quickly and easily.

A SPRITELY BEGINNING

What's a sprite? It's a small chunk of a picture. Once you've drawn a sprite, you



Original walking man art scanned from "The Male And Female Figure in Motion" by Eadweard Muybridge; cartoon overlays by Jon Bell.

Walt Disney started his first cartoon with a pencil and paper—he didn't have the graphics power of an Atari ST for smooth movement and flicker-free animation. But with Steve Blair's sprite editor, The Cartoonist, you can be cranking out your own Silly Symphonies in no time! You'll find the program, along with a complete demonstration, on your START Disk.

 You'll find the program for this article in the file **CARTOON.ARC** on your **START Disk**.

can move it around the screen easily as a block. The Cartoonist lets you design and manipulate a sprite of any size. However, it only works in low resolution, and it requires a color monitor.

To use the Cartoonist, first copy **CARTOON.ARC** to a fresh disk, along with **ARCX.TTP**. Run **ARCX**, and when

the Open Applications box appears type **CARTOON.ARC** and press the Return key. Your disk drives will whir, messages on the screen will let you know that files are being uncompressed, and soon you'll return to the

continued on page 35

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Benchmarks:	Laser C	Mark Williams 2.0
Compile&Link		
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Apskel	:08	1:40
Execution		
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THE CARTOONIST...

Desktop with a runnable version of the program, **CARTOON.PRG**, on your disk.

When you run **CARTOON.PRG**, you'll see four menus and a number across the top of the screen. The number tells you how many bytes of memory you have free. The four menus are **Desk** (which gives you access to desk accessory programs), **File**, **Sprite** and **Options**.

The **File** menu contains six options. **Load Pic** lets you load a **DEGAS** low-res picture into **Cartoonist** as your background screen; **Save Pic** saves the current screen as a **DEGAS** picture. **Load Sprites** loads an animation sequence into memory (and wipes out any sprites that are already there); **Save Sprites** saves an animation sequence. **Delete...** lets you delete files from your disk—very useful, since animations can be long and you may have to make extra room. **Quit** lets you leave **Cartoonist** and return to the **Desktop**.

The **Sprite** menu has five options that let you define animation sequences. **Define Sprite** lets you cut out part of the screen to use as a sprite. An open hand will appear; you simply press the left button on the upper left corner of the desired image and drag the resulting "rubberbox" to the lower right corner. **Set Current Sprite** lets you choose which of the program's 16 sprites you're working with (they're numbered 0 through 15). **Define Frame** lets each sprite have up to 16 different frames, numbered 0 through 15; the first frame is the sprite as you first defined it. In an animation, the sprite will flip through the frames in order. (If this seems confusing, we'll get to an example in a moment.) **Show Numbers** displays each sprite number and frame number on the screen near the sprite, and **Delete Sprite** completely removes the current sprite from memory.

On the **Options** menu there are six options. **Set Priority** lets you set a sprite's priority level, from 0 to 15. A sprite with a priority of one will overlap a sprite with a priority greater than one.

If a sprite has a priority of zero, it will appear only through holes in the background; a hole is the background color of the screen. **Display Sprite** lets you select which sprites to display, and **Display All** displays all the sprites. Select All lets you drag all the sprites around the screen at once using the mouse; **Select One** (the default) lets you drag just one sprite at a time. **Display Speed** shows you how fast the current animation can be shown, in frames per second. The number appears in the upper right-hand corner of the screen; the default is **Display Free**, which shows how much memory is available. **Clear Screen** clears the screen except for any sprites displayed; the screen will reappear if you select **Restore Screen**.

USING THE PROGRAM

You can see exactly how the program works by building a simple animation yourself. On your **START** Disk you'll find a **DEGAS** picture called **WALKER.P11**; it contains a series of views of a man walking. To create an animation, first load the picture using **Load Pic** from the **Files** menu. Next, make sure the current sprite is 0 with **Set Current Sprite**. Select **Define Sprite** and drag a box to surround the first view of the man (be sure you leave enough leg room for the other views). Once you release the mouse button, you can position the window and then click again to define the sprite. (You may have to hold down the mouse button for longer than usual when you click.) You can display the sprite with **Display Sprite**, and drag it around the screen by holding down the left mouse button as you move the mouse.

Now click on **Define Frame**, and choose frame number 1. You'll see a shadowed version of your sprite. Position it over the second view of the man, and click again. Now define frames 2 through 13 in the same way—positioning the shadow figure and clicking to define the frame.

Now you can flip through the frames

of your animated sprite. First click on **Clear Screen**, and drag the sprite to the middle of the screen. Then hold down the right mouse button, and you'll see the man walk as the sprite flips through its frames. (You can move the sprite around as it flips by holding down both the left and right mouse buttons and moving the mouse.) Next, save the animation sequence by clicking on **Save Sprites** in the **File** menu—for the moment, type in the filename **WALKER.ANI**. Finally, leave **Cartoonist** by selecting **Quit** on the **File** menu.

Once you're back at the **Desktop**, you can run your animation sequence separately by double-clicking on **DEMO.PRG**. When the file selector appears, choose **WALKER.ANI**, and the **Demo** program will flip through your animation automatically. Press any key to return to the file selector box, then either load another sequence or click on **Cancel** to exit. You can also use this program to see **START**'s sequence of a walking man; the filename is **DEMO.ANI**. When you run **DEMO.PRG**, you should make sure it is on the same disk as the sequences you wish to run.

THE DISNEY SYNDROME

The **Cartoonist** isn't a full-fledged animation program, but it does have one big advantage for programmers: You can use these routines to create simple animated sequences in your own programs. You'll find the source code for the sprite editor and **DEMO.PRG**, along with explanations of how the routines work and how to use them in programs, on your **START** Disk.

If you're a programmer, these routines will make your programs flashier and easier to write. If you're not a programmer, **Cartoonist** is an easy and fun way to put together your own animations! ■

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Steve Blair is a college student who lives in Terre Haute, Indiana.

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THE ELECTRONIC T-SQUARE

COMPUTER-AIDED DRAFTING

by DAVE EDWARDS

Atari ST graphics aren't just for fun—they're also perfect for architects, engineers and drafters who need to create technical drawings for construction and manufacturing. With CADD—Computer-Aided Design and Drafting—you can design anything from a circuit board to a skyscraper. Here's the ST software that'll let you do it.

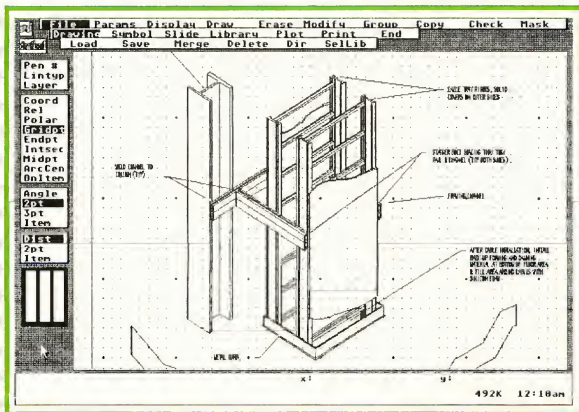
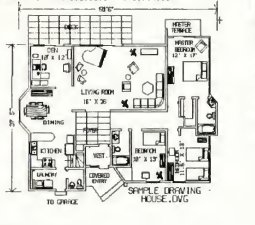


FIGURE 1: Drafix 1

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X 045.4021 Y 604.1493 dX 032.0295 dY 507.4300"



ENTER A COMMAND >>>
DRAWING NAME: TEST.DWG, LAYER: 0, ZOOM: 1: 139.682768
MEMORY USED: 9,9024, LINE TYPE: 0, LINE COLOR: 1, PEN IS UP

FIGURE 2: First CADD

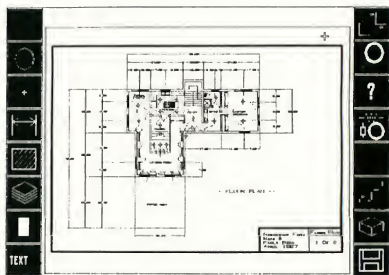


FIGURE 3: Athena II

Drafting is the process of creating drawings that represent real three-dimensional objects. These drawings are then used to build or manufacture the objects. Whether it's architectural plans for a skyscraper or the circuit design for a microchip, it can't be made until the plans are finished.

These drawings normally are produced to scale—larger or smaller than the objects they represent. Drawing plans to scale is often tedious, and making even simple changes can require a great deal of extra time; if a drawing needs to be changed to a different scale, a completely new drawing must be done.

"CADD" stands for "Computer-

Aided Design and Drafting." It's electronic drafting, and you can use it any time you would use ordinary drafting—for electrical design, architecture, structural engineering, etc. With a CADD program on your computer, you can create technical drawings, just as you would on a drafting table. But unlike drafting on paper, CADD makes it easy to change or rescale the drawing. And unlike an ordinary drawing or paint program, CADD works with individual objects or elements that can easily be moved around without disturbing any other elements in the drawing.

Like regular drafting, CADD uses the concept of *layers*. Suppose you're conceiving a building's plumbing and electrical systems. The pipes and wiring

may be very close to each other—so close that, on a single drawing, it's hard to see which is water and which is watts. In regular drafting, the solution is to draw the plumbing and electrical diagrams on two separate sheets of tracing paper.

With CADD, it can all be on a single "drawing," but on different layers of the drawing. Each layer can be made visible or invisible. When you're putting in the pipes, you can turn off the electrical level so the wiring can't be seen. When it's time to add wires, you can turn off the plumbing layer and turn on the electrical layer so the pipes won't get in your way. And when it's time to print things out, you can print a drawing that contains all levels, or just one or two.

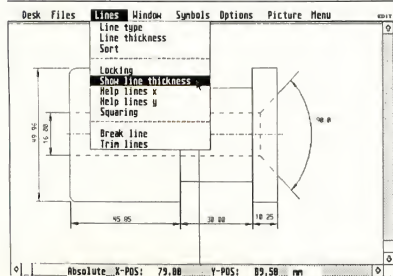


FIGURE 4: GFA Draft

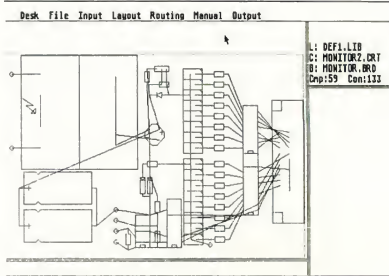


FIGURE 5: PC Board Designer's "rubberband" connections

Most CADD programs also include symbol libraries—components of drawings that you're likely to need often. Instead of drawing the same items over and over, you can usually draw your own objects, add them to the libraries, then pull them out again whenever you need them.

Best of all, with CADD you don't have to worry about getting it right the first time. If you place an object in the wrong place or size it wrong, you can change or delete it, and if a client wants a change in the design, you can make the change quickly and easily. That freedom can make for much greater design flexibility and creativity.

You
can't build a
microchip or a
skyscraper unless you
have finished plans.

CADD For The ST

In this article, we'll look at four CADD programs for the ST: Drafix 1, Athena II, First CADD and GFA Draft.

The chart compares the four programs' features. All four use the mouse for drawing and pointing on the screen, and all have similar commands for editing and adding objects to drawings. Each of these programs lets you use simple objects such as lines, circles and rectangles, but there are many different ways these objects may be placed and manipulated—and the more ways a CADD program offers, the better. And all these CADD programs let you print your drawings, usually with either a dot-matrix printer or a pen plotter. ▶

Atari ST CADD Comparison Chart

	Drafix 1	First CADD	Athena II	GFA Draft
Version reviewed	1.0	1.02	1.8	1.0
Price	\$195.00	\$49.95	\$99.95	\$49.95
Number of layers	256	256	256	255 ¹
Lines				
Single	Y	Y	Y	Y
Double	Y			
Tangent	Y		Y	Y
Perpendicular	Y		Y	Y
Parallel	Y		Y	Y
Offset ²	Y			
At angle from other	Y		Y	Y
Number of line types	8	1	9	4
Variable line widths				Y
Arcs/Circles				
3 point arc	Y	Y	Y	
4 point arc		Y		
2 point, angle arc	Y			
Center, radius arc	Y		Y	Y
Center, radius circle	Y	Y	Y	Y
2 point circle	Y	Y	Y	
3 point circle			Y	
Parallel arc/circle			Y	
Offset arc/circle	Y			
Center lines			Y	
Shapes				
Rectangles	Y	Y	Y	Y
Polygons	Y	Y		P
3 point ellipses	Y	Y	Y	Y
Elliptical arcs			Y	Y
Chain shape ³	Y			
Freehand sketch	P			Y
Spline curves	P	Y	Y	
Points/Pointmarkers				
Number of types	23	1	1	
Set size	Y			
Text				
At selected angle	Y	Y	Y	4
Text height	Y	Y	Y	Y
Selectable justification	Y			
Number of fonts	12	1	1	2
User-definable fonts		Y		P
Symbols				
Symbol libraries support	Y	Y	Y	Y
Scaled	Y	Y		
Rotated	Y	Y		
Remove all		Y		

ELECTRONIC T-SQUARE..

The programs have one other thing in common: They all promise "new and improved" versions that should be available soon. Along with the current features, the chart also shows the features that are promised for the next release of each program.

Most of these programs are large and use as much memory as is available; for CADD on an ST, the more memory, the better. All the programs work on both color and monochrome screens; I found the monochrome a little easier to use because of the greater resolution, but color makes it easier to keep track of different objects.

Drafix 1

Drafix 1 has been available for IBM PCs for quite some time as a low-cost alternative to expensive programs like Auto-

CAD and VersaCAD. The experience of Drafix's designers gives it a definite advantage over some of the other programs—they've simply had more time to improve it than companies who have just started writing CADD programs.

The Atari ST version of Drafix 1 is identical to the IBM version in almost every way. The IBM experience really shows in this program: it contains more drawing options than any of the others, and has features that even some of the higher-priced PC CADD programs don't have.

From Figure 1, you'll see that Drafix doesn't use GEM at all, but uses its own mouse-and-menu procedure. For ST veterans this can be annoying: You have to press a mouse button to see a menu instead of having it pop up by itself, but

it's very easy to switch from one menu to another. It's also easy to change the parameters for drawing, snap and angles—these change often, and it's very convenient to be able to change them without going to a menu.

Drafix can place double lines, which can really cut your work when you need lots of parallel lines. The program has 23 pointmarkers—small objects drafters use over and over for such things as line terminators. The 12 fonts help add variety to drawings. The options for dimensioning (defining the size of all or part of an object) and snapping (quickly connecting lines) are very complete. Keyboard input for points in absolute, relative and polar modes is helpful for setting up designs using precise measurements. Drafix uses dimensioning parameters to aid in

PC BOARD DESIGNER

Some CADD programs are designed to perform a specific task, and PC Board Designer is one such program. It provides complete capabilities for designing electronic printed-circuit boards.

The program allows you to use components from a symbol library and position them on a circuit board; then PC Board Designer automatically routes the electrical connections for you. This radically simplifies designing single- or double-sided PC boards for professionals or hobbyists.

A library of components is supplied with the program. You select the ones you need and place them on the board in any fashion you wish, specifying the connections that need to be made—which pins to connect, how wide the connection should be, and whether 45- or 90-degree bends should be used. The

program will then show you the connections you have made in straight-line or "rubber-band" form (see Figure 5). You can make any corrections or additions you need to the connections list; when the connections are all correct, the program's auto router will draw the connections for the final printed-circuit board (see Figure 6).

The auto router is very flexible—you can specify X-Y direction and limit the length of a connection, and it lets you know if a connection can't be made. (If that happens, you can add wire jumpers, through-holes or blockades.) You can move components and reroute, sort the connections to improve routing efficiency or run the router manually.

The component library includes most of the components you'll need; if you need one that's not supplied, there's a separate program included

that lets you add components to the library. But printout is where PC Board Designer really shines—the program prints on Epson FX80-compatible printers, and options include pinhole plot for a drilling mask, component plan for silk-screening the component side, and actual printed-circuit layout. The program prints at double size, letting you reduce the printouts later for photoetching.

PC Board Designer has one major drawback: The maximum board size is 6.3 x 3.95 inches, which severely limits what projects can be done with the system. I'd prefer to be able to design boards the size of the standard IBM PC board, which would cover most professional needs. That limitation aside, PC Board Designer is a great asset to anyone who designs printed-circuit boards. ■

- PC Board Designer, Abacus Software Inc., P.O. Box 318, Grand Rapids, MI 49588, (616) 241-5510, \$195.00.

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setting standards, so dimensioning and placement are precise and error-free.

The options for modifying elements impressed me the most; some, such as beveling (rounding off or creating angles on corners) and trim to edge (merging perpendicular lines), I have seen on no other CADD system. They're very powerful and could save a great deal of time. Two other strong points are manipulation by group or by fence. A group is a collection of elements that you flag individually, then manipulate all at once. A fence lets you manipulate elements within a given area.

Drafix supports pen plotters in a very advanced way. For multiple-pen plotters, you can specify which pen each object will be drawn with. Unfortunately, pen plotters are currently the only choice: though a dot-matrix printer driver is being readied for the ST, it's not currently available. For now, the plotter driver is very powerful, and you can do screen dumps to a dot-matrix printer or DEGAS-format picture file.

Drafix 1 comes with the most impressive set of manuals for a micro-based CADD system I have ever seen. There's an installation guide, a technical reference manual, and a tutorial manual that leads you step-by-step through the program's features.

This program is definitely geared for the professional user. At \$195 it's twice the price of the other ST CADD programs, but it's also the most powerful CADD program I've seen for the ST and one of the most powerful for any micro in this price range. The dot-matrix printer driver isn't finished yet, and I'd like a DXF (AutoCAD) translator; I also wish I could store plotter specifications, such as plot window and scale, in the drawing. Aside from these things, it's hard to find a flaw in this program.

First CADD

Once again, a best-selling CADD program for the IBM PC has jumped to the ST. First CADD is designed to let you ▶

Atari ST CADD Comparison Chart *continued*

Drafix 1 First CADD Athena II GFA Draft

Dimension	Drafix 1	First CADD	Athena II	GFA Draft
Angular	Y	P	Y	
Horizontal	Y	P	Y	Y
Vertical	Y	P	Y	Y
Parallel	Y	P	Y	
Rotated	Y			
Chain	Y		Y	
Baseline	Y		Y	
Radius	Y		Y	Y
Diameter	Y		Y	
Coordinate	Y			
Leader	Y		Y	
Centerline	Y			
Hatching/Fills				
Number of patterns	16		36 ⁵	1
Select angle	Y			Y
Select spacing	Y			Y
Isometric Creation			Y	
Keyboard input				
Absolute	Y	P	Y	P
Relative	Y	P	P	P
Polar	Y	P	P	
Snap Modes				
Gridpoint	Y	Y	Y	
Endpoint	Y	Y	6	Y
Intersection	Y	P	6	
Midpoint	Y	P		
Centers	Y		6	
On item	Y			
Tangent	Y			
Parameter Selections				
Layers	Y		Y	
Project information	Y			
Units	Y	Y	Y	Y
Scale	Y	Y	Y	Y
Sheet origin	Y	Y		
Sheet size	Y	Y		
Sheet margins	Y			
Grid origin select	Y	Y		
Grid aspect select	Y		Y	
Grid highlight spacing	Y			
Grid dot spacing	Y	Y	Y	
Dimension lengths	Y			
Dimension terminator type	Y			
Dimension text height	Y			
Dimension text angle	Y			
Dimension text locations	Y			
Background color	Y			
Grid color	Y			

ELECTRONIC T-SQUARE . .

Desk File Input Layout Routing Manual Output

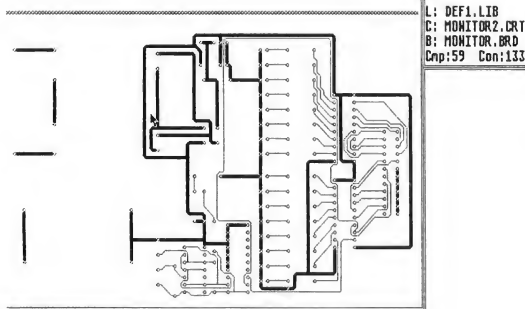


FIGURE 6: PC Board Designer's final connections

get a good feel for what CADD is with-out spending a lot of money.

Like Drafix, First CADD uses its own multiple menu system (see Figure 2). To select a command you move the menu bar on the side of the screen, then press the right mouse button. Alternatively you can type a two-letter code for each command—a powerful technique once you've mastered the program.

First CADD has some nice features, such as the ability to create your own fonts. First CADD's publisher, Generic Software, offers symbol libraries for electrical components, flow charts and furnishings. You can add custom menus in conjunction with these furnishings, a feature that's found on none of the other systems. It really makes First CADD worth looking at.

First CADD can use files created with the IBM versions of First CADD and Generic CADD. The program prints on dot-matrix printers; a separate pen plotter driver is also available from Generic.

All in all, First CADD is a very straightforward system that's easy to learn; once you've mastered it, it lets you create drawings much faster than with some of the other systems. Generic Software will be offering a more advanced CADD program soon that will

use First CADD files and symbols; if you own First CADD, you'll be able to upgrade to the new program using a rebate system.

Athena II

Athena II is an icon-based system with more features than any ST CADD pro-

One
of the most
important elements
of a CADD system
is its user interface.

gram except Drafix I. You choose commands by selecting one of the icons at the side of the drawing area (see Figure 3); in most cases, another set of icons then appears, increasing the options available to you.

The icon interface makes Athena II very quick to learn—in fact, I was able to go through most of the functions

without ever opening the manual. The manual itself is very thorough and explains every command in sufficient detail. It also has thumb indexes printed on the pages, making it easy to find a particular section.

Athena has most of the features you'll need to create drawings. An especially nice feature is semi-automatic isometric creation and pattern fill of areas—not just hatching (slanted shading lines). Also helpful is the ability to display circle center lines. A good set of architectural symbols is available from Iliad. The program does plot high-resolution prints on a dot-matrix printer, however, it uses GDOS, and currently has no plotter drivers (they'll be available with a later version of the program). You can also dump the screen image as a DEGAS file.

Some of the most exciting Athena features are still on the drawing board. A command language interface will soon be available so that custom applications for the program can be written. Iliad is also working on the DX translators that will let you use files from AutoCAD; since most IBM CADD packages have DXF translators, this will make Athena II compatible with a majority of CADD systems. An engineer using an ST could exchange files with an architect working on a project even if the architect were using one of the popular IBM packages. Iliad's DX translator is almost finished and should be available soon.

As it is, Athena II is a useful program; when some of the promised enhancements become available, it will have even greater potential. And Iliad is working on another CADD program aimed more at high-end users, which should be available soon.

GFA Draft

GFA Draft is the only one of these CADD packages that uses GEM drop-down menus and slide bars. You choose commands by making selections from the menus and you can

move around your drawing by using the slide bars (see Figure 4).

GFA Draft was created by GFA Systemtechnik in Germany, the same company that brought you GFA BASIC. Its European origins show up in the fact that GFA Draft tends to work better in meters and millimeters than in inches, and it doesn't use feet at all. It's understandable, and for some kinds of drafting it doesn't matter; but for American architects and engineers, it needs to work in feet and inches.

The program comes with a standard array of commands, but it has few editing features other than delete. However, GFA Draft has more commands for manipulating areas of a drawing than any other ST CADD program. The fence command lets you place a box (or "fence") around an area of your drawing; you can then perform manipulations that only affect the objects that are inside the fenced area. Some of the more unique commands using a fence are the stretch/compress and skew commands. Few CADD systems have these, and they can come in very handy when you need to change the shape of a particular area of a drawing.

GFA Draft also comes with several symbol libraries, including symbols for architectural drawings, electrical layouts and flowcharts. These libraries are one of the nicest features about this program, and can help you get an early start on your drawings.

The program does produce excellent printouts on dot-matrix printers, and also supports some pen plotters. However, I would really like more commands in GFA Draft, especially commands for editing objects. MichTron, the American distributor for GFA software, will soon be releasing GFA Draft Plus; it may have some features I'd like to see.

The Best Choice

One of the most important elements of a CADD system is its user interface. I didn't find it odd at all that every CADD program I review here uses a completely ▶

Atari ST CADD Comparison Chart *continued*

	Drafix 1	First CADD	Athena II	GFA Draft
Menu colors	Y			
Prompt colors	Y			
Display				
Redraw	Y	Y		
Zoom in/out	Y	Y	Y	Y
Zoom area			Y	
Pan	Y	Y	Y	Y
Show last	Y	Y		
Save view	Y			
Recall view	Y			
Full screen	Y			
Extent	7	Y	Y	Y
View actual size			Y	
Grids on/off	Y	Y	Y	
Text on/off		P	Y	
Circle center lines on/off			Y	
Menu on/off		Y		
Modify				
Move	Y	Y	Y	
Copy	Y	Y	Y	
Rotate	Y	Y	Y	
Mirror	Y	Y	Y	
Layer	Y			
Pen	Y			
Linetype	Y	Y		
Font	Y			
Text size	Y		Y	
Stretch	Y	Y		
Break	Y	Y		Y
Channel	Y			
Edge	Y			
Divide	Y			
Corner	Y		Y	Y
Fillet	Y	P	Y	Y
Bevel	Y			
Symbol explode ⁸	Y		Y	
Symbol replace	Y			
Shape close	Y			
Shape fill	Y			
Shape smooth	P			
Shape explode ⁸	Y			
Group				
Item	Y			
Fence	Y			
Poist	Y			
Save as symbol	Y			
Delete	Y			
Modify	Y			
Copy/move	Y			
Mask	Y			

ELECTRONIC T-SQUARE..

different approach to how commands are chosen and used; though they all use the ST's mouse, only one actually uses a full GEM interface.

With these differences, it's especially important for you to try these programs before you decide to buy one. Find a software dealer who will let you try out each program, and evaluate how well it seems to suit your needs. You'll find that every program has features the others don't, and that each one does some things better than the others.

Choosing a CADD program is very much like choosing a car; you must balance the features you want with the price, and make sure that it feels comfortable to drive. All four of these programs offer good performance for the price, but only you can decide which one most closely matches your needs. ■
If you'd like more articles like this, circle 169 on the Reader Service Card.

Dave Edwards has worked with microcomputers for more than 15 years, and is currently the CADD Manager for Tiller/Butner/Rosa, Architects, in Montgomery, Alabama.

Products Mentioned

- **Drafix 1**, Foresight Resources Corp., 932 Massachusetts Ave., Lawrence, KS 66044, (913) 841-1123, \$195.00.
CIRCLE 163 ON READER SERVICE CARD
- **First CADD**, Generic Software Inc., 8763 148th Avenue N.E., Redmond, WA 98052, (206) 881-0174, \$499.50. Symbol libraries, \$24.95 to \$74.95. Pen plotter driver, \$49.95.
CIRCLE 164 ON READER SERVICE CARD
- **Athena II**, Iliad Software Inc., 495 West 920 North, Orem, UT 84058, (801) 226-3270, \$99.95.
CIRCLE 165 ON READER SERVICE CARD
- **GFA Draft**, Michtron, 576 S. Telegraph, Pontiac, MI 48053, (313) 334-5700, \$49.95.
CIRCLE 166 ON READER SERVICE CARD

Atari ST CADD Comparison Chart *continued*

Drafix 1 First CADD Athena II GFA Draft

Fences	Drafix 1	First CADD	Athena II	GFA Draft
Copy/move	Y	Y	P	Y
Delete	Y	Y	P	Y
Mirror	Y	P	P	Y
Rotate	Y	P	P	Y
Scale	Y	P	P	Y
Mask ⁹	Y			
Modify	Y	Y	P	Y
Stretch/compres				Y
Skew				Y
Inquire				
Area	Y	Y		
Angle	Y	Y		
Distance	Y	Y		
Item	Y		Y	
Print object report			Y	
Symbol	Y			
Symbol list	Y			
Mask ⁹				
Layer	Y		Y	
Item	Y			
Merge Drawings	Y		Y	
Save Screen				
Image File	Y		Y	
Plotting				
Hardware options	Y			
Text fill	Y			
Polygon fill	Y			
Pen select	Y			
Best fit	Y	Y	Y	Y
Scale	Y	Y	Y	Y
Support pen platters	Y	P	P	Y
High-res dot matrix	P	Y	Y	Y
Command Language Interface			P	P
Function Key Macros	P			
DXF Translator ¹⁰				P
IGES Translator ¹¹				P
P: Proposed for later release				
Notes:				
1 Only 10 layers displayed at one time				
2 Offset lines are parallel at a selected distance				
3 Combines selected objects into one shape				
4 Increments of 90 degrees				
5 Area fill patterns				
6 Done by placing active paints; regular snap proposed for later release				
7 Display entire drawing on screen				
8 Exploding an object breaks it into its basic components so that they can be manipulated separately				
9 Masking prevents objects or layers from displaying				
10 DXF is the file exchange format used by most IBM PC CADD systems				
11 IGES is the file exchange format used by most mainframe CADD systems				

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DESKTOP VIDEO

Personal computer animation comes of age

by **MATTHEW N. SHELLY**

Every year at the SIGGRAPH computer graphics show you will see the latest, most incredible advances in computer animation. Films rendered with \$80,000 Pixar animation computers, TV commercials created with \$15-million Cray XMP supercomputers, and animations designed on microcomputers—like the Atari ST. . .

W

elcome to the world of desktop video.

The ST is probably the least-expensive animation computer available today, but with the software that's available now it's a realistic alternative to animation workstations costing many times as much. For a fraction of the cost, you can create full-length animated video productions from your desk!

The ST's resolution (320 x 200 in low-res color) isn't really a problem in video animation, since a standard television does little better. The major limitation of the Atari is its lack of colors. With only 16 simultaneous colors from



Animator ST

a palette of 512, the ST is very limited compared to computers that can provide 256 colors simultaneously from a palette of 16 million.

The three animation programs for the ST are Make It Move (from MichItron), Animator ST (from Aegis) and the Cyber Family (from Antic). Each one lets you create animations a frame at a time or automatically. Each also includes an animation player program that you can freely distribute, so people who don't own the animation programs can still watch your creations on their own STs. Also, none of these programs is copy-protected.

Make It Move

At \$49.95, Make It Move is the least expensive of the ST animation packages. It consists of two main programs:

OBJECTS.PRG and SCRIPT.PRG. The OBJECTS program is used to define objects—rectangular cutouts from NEOchrome or DEGAS pictures—for later use within an animation. The SCRIPT program manipulates the objects and the flow and timing of animation events. Both programs work only in low resolution.

In order to use Make It Move, you must have a paint program that can generate either DEGAS or NEOchrome format low-resolution pictures. (That means most popular ST paint programs, including DEGAS Elite, NEOchrome, and even Flicker from the Summer 1987 START.) You create the background pictures and objects using the paint program, then import them into Make It Move using the OBJECTS program.

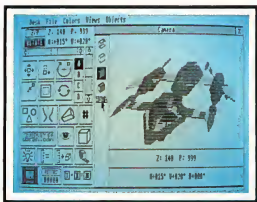
Make It Move is essentially a super-slideshow program with some cel animation facilities. A typical script will load in one or more background pictures and objects, then animate the objects over the background. Background pictures can be switched using a wide variety of cuts, fades, wipes and dissolves. In fact, Make It Move is the only animation program with a sophisticated array of slideshow effects in addition to cel animation.

Make It Move is not well suited to moving anything but static objects (objects with no internal animation) and it's limited to moving them in a two-dimensional plane. However, the animation facilities it does provide perform fairly well. An interesting cel effect is the zoom facility, which allows an object to grow or shrink onto the screen.

Although it's frustrating to have to repeatedly run up to three different programs (paint, OBJECTS, and SCRIPT) in order to get an animation going, most of your time will be spent orchestrating the animation in the SCRIPT program. The SCRIPT user interface is extremely



Make It Move



CAD 3-D 2.0



Cyber Paint

simple and a bit garish: every script event, whether loading in an object file or dissolving between two backgrounds, is shown as a giant purple and pink icon. These icons appear in a non-GEM window and show the sequence of events. The remainder of the screen contains rows of buttons allowing you to select parameters and events.

Granted, the SCRIPT screen is pretty, but on the whole I found the user-interface more flashy than helpful.

The Make It Move documentation is less than 30 pages, with only a few screen shots. The manual barely covers the basics of the program. However, to the designer's credit, there are five tutorials in Make It Move animation form. These animation files, when viewed, will actually demonstrate using the programs. In addition, the tutorial scripts double as sample files so you can learn from the techniques.

With its cel and slideshow effects, Make It Move is best suited for developing product demos and non-interactive educational videos. The results are not spectacular, but they do the job.

Aegis Animator ST

Animator ST was the first significant animation program released for the Atari ST. Boasting a robust combination of metamorphic, cel and cyclic animation features, Animator ST is an excellent animation package.

Animator ST comes with a well-written spiral-bound manual along with some sample animations and example artwork. The program requires only 512K to run and works in low-resolution.

The cel animation features of Animator ST allow you to move bitmap images (cutouts from NEOchrome or DEGAS pictures) around the screen the way you can with Make It Move, and the cyclic animation features let you cycle the screen colors. But the most powerful aspect of Animator ST is its metamorphic animation capabilities. You can create a polygon, such as a star, a triangle or a ▶

DESKTOP VIDEO..

jagged-edged abstraction, by clicking and dragging out the object's corners. Freeze the object on one key frame, then change its shape by dragging its corners into different directions—making, say, a star into a tortuous mountain range. Then click on the play icon and watch the star change smoothly into the mountains.

But you're not just limited to moving vertices. You can rotate objects in two or three dimensions, shrink them, move them and change them. The program generates liquid-smooth transitions from one shape to the next.

The smooth transitions are achieved through automatic *tweneing*—you create the starting and ending shapes and positions, then your ST computes the intermediate images. This tweneing also works (somewhat) with the cel and cyclic animation features. You pick starting and ending points for cel movement and the program worries about getting it from point A to point B; you determine the degree of color cycling and Animator ST takes care of changing one color into the next.

Although Animator ST supports some cel animation, it is not well-suited for a lot of such manipulations. The cels are handy, but rather limited in their utility and flexibility. If you intend to rely heavily on simple cel animation—bitmaps moving around the screen—then Make It Move would probably be a better choice. However, Animator ST is the only animation program for the ST that supports metamorphic animation, and it is the most complete and well-rounded animation package available for the ST.

The Cyber Family

The Cyber Family consists of three different products: Cyber Studio, Cyber Control and Cyber Paint. Cyber Studio is the CAD-3D 2.0 solid modeling program along with the CyberMate animation editor; Cyber Control is a more elaborate animation programming language for the Cyber Studio; and Cyber

DESKTOP VIDEO ANIMATION PROGRAMS

	Make It Move	Aegis Animator	CAD-3D 2.0	Cyber Paint
PROGRAM REQUIREMENTS				
Uses GEM	N	Y	Y	N
Allows desk accessories	N	Y	Y	N
Memory required	512K	512K	1 Meg	1 Meg
COLORS/RESOLUTION				
Low-res color	Y	Y	Y	Y
Medium-res color	N	N	N	N
High-res (monochrome)	N	N	Y	N
DRAWING FUNCTIONS				
Airbrush	N	N	SEE NOTE 3	Y
Brushes	N	N		Y
Boxes	N	Y		Y
Circles	N	Y		Y
Fills	N	Y		Y
Lines	N	Y		Y
Polygons	N	Y		Y
Stipple	N	N		Y
TEXT				
Multiple fonts	SEE NOTE 1	SEE NOTE 1	Y	Y
Load additional fonts			Y	Y
Create fonts			Y	Y
BLOCKS				
Block copy	SEE NOTE 2	SEE NOTE 2	SEE NOTE 4	Y
Solid copy				Y
X-ray copy				Y
ANIMATION TYPES				
2-D (flat)	Y	Y	SEE NOTE 5	Y
2½-D (flat multiplanar)	Y	Y		Y
3-D (three-dimensional)	N	N	Y	N
ANIMATION FUNCTIONS				
Object oriented	Y	Y	Y	N
Tweneing	Y	Y	N	Y
Enlarge/shrink images	Y	Y	Y	Y
Rotote on multiple axes	N	Y	Y	Y
Soves frames os DEGAS/NEO files	Y	Y	Y	Y

¹ Relies on pictures imported from other ST point programs for text.

² Lets you animate blocks of images, although not cut and paste them as with a drawing program.

³ Contains drawing tools for 3D object construction—spin, extrude, etc.

⁴ Lets you move and copy 3D objects, either wireframe or solid.

⁵ By flattening 3D objects along one axis, you can manipulate them as if they were 2D.

Paint is a combination paint and animation program.

All these programs work together, and each one requires a megabyte of memory—either a 1040 ST, a 520 ST with a memory upgrade, or a Mega.

Cyber Studio

CAD-3D 2.0 lets you create a group of 3-D objects, then move them around in animations. It requires a megabyte or more of RAM, with either a monochrome or color monitor.

To create a 3-D object with CAD-3D, you can choose one of the program's standard objects or create one yourself, then rotate, extrude and manipulate the object until it's exactly as you want it. Creating an animation consists of creating 3-D objects, putting the program in RECORD mode, and building the animation a frame at a time by moving the objects, the camera position, light sources, etc. For example, to make a fighter plane do a barrel roll across the screen, you must move the airplane object incrementally along its flight path, rotating it about its fuselage, and possibly modifying the camera position or the degree of zoom. A 60-frame animation requires spreading the full motion over 60 frames, each time gauging the amount of movement needed in a process reminiscent of stop-motion photography. It's a complicated process.

CyberMate is a FORTH-like programming language that automates the process of creating CAD-3D animations. Unfortunately, it's not very user-friendly: it's entirely text-based, and the language commands are sometimes confusing and difficult to use. CyberMate does support a large number of functions, including looping, sound effects, and dynamic dissolves, fades and color cycling. It can also create stereo animations that use the StereoTek 3-D glasses for true three-dimensional animations.

Cyber Control

With Cyber Control, you can automate your Cyber Studio object creation and animation much more easily than with CyberMate. Not only can you construct odd and complex objects based on mathematical formulas, but you can write a program to generate your animations, automatically keeping track of the objects, their positions, the cameras and the light sources. You can write your script, start it running and walk away; Cyber Control will generate and record your animation automatically.

Cyber Control is easy to learn; it's

GOING TO VIDEO

Most of us probably think of computer animation in terms of our favorite video game or the newest demo, and when we think of animation software, we naturally think of using the computer to both create and play back our animations. But now it's practical to save the animation on videotape, using the computer to generate individual frames of animation while recording and editing on tape. Megabytes of animation frames can be merged on videotape to create 30-second demonstrations or half-hour movies. You can later dub digital sound onto the tape, allowing music or voice accompaniment.

The most economical route to a video animation workstation is a 520 ST with an RF modulator and a standard home video recorder. An RF modulator lets you use an ordinary TV to show what's on your ST's screen; many newer 520 STs have built-in RF modulators. The total in-

vestment, including the computer and software, can be as little as \$750.

A more sophisticated (yet still reasonably priced) setup consists of a 1040 ST or Mega, an RGB-to-composite converter, and a Sony 8mm video deck. The RGB-to-composite converter converts the ST's color monitor signal into a standard composite video signal that feeds directly into the Sony recorder. Sony's 8mm video recorders are inexpensive and offer extremely clean editing; some models have a remote pause jack that can be used to control the video recorder from the computer. You can put together a system like this for \$2,000 or less.

Going to video isn't a must, of course; all the ST animation programs work fine *without* a video recorder. But putting your animations on tape can open up a whole world of new audiences for your creations. ■

similar to BASIC. It's still a programming language, though, and you'll find it a far cry from pointing and clicking.

Cyber Control supports floating-point arithmetic expressions as well as logical expressions, variables, one-dimensional arrays, facilities for linking objects into structures for complex interactions, automatic spline (smooth curve) generation, and a full repertoire of commands for controlling CAD-3D functions such as zooming, spinning and object creation.

Cyber Paint

Cyber Paint is a paint and effects program that gives you frame-by-frame access to your animations. You can create animations from scratch within Cyber Paint, using a full complement of paint-

ing tools (lines, circles, fills, etc.) that help you make incremental changes from one frame to the next. You can also import CAD-3D animations and add highlights and other effects to specific frames or ranges of frames, or you can compile and import Animator ST animations. Cyber Paint works only in low-res, and requires at least one megabyte of memory.

When you first run Cyber Paint, it works as a paint program: you can load DEGAS and NEOchrome screens into this frame, or you can use the painting tools to create a picture. When you cut a rectangle from a picture, you can manipulate it by shrinking, enlarging or rotating it on any axis.

You can create animations by duplicating an image several times, then ▶

FRAME BY FRAME: AN ANIMATED GLOSSARY

In traditional hand-drawn animation, a professional illustrator paints the characters and animated objects on sheets of clear acetate called *cel*s. Hundreds or thousands of these *cel* images are drawn, each with slight changes in the characters' motions or expressions. The *cel*s are then assembled in front of a background drawing and photographed, one frame at a time. When the film is developed and shown at full speed, the small individual motions merge together, and the movement appears smooth.

A top animator will usually only draw the *key frames*—the *cel*s that show critical positions in the animation. Then an assistant (often an apprentice animator) draws the *cel*s that appear between the key frames. For example, the master animator might draw two key frames, one with Mickey Mouse's arm bent at the elbow and one with his arm outstretched. The assistant would draw the intermediate positions between bent and outstretched. Because the assistant is drawing the frames between, this process is called *tweening*.

Many of the terms used to describe computer animation are borrowed from traditional animation and filmmaking. Here are some of the more common terms:

2-D: Two-dimensional images have only height and width. They're flat images, like drawings on paper. The computer screen produces two-dimensional displays.

2½-D: The pseudo-dimension seen in most cartoons: objects are two-dimensional, but on multiple planes, so that some objects can pass in front of or behind others, giving a simple illusion of depth.

3-D: The real world exists in three dimensions; objects have a height, width and depth. In three-dimensional animation, objects are represented in three dimensions and are positioned and moved in along three axes; when they're displayed, they are projected onto the two-dimensional plane of the computer screen.

Animation frame: A single picture from an animated sequence. When many frames are combined and played back at full speed, you can see the illusion of movement.

Cel animation: A type of computer animation that consists of flat objects, usually rectangular cutouts from full pictures (such as DEGAS or NEOchrome pictures).

Cyclic animation: A type of computer animation that simulates movement by repeatedly changing the picture's colors through a cycle—for example, color cycling in DEGAS or NEOchrome.

Cut: A transition in which one image is abruptly replaced with another image.

Dissolve: A transition in which one image is replaced, a piece at a time, with corresponding portions of another image.

Fade: A transition in which one image gradually changes to black, or changes from black to an image.

Metamorphic animation: A type of computer animation in which an object created from points or polygons changes when the points or corners move in relation to each other. Thus, a five-pointed star might unfold itself to change into a mountain range.

Overlay: An image that appears in front of all other images.

Script: A formal description of the sequence of events in an animation.

Splice: To combine two computer animations by following the last frame of one with the first frame of the other.

Tweening: The process of automatically computing the intermediate positions between one key frame and the next of an animated object.

Underlay: An image that appears behind all other images.

Video frame: A single complete picture as shown on a standard television set, which requires 1/60th of a second to show. A video frame is distinct from an animation frame, although the two may be synchronized.

Wipe: A transition in which one image is replaced with another gradually, either from side to side (horizontal wipe) or from top to bottom or bottom to top (vertical wipe). ■

making slight changes to each frame, adding lighting or reflections. You can also cut a rectangle from a picture and perform tweening to rotate and paste the cut across an animation.

You can load CAD-3D animations into Cyber Paint and modify them frame by frame. You can merge and splice animations with a few points and clicks, and the more memory you have, the longer and more sophisticated the animations can be. Best of all is the ADO F/X menu, which lets you take an already-moving animation sequence, then flip it across the screen. It looks like a movie screen with images projected on it that's flipping and spinning through space.

Cyber Paint is a spectacular tool, but it's also a memory-eater. With a one-megabyte machine, you'll be hard pressed to create more than seven or eight seconds of full-speed animation entirely in memory. You can, however, use the patch tool to edit animations

that are larger than available memory by working with smaller chunks of the animation at a time, although it's quirky and slow to work with.

Animator ST generates liquid- smooth transitions from one shape to the next.

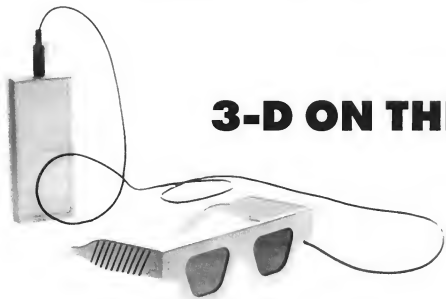
Overall, though, Cyber Paint is the most exciting animation product available for the Atari ST computers. It's fast, fun and instantly gratifying. ■

If you'd like more articles like this, circle 185 on the Reader Service Card.

Matthew N. Shelly programs for the Atari ST and writes software documentation.

Products Mentioned

- **Make It Move.** \$49.95. MichIron, Inc., 576 South Telegraph, Pontiac, Michigan 48053, (313) 334-5700; BBS: (313) 331-5452.
CIRCLE 186 ON READER SERVICE CARD
- **Animator ST.** \$79.95. Aegis Development, 2115 Pico Boulevard, Santa Monica, CA 90405, (213) 392-9972.
CIRCLE 187 ON READER SERVICE CARD
- **Cyber Studio (CAD-3D 2.0 and CyberMate),** \$89.95; **Cyber Control,** \$59.95; **Cyber Paint,** \$69.95. The Catalog, Antic Software, 544 Second Street, San Francisco, CA 94107, (800) 234-7001.



3-D ON THE ST

If you want to take the next step beyond 3-D (solid modeling) ST graphics, then run down to your friendly Atari dealer and take a look at—and through—the LC Technologies StereoTek glasses. The glasses connect, via cable, to a cartridge plugged into your ST. Their lenses

(liquid crystal shutters) flicker on and off 60 times a second (30 for each eye), synchronized to the alternating left eye/right eye views being shown on your ST. The effect is startling—true stereo; the illusion of real-world depth into your ST monitor.

Of course, in order for the stereo

effect to work, ST programs have to be specifically programmed to operate with the glasses. Each StereoTek system comes with a DEGA Elite Stereo Desk Accessory and Stereo CAD-3D, and there is a growing list of StereoTek-compatible programs: CAD-3D 2.0, Cyber Control, the educational Genesis Molecular Modeling system, Maps and Legends, the games LCS Wanderer, Shoot-The-Moon, and several others. Additional stereo software (including games) should be released later this year.

StereoTek Glasses, \$149.95. LC Technologies, a division of Tektronix, P.O. Box 4960, Beaverton, OR 97076. (800) 426-2200.

CIRCLE 273 ON READER SERVICE CARD

PIXELS ON

PAPER

CREATING BANNERS, POSTERS AND CARDS

by **TOM HUDSON**

Remember making homemade cards with poster paints, glue and crayons? Remember the mess? Now sit down at your ST with some of these useful and fun printer utilities and let your imagination go! An ST and dot-matrix printer are all you need to produce professional-looking copy.

The ST has been blessed with a number of utilities to help you to prepare text and graphics for printing. Presented here is an overview of software packages that let you put your words on paper—creating banners, posters, cards and calendars. All of the software works with 512K ST systems (either color or monochrome), and all of the packages are a lot of fun!

Label Master Elite

Label Master Elite (LME) is for anyone who needs to create mailing or disk labels. It operates in either the high-res monochrome or medium-res color mode, necessary because of the large di-

alogs used in the program. And, since it's GEM-based, it's easy for any ST user to operate.

At the core of LME is a simple file structure, split into "First name," "Last name," "Address," "City," "State" and "Zip." A record may be designated "Personal" or "Business" — you enter personal addresses with first and last names separate, and when printed they're combined on one line, giving a three-line label. Business addresses use the "last name" entry as an attention or other information line, printing a four-line label. The name and address information lines may be up to 30 characters each, and the zip code line may be 10 characters. Canadian addresses may

present a problem, since the state line is only two characters and there's no space for a country entry.

Each label may have an accompanying graphic design chosen from over a hundred pictures on the LME disk. LME also includes a complete graphic design editor built into the main program. You can save your new designs to disk for future use.

For quick, one-shot labels, LME has a facility for printing up to 999 copies of a label, and the latest version of the program allows mailing list merges.

The program can read a disk and generates file lists automatically—up to 57 names per label. The package comes with a strip of ten 3.5-inch disk labels, ▶

PIXELS ON PAPER...

and Migraph sells these labels in packages of 100 or 500.

The LME manual states that the program may be used with most 9- or 24-pin printers, and the program works fine with my Epson-compatible NEC P6 24-pin printer. However, the program is designed to work only with Epson-compatible printers, although you may imbed control-character sequences in the label information to get special effects on the text if you like. The graphic designs may present problems with other printers.

Your Personal Poet

Here's a unique product for the home market. Your Personal Poet generates personalized greeting cards based on parameters you enter. For example, let's say you want to send your friend Dave a "Get Well" card. Enter Dave's name, your name, Dave's primary and secondary character traits, the type of card, where Dave lives, the date and a PS. line. You can also specify Dave's sex (though you may know it, the computer doesn't!), and a custom title for the poem.

Your Personal Poet is menu-driven through the keyboard. You choose a "Light and Limerickal" or "Sentimental and Serious" verse for the poem, depending on your mood. Once you enter all the options, you can review your selections and change them, if necessary; then the computer generates two poems. The poems are randomly generated based on your input, and can be amazingly appropriate.

By using random poetry generation techniques, Your Personal Poet can create over 25 million different poems. It's a lot of fun—the first poem I generated was an ode to a character from a funny short story, and it was amazingly on-target. Here's an excerpt:

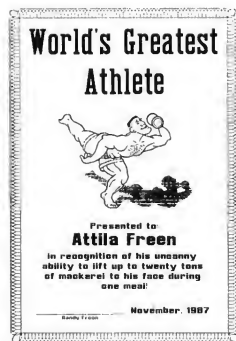
"To Freddy"
Reflecting on you I did smile
I'll speak of you now for awhile
You're weird all around
For odness renowned

It's Freddy of Springfield's fine style

Once you generate your poem, you can print it out on your Epson-compatible printer in an attractive custom font. You can also save the text to disk for use by other text editors or desktop publishing programs.

The package comes complete with 5-by-7-inch continuous forms for your printer. The paper has a self-stick backing, and you can insert the final, printed poem inside one of the greeting cards that are provided. Envelopes for the completed greeting cards are included.

An add-on product, Greeting Card



Certificate Maker

Form Paper, is available for Your Personal Poet. This is a "refill" pack that includes 20 self-stick greeting card papers.

Certificate Maker and Certificate Library

Similar in concept to Your Personal Poet, Certificate Maker has a different target audience. With Certificate Maker you can make over 200 personalized certificates: awards, licenses, achievement certificates and so on.

Using the GEM-based interface, you mix and match title, illustration, border, body text, date line and signature. Choose one of two sizes: 8½-by-11-inch (horizontal and vertical orientation) and

8½-by-5½-inch. The parameters for the certificates may be saved to disk for later use.

You can select the type of certificate from the 220 basic forms on the disk, ranging from blank forms to "Clock Watching Award" to "Certificate of Reading Proficiency." Then you can enter specific information (borders, body text) and choose from the various fonts available.

Printing the certificate is the final step. The finished product is quite nice-looking, and three dozen sealed, self-adhesive "seals," some which are made with gold metallic foil, are included to add that final touch. The artwork used on the certificates is very professional and, in many cases, amusing. This is a great package to make up mock awards for co-workers at the office, teachers who want to recognize exceptionally hard-working students or anyone who wants to brighten someone's day.

As if 220 certificate forms weren't enough, Springboard also offers an add-on library of 105 more certificate forms, with 24 more borders and six dozen new self-stick seals. Wow!

PrintMaster Plus

Judging from user group publications I've seen, Unison World's PrintMaster Plus is one of the more popular graphics-generation packages around, and a natural for the ST.

The program allows you to create a number of different graphic projects, such as posters, banners, stationery, greeting cards and calendars, and has a built-in graphics editor letting you create your own graphics. The biggest drawback of the program is the fact that it has been "ported" from other computer systems to the ST and has a strange user interface, rather than GEM. The primary problem is the way the mouse is used to position an invisible cursor on the screen, which highlights selections. Since there's no visible cursor, it's difficult to know where you'll be pointing next. This was a constant an-

noyance during testing, but as an option you can use the keyboard. With sufficient use you can become accustomed to it.

All elements are selected from on-screen menus, and choices are numerous. For example, there are eleven different borders, ten various fonts, special effects and 122 graphic images in up to three sizes each. If you're creating a poster, you can preview it on-screen



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Label Master

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LWASTER.P06 LWASTER.B0C LAYOUTR.S02
LWATER.S07 MCGRAPH.L01 SAMPLES.T04

Label Master Elite

and correct it, if necessary, before printing it.

Other options include: greeting cards, which are printed on one sheet of paper and folded into a card that has a design and message on the front and opens to reveal another design on the inside; calendars, both in a monthly and weekly layout; stationery, which prints graphics and text along the top and bottom edge of the paper; and large

banners for "Welcome Home" signs or party banners.

The PrintMaster Plus program operated very well in testing, and the only negative aspect is its nonstandard user interface. A little more work would have made the program much more familiar to ST users. PrintMaster Plus supports a wide array of printers, not just Epson compatibles.

Unison World has several add-on products for the PrintMaster Plus system: Fonts & Borders and the PrintMaster Art Gallery I and II. The Fonts & Borders package provides the PrintMaster user with twenty more fonts and twenty more graphic borders; the Art Gallery I and II packages offer 140 new graphic images. The images in both packages are grouped into convenient libraries and may be selected easily from PrintMaster Plus.

If you'd like to see more articles like this, circle 176 on the Reader Service Card.

Tom Hudson is the author of DEGAS Elite and CAD-3D for the ST. Tom lives in Shawnee, Kansas.

Products Mentioned

- **Label Master Elite**, Migraph Inc., 720 S. 333rd St., Federal Way, WA 98003, (206) 838-4677, \$44.95.
CIRCLE 178 ON READER SERVICE CARD
- **Your Personal Poet (\$9.95), Greeting Card Form Paper (\$4.95)**, Door Openers, Inc., 775 East Greg St., Sparks, NV 89431, (702) 359-8200.
CIRCLE 180 ON READER SERVICE CARD
- **Certificate Maker (\$39.95), Certificate Library Volume 1 (\$29.95)**, Springboard Software, Inc., 7808 CreekrIDGE Circle, Minneapolis, MN 55435, (612) 944-3915.
CIRCLE 182 ON READER SERVICE CARD
- **PrintMaster Plus (\$39.95), Fonts & Borders (\$34.95), PrintMaster Art Gallery I and II (\$29.95 each)**, Unison World, 2150 Shattuck Ave., Suite 902, Berkeley, CA 94704, (415) 848-6666.
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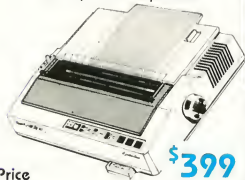
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STICKY SPACES

Having trouble getting documents transferred from your word processor to 1st Word Plus or Word Writer? Most word processors will load ASCII files, and most also have an option to save ASCII files to disk, so creating an ASCII file is the first step. However, once the ASCII file has been loaded into one of these word processors, you may find that because you are working with a text file, you won't be able to use the same formatting commands that work on document files. To change the file back into a document, Search and Replace all the spaces for spaces. That's right. Doing this will get rid of the "sticky spaces" that are preventing you from being able to reformat your file. (If you are using 1st Word Plus, you will also have to switch to word-processing mode to complete the process.)

Another thing to keep in mind when reformatting a document is that Word Writer will not reformat the last line of the document unless that line ends in a carriage return.



SHADES OF GRAY

Many times a GEM dialog box will have two buttons: one with a light outline and one with a heavier, shaded outline. This shaded button is the default; pressing Return will select this option automatically. If neither button is darker than the other, then you must click on one of them to exit the dialog box.



CHANGING RESOLUTION

Many programs require either a color or monochrome monitor; others, especially games and some drawing programs, must be run in a specific resolution. If this is the case you can change resolutions from the desktop by selecting Set Preferences on the Options menu, then clicking on the appropriate resolution and then clicking on OK.

One or more of the resolution selections will be "ghosted" (gray); this is because monochrome monitors can only run in high resolution, and color monitors can only run in low or medium res.



MOVING OUT OF FOLDERS

Copying a file to a folder is fairly intuitive: drag the file to the folder so that the folder is highlighted, and then let go. (This lets you put the file inside the folder without opening the folder.)

Copying a file from a folder to the parent directory is a little different, though: drag the file to the drive icon until it is highlighted, then let go.



STARTING AND STOPPING A SCREEN DUMP

Your ST owner's manual will tell you that selecting Print Screen from the options menu will do a screen dump, and you may already know that holding down the Alt key and pressing the Help key produces the same result—and can be used while running a program as well as from the desktop. Did you also know that pressing Alt-Help again will stop the printout?



THREE-AND-A-HALF-INCH NOTES

Quick—what's the difference between a double- and a single-sided disk? Well, there's no difference: all disks have two sides. Remember how you used to take a hole-punch to your 8-bit floppy to turn it into a double-sided disk? You can use both sides of a 3.5 inch floppy for the same reason. Of course, the back side will come with the same guarantee of quality as a homemade 5¼-inch double-sided disk—that is, no guarantee. And just because a disk has two sides doesn't mean you can always use both sides; you must have a double-sided drive to read them both. But in a pinch the only real difference between a double- and single-sided disk is the way they're formatted.

Got an ST technical tip or trick to share? Send it to START Programs Editor Heidi Brumbaugh, 544 Second St., San Francisco, CA 94107. ■

Are You Missing Part Of This Issue?

Do you have the disk for this issue of START?

If not, then you're missing out on our great ST graphics and music programs, and our hot animation demos from Make It Move, Animator ST and Cyber Paint! Over 650K of super ST software, squeezed down to fit on a single-sided disk, for only \$12.95! (Includes shipping and handling.)

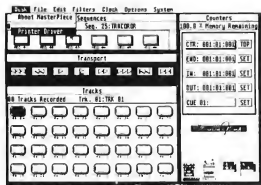
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PRODUCTS UPDATE

Patching It Up

No sooner do we update our ST MIDI software list than more ST music programs tumble across our desks.

One of the newest is Edit-8000, a graphic patch editor/librarian for the Korg DW- and EX-8000 series of synthesizers. Edit-8000 includes four levels of patch generation, a built-in mini-sequencer and full librarian functions. You can swap, save and load patches and banks (of sounds). Edit-8000's



MasterPiece, from Sonus Corp.

Even More Music and Graphics on the ST

One of the most useful pieces of electronic sound equipment is a sampler. A sampler lets you record sounds of any kind and save them to disk as digital information. Once digitized, you can play the sounds back on a synthesizer or drum machine.

ST-Replay is a new cartridge-based sampler that lets you digitize and play back sounds or music on any ST. You can sample the output from a cassette or CD player or a turntable, using phono plugs, then play the samples through your ST monitor, TV speakers (for STs with RF modulators) or through your own home stereo. You can also use the samples in your own programs with the ST-Echo and User software that comes with the cartridge.

Digidrum is a drum machine/sequencer package that lets you program up to 32 beats per rhythm pattern, up to 99 patterns and up to 70 song entries. It also includes a variable playback rate, and allows you to load additional samples from disk. ST Replay, \$159.95; Digidrum, \$399.5. Microdeal Ltd., distributed by MichTron, 576 S. Telegraph, Pontiac, MI 48053. (313) 334-5700

CIRCLE 232 ON READER SERVICE CARD

workscreen uses a combination of "tuning knobs" and "sliders," allowing you to alter your sounds with the mixing board-style interface. It even includes over 500 patches to get you started. \$79.95. Savant Audio, 2140 Bellmore Ave., Bellmore, NY 11710. (516) 826-6636

CIRCLE 233 ON READER SERVICE CARD

From Sonus comes two MIDI products: MasterPiece and SST Super Sequencer. MasterPiece is a powerhouse 32-track sequencer for professional musicians. It supports real or step-time entry, keyboard mapping, extensive editing and filtering options and a wealth of other features. SST Super Sequencer is a starter sequencer, similar to MasterPiece, but without as many features. MasterPiece, \$375.95; SST Super Sequencer, \$149.95. Sonus Corp., 21430 Strathern Street, Suite H, Canoga Park, CA 91304. (818) 702-0992

CIRCLE 234 ON READER SERVICE CARD

Don't Be A CADD

There are a couple of new CADD (computer-aided drawing and drafting) programs in town; they should be available as you are reading this.

MasterCAD lets you create 2- and 3-D graphics through its concept of "projection planes." You can spin 3-D objects from 2-D drawings, move, copy, flip or rotate them either horizontally or vertically, and view them from different angles, either in wireframe or solid mode. You can write text in either 2- or 3-D and manipulate it as an object. It also allows you to print your work in any size. Different versions of MasterCAD will be available for both monochrome and color ST systems, 512K and one megabyte. \$199.95. Indi, C.A., distributed by MichTron, Inc., 576 S. Telegraph, Pontiac, MI 48053. (313) 334-5700

CIRCLE 266 ON READER SERVICE CARD

Symmetry lets you design anything from architectural models to circuit boards. It features interactive 2-D and true 3-D capabilities, multiple windows, rotation axes and layers (up to 256) and zoom (magnify your drawing up to a million times). It also allows scaling in either English or metric measurements. You can label your drawings with the text features, specify different fonts, and manipulate the text as 2-D and 3-D objects. \$199. Northern Design Systems, 649 Down Crescent, Oshawa, Ontario L1H 7X9, Canada. (416) 436-2941

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Continued on page 4

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CIRCLE 020 ON READER SERVICE CARD

PRODUCTS UPDATE

By Jon A. Bell
START Associate Editor

Hyperstuff

The **ST Lightpen Interface** is designed to work with popular ST drawing, painting and CADD programs (in any resolution), and you can also use it simultaneously with your mouse. At press time, the lightpen was still-awaiting FCC approval. Price should be between \$220-250.

OmniRes ST purports to let you run virtually any color-only software on your monochrome monitor. The program is slated to include options for low- and medium-res emulation, plus a "turbo" mode allowing color programs to run *faster* in monochrome. U.S. price should be \$34.95.

With the **ST Graphics Tablet Driver** and a Kurta graphics tablet, you'll be able to draw or trace your favorite artwork, with resolution up to 200 dots per inch. The software allows you to use the mouse and tablet simultaneously. U.S. price is \$129.95. **Hypertek/Silicon Springs Development Corp.**, 120-1140 Austin Avenue, Coquitlam, British Columbia V3K3P5, Canada. (604) 939-8235

CIRCLE 265 ON READER SERVICE CARD

Three Computers In One: PC and Macintosh Software on the ST

With *pc-ditto*, a software package from Avant Garde Systems, and the Magic Sac cartridge, from Data Pacific, you can run hundreds of PC and Macintosh software packages on your ST. In short, with an Atari ST, you're actually got three computers in one!

This is the first installment of our IBM PC and Apple Macintosh software coverage. In future issues we'll review top-of-the-line PC and Mac software that's been *proven* to run on the ST, using *pc-ditto* and the Magic Sac. If you've been wanting to see names like Borland, Microsoft and Lotus on your ST screen, then keep watching these pages!

IBM Software

Here are some of the hottest IBM titles that Avant-Garde Systems has certified as running with *pc-ditto*: **Enable** (The Software Group);

Framework and Framework II (Ashton-Tate); **Lotus 1-2-3, 1-2-3 Report Writer**, and **Symphony** (Lotus Development Corp.); **Infidel** and **Cornerstone** (Infocom); **Multiplan Microsoft Chart** and **Microsoft Project** (Microsoft Corp.); **Dollars and Sense** (Monogram); **Sidekick** (Borland); **PFS: Professional Write** (Software Publishers) and **Wordstar** (Micropro).

Macintosh Software

You can run hundreds of Macintosh programs with the Magic Sac Plus cartridge—and in some cases, the software's faster on the ST than it is on the Mac! (If that isn't enough, Data Pacific has two other products for the Mac-hungry ST owner: **Translator One**, an interface box that enables ST drives to directly read Mac disks, and **Magic Sac Professional**, which includes the Magic Sac, the

Translator and the **Magic Epson Printer Driver**.)

Some of the super Mac titles that will run on the ST are: **Reflex 1.01** and **Turbo Pascal** (Borland); **Cyborg**, **Essex**, **Geometry**, **Lode Runner**, **Mindwheel**, **The Ancient Art of War**, **The Print Shop** and **The Toy Shop** (Broderbund); **Ballyhoo** and **Zork III** (Infocom); **PageMaker 2.0** (a powerful desktop publishing program from Aldus Corp.); **Desk Top Art** (Dynamic Graphics, Inc.); **Printworks** and **Epstart** (Softstyle, Inc.); **ThunderScan** (Thunderware, Inc.); the **Aztec C Compiler** (Manx); the **Megamax C Compiler** (Megamax); **BASIC Interpreter**, **Chart 1.0**, **Excel 1.03**, **Multiplan 1.02**, **Word 3.00** and **Works** (all from Microsoft Corp.); and most Apple software, such as **MacWrite**, **MacDraw**, **MacPaint** and **MacProject**.

We've Only Just Begun

If you've bemoaned the fact that your local computer store doesn't carry ST software, then *pc-ditto* and the Magic Sac will lift those woes from you. These same computer stores will most likely be carrying the software mentioned above, or will probably order it for you.

pc-ditto, \$89.95. **Avant-Garde Systems**, 381 Pablo Drive, Jacksonville, FL 32225. (904) 221-2904

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Magic Sac Plus, \$149.95; **Translator One**, \$279.95; **Magic Sac Professional**, \$449.95. **Data Pacific, Inc.**, 609 E. Speer Blvd., Denver, CO 80203. (303) 773-8158

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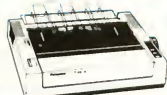
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CIRCLE 015 ON READER SERVICE CARD

Goldrunner, Jupiter Probe and Trailblazer

by David Plotkin

It's true that computer games don't have to have graphics or sound; playability is certainly the single most important factor for a good game. But for this special issue of START it's exciting to examine the excellent graphics and sound capabilities of the ST, and how this state-of-the-art equipment, combined with gifted and creative programming teams, can make computer games more exciting and keep the player's interest longer.

GOLDRUNNER

Microdeal's Goldrunner is a superbly-crafted shoot-'em-up and a real joystick buster. My hands are still shaking from



Goldrunner

my last round! In Goldrunner, you pilot a spacecraft across a smoothly scrolling landscape. Control is either joystick, mouse or keyboard; I recommend the

joystick. The object is to destroy everything you can, and you have the firepower to do it. The primary targets are ground-based buildings, but some lightning-fast enemy craft will come up to do battle. You can run over these without damage, but they launch missiles at you; take five hits and you lose one of your lives.

The documentation claims that the game is split up into "rings," with each ring being a different world you must attack. Destroy enough buildings and machinery and the ring is depleted of its energy. Then a door opens in one of the destroyed buildings, and you move on to a bonus round, where you shoot down formations of enemy fighters which don't shoot back to build up your point total. Then you move on to the next ring. You can tell when a ring has been depleted when one of three icons to the right of the screen turns black. The other icons represent the state of your lasers and auxiliary boosters, which can give you an extra boost of speed.

Goldrunner sports just about the best graphics I've seen in a space game. Your highly-detailed spacecraft rolls into turns convincingly. The landscape is realistic, with shaded buildings, shadows and other shapes. The enemy

craft which rise to do battle are well rendered, and explode convincingly, leaving gaping holes. The digitized sound is superb, with voiced commands and explosions. The scrolling is smooth at even very high speeds.

This is one tough game! Every time you die, you end up back at the beginning of the current ring. All the buildings you've destroyed are reincarnated, so you must begin depleting the ring energy all over again. This proves frustrating. An added difficulty is that some of the buildings will destroy you if you run into them. They look like regular buildings, except that they cast a longer shadow (to indicate that they are taller) and cannot be destroyed by gunfire. It is next to impossible in the heat of battle to keep an eye on the length of the

*In Goldrunner,
the object is to
destroy everything
you can.*

shadows of the buildings, and this is the most common way to lose your spacecraft. The trick is to memorize the playing field and fly *carefully* to avoid those buildings. One consequence of this is that this game is addicting, since you can pinpoint your error, the urge to try again to do better can bring cramps to your joystick hand.

The only complaints I have are with the packaging of this game. The copy protection scheme means that you must autoboot the disk, and I found that the computer froze up often when writing



Aftertouch A synthesizer feature in which the keyboard senses the continued pressure on a key as it's pressed.

Breath controller An accessory letting you control musical sounds with a wind instrument-like interface. The harder you blow, the greater the control signal you send.

Cycle 1. One complete occurrence of a waveform, from start to finish (see **Waveform**). **2.** A unit of sound measurement. An instrument that vibrates 120 times in one second is said to have a frequency of 120 cycles per second, or 120 Hertz (Hz). See **Frequency**.

Envelope The overall configuration of a waveform. If you draw a line around one entire cycle of a waveform, this constitutes a sound envelope. See **Waveform**, **Cycle**.

Frequency How often a sound (from either an acoustical or electronic musical instrument) vibrates in one second. The higher the frequency, the higher the pitch.

MIDI Musical Instrument Digital Interface. In 1982 several major musical equipment manufacturers decided upon a set standard, MIDI, for the transferral of sound data from one electronic instrument to another. MIDI-equipped synthesizers can "talk," or exchange data, with similarly-equipped devices such as drum machines or personal com-

puters. In the case of the latter, you can control many functions of MIDI instruments with specialized software. The MIDI standard provides for 16 channels of communication.

Modulation A way of modifying or adding expression to sounds by altering the waveforms (see **Waveform**). Many synthesizers have wheel controllers to add modulation to your music.

Note-off velocity When a synthesizer detects how quickly a key is released (the speed of the key rising) and alters the sound of the note accordingly.

Note-on velocity When a synthesizer detects how fast and with what force you are hitting a key, and alters the actual sound of the note accordingly. (Also known as **velocity sensitive**.)

Patch Editor Software enabling you to alter specific values such as pitch, volume and frequency for the various instrument parameters that make up a synthesizer's musical tones. By altering these values, you can produce a wide variety of sounds. The resultant collection of sound parameters is called a patch. A patch librarian allows you to store patches on disk.

Pitch bend Usually a synthesizer controller (often a wheel) that allows you to move the pitch of a note up or down, within a specified range.

Sequencer Hardware built into a synthesizer, a peripheral or computer software enabling you to input a series of notes for later playback. With a sequencer you can build complicated rhythms to serve as backgrounds for melodies. The best sequencers allow you to edit each note of your sequence, much as you would edit words in a document with a word processor.

Sustain The continuation of a note or sound.

Voices Different channels of sound on a synthesizer. A monophonic synthesizer (which sounds only one note at a time) will have only one voice, whereas a polyphonic synthesizer (which can play multiple notes at once) has several voices.

Waveform The changes in air pressure, measured graphically as a line, as a sound is created. A waveform occurs across a specific range of time and can have several configurations. Waves can have sine (a smooth *s*), sawtoothed, square or other shapes. If a waveform completes one cycle and returns to its starting configuration, it is called a periodic waveform. See **Cycle**.

Wavelength The distance of a waveform as it completes one cycle. See **Cycle**. ■

rock 'n' roll with atari

music stars and your
favorite computer

by MARD NAMAN

It's being called the musician's computer and the rock and roll computer. And it is now receiving the respect and accolades it richly deserves. The Atari 1040 ST is the computer of choice for top recording artists such as B.B. King, Mick Fleetwood, The Pointer Sisters, Dave Mason, Tangerine Dream, and Jay Ferguson. "It's fantastic," says blues great B.B. King.

Jay Ferguson, the former leader of the rock group Spirit who now writes soundtracks for Hollywood films, summed up his feeling about the marriage between music and the ST. "I love it. Frankly, it's a wonderful time to be making music."

What exactly is MIDI? MIDI, or Musical Instrument Digital Interface, enables electronic musical instruments to communicate with each other and the computer. As a musician plays an electronic instrument, the computer keeps track of which notes have been played, how long they were, how hard the keys were pressed. The software that does this is called a sequencer.



What makes the ST better than the rest? Basically, its superb built-in music/MIDI capabilities coupled with its low cost. Who could ask for anything more? Certainly not any of the musical celebrities you'll read about here!

With the proper software, your computer can then make your synthesizer play back the notes you played on the synthesizer. Good sequencers allow you to edit each note much like a word processor edits a manuscript. You can add notes, take them out or change existing notes. You can also take out rhythmic imperfections, change the tone or loudness or set up repeating patterns.

B.B. King

One might expect that an old blues purist like B.B. King would want to stick to the old-fashioned way of making music. Not so. He recently purchased an Atari 1040 ST complete with \$14,000 worth of equipment. B.B. laughs and says, "I'm one of those guys who likes to do things people don't expect me to do."

The man who got B.B. excited about MIDI and the ST is record producer Jimmy Hotz. (See the sidebar on Hotz.) Last year, he was asked to help produce five songs on B.B.'s new album. He was in the studio playing around with the

The King of the Blues and his guitar Lucille: his favorite lady now has a new companion—an Atari ST.



ST using Hybrid Arts software. "B.B. heard it and was so flipped out by it he had me put together a similar system for him," says Hotz. "The first time he heard it, it opened a whole new reality for him. He was moved in a very big way."

Hotz set B.B. up with the Atari 1040 ST with Hybrid Arts software and sound samplers, and believes the Atari's MIDI capabilities will really open new creative possibilities for B.B. "When you think of B.B. King, you think of a blues guitar player. Well, B.B.'s got a lot of wonderful ideas that go way beyond blues guitar. The Atari has opened a window of creativity that was never before available to him, except in his mind. Once he gets a chance to work with it awhile, you're going to see some incredible stuff coming out of him."

B.B. says that five songs on his new album employ MIDI technology. But he seems certain that all future albums will rely heavily on MIDI systems. He loves what MIDI does when he's composing: "Not only can you hear what you play ▶



JIMMY HOTZ: ST PRODUCER

Jimmy Hotz is the man professional musicians go to when they want to know about the latest electronic equipment and what to buy. He recently completed Dave Mason's new album using MIDI technology throughout and is setting up Fleetwood Mac with a MIDI system for their current tour.

According to Hotz, the reason some professional musicians have shied away from MIDI is because "no one made it usable to them personally in a user-friendly way. If you present it in a way that functions, that makes it real to them."

But, of the Atari ST, Hotz is unequivocal in his praise. He's used the Macintosh. He's used the IBM. In fact, he's tried every computer available. Compared to these other machines, Hotz says "the Atari is cheaper and works faster. Of all the computers I've used, Atari seems to react the fastest and have the best MIDI timing to make it sound the most natural with what you put in there."

Hotz says the newer Mac II, if completely loaded down, approaches the Atari. But such a system will retail for nearly \$7,000. The same features on the Atari: only \$2,000. Another reason Hotz feels so strongly about the Atari is the num-

ber of companies supporting the ST with excellent software. Leading the pack, says Hotz, are Hybrid Arts and Dr. T's.

Hotz also sets his people up with synthesizers and especially samplers, which make accessible sounds that would otherwise be too complicated for a reasonably priced synthesizer to produce. He says that the most exciting aspect of the samplers for B.B. King, for instance, is that "he now has access to saxophones, clarinets

and real sounds, as opposed to just being able to synthesize something.

"You find that a lot of musicians like B.B. King, Dave Mason and Leon Russell really prefer natural sounds and the reason they never got into synthesizers before was because they always sounded synthesized. But with the samplers and synthesizers like the new Roland D-50, suddenly a window has been opened to real sounds." ■

Jimmy Hotz, record producer.



right off, but you can also loop it and play different things with yourself so it's like having a whole orchestra. In fact, if I stack everything that I've got together, I can have at least 60 different sounds. And I don't need anybody to play with me. I can lay down tracks and with sound samplers I can put everything on it, even drums. . . There's no end to what you can do once you get started

with it. You might say I'm just an apprentice, I'm just getting into it. But it's fantastic."

Once B.B. familiarizes himself more with his system, he intends to take it on the road with him. And maybe— maybe if he gets really familiar with it, he can give his MIDI a nickname. He doesn't think his guitar Lucille will mind at all.

Jay Ferguson

Jay Ferguson is a good example of a musician who has made the successful transition from leader of a rock band to composer of Hollywood film scores. And the Atari ST has been an integral part of that transition. Ferguson was the major creative force behind Spirit, a California rock band that enjoyed

tremendous success in the sixties with hits like "I Got a Line On You." More recently, Ferguson had some solo hits like "Thunder Island" and "Shakedown Cruise," but like other rockers, he grew tired of constant touring. With the help of the Atari ST, Ferguson sees his career in films now. "The benefits of having my own studio, working at home with the computer and being able to be with my family are tremendous," he says.

At first he placed songs in films like *Perfect* and *The Terminator*. Then he was hired to score an entire film, a foreign movie called *Deadly Passion* (Ferguson says it should have been called *Dudly Passion*). That was almost three years ago, and it's been a steady rise since then. He scored last year's *Best Seller*, starring James Woods, and has several films set for release this year, including *Pulse*, a science fiction drama, and *Johnny B. Goode*, a rock film.

The Hybrid Arts package Ferguson uses is SMPTE-based. SMPTE (which stands for Society of Motion Picture and Television Engineers, which developed the system) is a time-code standard for video, film and multi-track use. The Atari's ability to easily use SMPTE gives it a big advantage over other computers like the Macintosh and IBM. It's perfect for Ferguson's film work. Says Ferguson, "It's locked to three-quarter inch video, and every time I roll picture, I'm rolling computer. I sit watching the monitor with the keyboard directly in front of me. I literally watch the picture and anything that comes into my mind in terms of an idea, a rhythm, a part, I can just lay it down and the computer catches it all and it's all locked to picture. So in terms of the creative process, you can really fly.

"Sometimes they change a scene by just a few frames, and that involves just a simple tightening up by increasing the tempo in your sequencer," says Ferguson. Without the computer, of course, the entire score would have to be re-recorded, a time-consuming venture. Ferguson continues, "Other times, they



Jay Ferguson, rock musician and composer.
(Courtesy Capitol Records)

make wholesale cuts in a scene. If you've input properly into your sequencing program, you can just cut and splice and take out nearly whatever you want."

Ferguson warns, however, that "the

throw up your hands and say let's start again."

Ferguson acknowledges it's difficult to know when and what to buy, especially for newcomers. "The potential is there to sit on the sidelines forever, because you know everything that appears may be superseded in six months. Fortunately," says Ferguson, "the industry produces some classics, such as the Yamaha DX-7 synthesizer, as well as the Prophet VS and Roland D-550. (Ferguson's own equipment includes these and more!) But the greatest example is the Mini-Moog, which has never been matched for what it does," says Ferguson. "The thing that's helped me the most is to really read, ask questions, listen and look around before you spend your money."

But to the argument that computerized music will replace live musicians, Ferguson responds, "it will never replace the flesh-and-blood player holding an instrument. It will reduce it. The automobile did not make the horse extinct. It just made it more of a special ▶

**Computerized music
will never replace
the flesh-and-blood
player holding an
instrument.**

computer is not the cure-all for the film editor's razor blade. Sometimes editors make so many small changes you just

ROCK 'N' ROLL...

experience. That's what MIDI and electronics will do for the world of music. . . Also, anything you can conceive putting on an album you can now pretty much duplicate on stage if you work on it."

Jim Purcell

Not everyone who uses the ST has a name that's a household word. Some are just really good at whatever they do. Fifty-three-year-old Jim Purcell is such a man. He's really a Renaissance man. He's been a stockbroker and a film producer. Today, half of his professional life is spent as a successful clinical psychologist. The other half is spent as a professional musician. He composes musical scores for educational films, TV commercials and public television.

Purcell has four keyboard synthesizers and a drum machine that's also a synthesizer. He owns the classic Yamaha DX-7 and the updated DX-7, Mark II. He also has the Yamaha TX-7—like the DX, but with no keyboard. Then he's got a Roland D-50 and a drum machine, the Yamaha RX-15. And finally, he plays a Rhodes Chroma,

which he calls the "old Cadillac of keyboards." He uses it as his controller keyboard, the one that controls all the others. He likes it because, unlike the others, it has wooden keys and feels like a real piano.

His computer? The Atari 1040 ST, of course. Like other creative musicians, Purcell says he needs flexibility in his

and out of every gear available." And the ST fits his needs perfectly. "I'm in love with it," he says.

Purcell uses Dr. T's (Emil Tobenfeld's) software. "I looked around for an excellent sequencer to do anything I wanted it to. This is it. I think Dr. Tobenfeld's a genius." He uses a librarian program called the Caged Artist and has collected over 2,000 voices in his library.

"The fundamental use of the MIDI system for me is access to the sequencer in the computer, which gives me total control over every element," enthuses Purcell. He has recently completed the music for an educational video on math manipulatives. Each segment in the film called for nine seconds of music. To show how MIDI could make life much easier, Purcell offered an example. "Let's say the director called me and said, 'we blew it on the timing. Each segment has to be seven seconds instead of nine.' I'd ask 'when do you need it?' She'd say 'how about a week from Friday?' And I would say 'how about this afternoon?'"

"I would simply go into the system, pull up each segment and start retiming it until the beats per minute gives me seven seconds instead of nine. Next I record it and make a master. Then I'd put on my shoes and drive it over. Not only that, if they have a modem, I could send the whole thing to them over the phone. Of course, all they would get is the MIDI data. They would need a studio to actually duplicate the music."

Maybe
B.B. will nickname
his MIDI equipment.
He doesn't think his
guitar Lucille will
mind at all!

musical system because he likes to experiment, or as he puts it, to "pop in

Jim Purcell, clinical psychologist and composer, surrounded by his tools of the trade: an Atari ST, a grand piano and a multitude of synthesizers.



Erik Weber

Behind the Screens

Hybrid Arts, which makes software to support only the ST, has grown up with Atari. Hybrid Arts' first products were designed for the 8-bit Ataris. Before the ST was out, they made the only MIDI interface for Atari computers. Nowadays, they're releasing a new ST product every two months.

Frank Foster, who heads up the marketing department at Hybrid Arts, says, "In the old days, a professional would take a piece of tape and put it over the



Erik Webster

De rigeur for the modern musician—a personal computer and an electronic keyboard.

Atari logo if he brought it into the studio. That way no one would make jokes about video games. Now the ST has such credibility in the market that people are proud to use it."

According to Tom Jeffries, who programs for Dr. T's, ST MIDI software is better because it's easier to write MIDI software for the ST. "TOS provides some functions that work very well for sending and receiving MIDI data," he says. "Usually a programmer has to write some very knotty and time critical code; Atari has taken care of that work for us. Anyone who's written MIDI software for other micros appreciates how easy Atari has made these things on the ST."

Companies like Passport and Sonus, who have been in the MIDI software market for other computers, have recreated their best MIDI programs for

the ST. And there's a whole raft of new software companies that have built themselves from the beginning on the ST's MIDI power and popularity.

The Million-Dollar MIDI

Perhaps the strongest endorsement of the ST comes from the Pointer Sisters.

**I'm in
love with my ST,"
says Jim Purcell.**

Last year, they were paid \$1.2 million to make an endorsement for Coca-Cola.

Recently, they endorsed the Atari ST and all they asked for in return was an ST with lots of MIDI software.

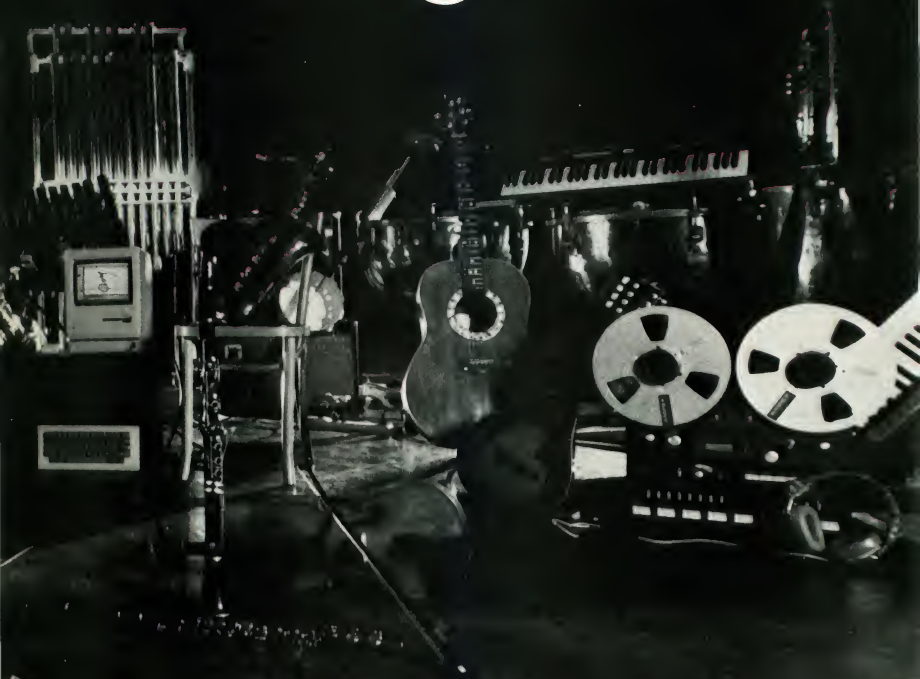
Clearly, MIDI is changing the way musicians make music. And increasingly, the ST is playing a major part in these changes. For toplight professionals like B.B. King or for weekend hobbyists just having fun, a whole new world of sound is literally at their fingertips. ■

If you'd like more articles like this, circle 225 on the Reader Service Card.

Mard Naman, a freelance magazine and TV writer, recently interviewed Linus Pauling for Image Magazine.

If you would like further information on products mentioned in this article, see pages 96 through 99.

THE HARD & SOFT OF IT.



MUSIC EXPO '88

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MIDVIEW. . .

you do, the screen will go blank, in anticipation of incoming MIDI data.

If messages start appearing immediately, press either the left or right Shift key. That should stop those messages (I'll explain what they mean in a moment).

Now play a few notes on your instrument, and you should see two columns of numbers and one of text on the ST's screen. Each row represents one byte that has come in through the ST's MIDI port. The number in the first column just shows how many MIDI bytes have been printed since the program started. The second number is the decimal value of the MIDI byte. The text column shows the program's interpretation of the MIDI byte. The message in this column will be different, depending on what keys you played and how your instrument sends MIDI data. Some messages will make sense immediately; other aspects may be a bit less obvious if you don't know much about MIDI.

Too Many Messages

What if your screen filled up with messages even before you played a note? That probably happened because some synthesizers, especially earlier models, send an Active Sense message every 300 milliseconds (about three times each second). The Active Sense message lets any receiving instruments know that the MIDI connection between them is still intact. This feature of MIDI has turned out to be not terribly useful, and isn't usually found on newer MIDI instruments.

Another possibility is that you're connected to a MIDI drum machine or sequencer, which send a continuous stream of Clock messages. That's more useful than Active Sense messages, but they'll still obscure any other, more important, MIDI data that come in.

Pressing one of the Shift keys solves the too-many-messages problem by filtering out these two message types. If you need to watch for these data types, you can stop filtering them out by

pressing a Shift key again.

The only other keys MIDI View uses are the Alternate and Control keys. While you hold down the Alternate key, MIDI View will stop printing data. That allows you to examine the MIDI data stream at a more leisurely pace. Pressing the Control key leaves the program and returns you to the GEM desktop.

Now there's only one question left: What do all these MIDI messages mean?

```
1 144 Note On, Channel 1
2 60 C 4
3 64 Velocity
4 60 C 4
5 0 Velocity
6 144 Note On, Channel 1
7 62 D 4
8 64 Velocity
9 62 D 4
10 0 Velocity
11 144 Note On, Channel 1
12 64 E 4
13 64 Velocity
14 64 E 4
15 0 Velocity
16 192 Program Change, Channel 1
17 1 Data
18 144 Note On, Channel 1
19 61 C#4
20 64 Velocity
21 61 C#4
22 0 Velocity
23 176 Control Change, Channel 1
24 65 Portamento Switch
25 127 Value
26 192 Program Change, Channel 1
27 0 Data
```

Sample Output From Midi View

The MIDI Code

For those who have no familiarity with the MIDI spec, here's a little background on how MIDI communicates musical information. The individual bytes that make up a MIDI message are divided into two types: data bytes, which carry the actual data to be sent to the instrument, and status bytes, which tell the

receiving instruments exactly what type of data is being sent. Status bytes always have a value of 128 or more, and data bytes are always 127 or less, which makes it easy to tell them apart.

The status bytes break down into four types, corresponding to the different classes of messages that can be sent via MIDI: Channel messages, System Common messages, System Exclusive messages and System Real Time messages. Channel messages are sent to individual instruments via one of MIDI's 16 channels, while System Common messages are sent to all instruments in the system. System Exclusive messages are used by individual manufacturers to send non-musical information (such as voice patches) to their instruments. System Real Time messages are used to synchronize sequencers, drum machines, and other time-dependent devices.

All the musical actions a musician can perform on a synthesizer, such as pressing a key, moving a wheel or pedal, selecting a sound or blowing into a breath controller, are translated into MIDI channel messages by the synthesizer, so these make up the bulk of what you'll be looking at with MIDI View.

When a key is pressed on a MIDI synthesizer, a Note On message is sent. It tells you the note number of the key that was pressed and the velocity with which the key was pressed.

When a key is released, a number of different things could happen. MIDI does provide for a separate Note Off message, but it also allows the use of a Note On message with a velocity of zero to signal the end of a note. Most manufacturers these days use the Note On message. Roland instruments send an All Notes Off message anytime all the keys on an instrument are released; this has been known to cause problems when interfacing certain types of equipment, and is exactly the type of thing that MIDI View is good at tracking down.

Off The Keyboard

For a look at some of the other types of data handled by MIDI, move one of your synthesizer's wheels, levers, or pedals. You should see a long stream of data—either Continuous Controller or Pitch Bend messages, depending on which control you moved. Continuous Controller messages give the name of the controller and the controller's value; Pitch Bend messages carry pitch bend information. The meanings of the various continuous controllers weren't standardized until mid-1985, roughly two years after the birth of MIDI, so older instruments may not agree with MIDI View's interpretations. If something doesn't seem to match with your older MIDI instrument, try checking the manuals for information.

As you experiment with your MIDI instrument and MIDI View, you'll begin to get a handle on how MIDI really works. Try connecting each of your instruments to MIDI View in turn, and compare what you get on your screen

from each key or controller. As you do, you'll become familiar with each of the different data types, and you should be able to start tracking down glitches, as well as any hidden features, that may be lurking in your equipment.

For example, I have a Yamaha KX5 remote keyboard. I discovered that whenever it's set to send on Channel 2, it sends a continuous stream of System Reset commands in place of the Active Sense message—a potentially disastrous bug that can only be tracked down with this type of program. I made another, more cheering, discovery with MIDI View when I found that my Ensoniq ESQ1 sends Note Off commands, complete with release velocity data, when keys are released, rather than the more common Note On/zero velocity combination. Only a few MIDI instruments recognize release velocity, but those that do allow the performer to control many aspects of the sound by how fast the keys are let up, or released, in addition to how fast they are struck.

Final Analysis

As it stands, MIDI View is a complete MIDI data analysis tool, and one that's bound to be a valuable part of any computer musician's software toolbox. If you're a programmer, you'll find the C source code on your START Disk. You may want to try adding interpretation functions to deal with MIDI Time Code or the MIDI Sample Dump Standard, two recent additions to the MIDI spec. Or you could add more extensive filtering options, or any other functions you feel would be useful as you explore or troubleshoot your MIDI system—and analyze and understand what MIDI is all about. ■

If you'd like more articles like this, circle 194 on the Reader Service Card.

Jim Johnson is a freelance writer, musician and MIDI programmer whose writing has appeared in Keyboard and Electronic Musician.

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LEVEL II

TRACK	NAME	STATUS	PUN	TRACK	NAME	STATUS	PUN	TRACK	NAME	STATUS	PUN
1	BassDrum	PLAY	**	13	D MidiBass	PLAY	****	125	P CZ Brass	PLAY	**
2	SnareDrum	PLAY	**	14	E Mirage 1	MUTE	**	126	O CZ Oboe	PLAY	**
3	HiHat	PLAY	****	15	F Mirage 2	MUTE	**	127	R CZ Sitar	PLAY	****
4	LightTom	MUTE	**	16	G Mirage 3	PLAY	**	128	S CZLogDr	PLAY	**
5	Med Tom	PLAY	**	17	H Mirage 4	MUTE	**	129	T	RECORD	**
6	Low Tom	PLAY	**	18	I X77 Stab	PLAY	****	130	U		**
7	Cymbals	PLAY	**	19	J X77 Strg	PLAY	**	131	V		**
8	CowBell	PLAY	**	20	K X77 Bras	MUTE	**	132	W		**
9	Congos	PLAY	**	21	L S90S5trg	PLAY	**	133	X		**
10	Timbales	MUTE	**	22	M S90Horn	PLAY	**	134	Y		**
11	B Tablas	PLAY	****	23	N S90Hng	MUTE	**	135	Z		**
12	C Claves	PLAY	**	24	O K3 Voice	PLAY	**	136	W1		**

CONTROLS	SOLO	RECORD	STOP	PAUSE	PLAY	PUNCH	SET PITS	FROM <<<	CUE
AFTOUCH	MUTE	CLOCK: BPM	120	<<<	>>>	CLR PITS	71	to >>>	
MERGE	QUANT	MEASURE: 71	082	RE-RECORD	ERASE TRK	ERS PUN	end	to >>>	
ECHO	<> 12					CPY PUN			
<<< >>>	EXIT								

MESSAGES:

TRACK-MODE RECORD/PLAY

MSR	ST	EVENT	TIME	CH	TYP	NOTE	VEL	DUR	Sequence #:	Name:
1	1	1	0	18	DN	F#	3	125	1	Arden St
1	7	2	6	11	DN	B	8	84	11	8171
1	12	3	6	11	DN	C	9	181	11	
1	13	4	6	11	DN	D	8	7	6	
1	25	5	6	11	DN	C#	8	80	6	
1	31	6	6	11	DN	C#	6	68	11	
1	31	7	0	11	DN	F	0	10	6	
1	37	8	6	18	DN	E	8	7	1	
1	43	9	6	18	DN	D#	3	55	12	
1	49	10	6	18	DN	B	1	14	6	
1	67	12	6	18	DN	D#	8	118	1	
1	73	13	6	18	DN	E	6	56	6	
1	79	14	6	18	DN	G	4	98	1	
1	79	15	6	18	DN	D#	5	33	1	
1	79	16	6	18	DN	D#	6	77	1	
1	85	17	6	18	DN	B	2	14	1	
1	85	18	6	11	DN	G#	1	4	1	
1	85	19	6	11	DN	C	3	82	3	
1	85	20	6	11	DN	C	3	14	1	
1	91	21	6	11	DN	D	1	59	6	

Copy Sequence	Copy PVT MT3	Play	Record	Load/Save	Set Options	TRACK Mode	SONG Mode
Split	Append	Undo	Calc	Undo	Daily		
Insert Adjust	Delete	Step Time	Append				
Map							

MESSAGES:

OPEN-MODE EDIT

COPYIST V1.4

PVG

ROLAND MT-32

PROGRAMMABLE VARIATIONS GENERATOR AND MASTER EDITOR

The PVG was written to allow the user to computer to generate variations from any previously recorded musical part. It can produce changes or permutations in pitch, dynamics, controller values, rhythm and expression, according to instructions that can be entered in detail by the user. For example, the beginning of a part can be given small pitch changes, while the end of the part is given large velocity changes. The program can produce a single variation on a part or a series of variations that evolve over time. The variations produced can contain some randomness or be fully determined.

Integrated with the PVG is the Master Editor, an editing and orchestrating tool of unprecedented power and flexibility. It allows the selection of notes for editing operations by a wide range of criteria, including pitch, velocity, interval from next or last note and position in pattern.

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HOME RECORDING

ON A BUDGET

SETTING UP YOUR OWN MIDI STUDIO



by **JIM PIERSON-PERRY**

Ever dream about playing center stage in a rock band? Do you write music, or want to learn how? Looking for a way to introduce music to your children? Whether you just like to doodle on the keyboard or want to produce demo tapes of your music, with the ST and MIDI, you can now do it all at home.

HOME RECORDING...

Setting up a home MIDI studio is a lot easier than you may think. The main requirements are an understanding of what you hope to do with the system and a willingness to learn a few new vocabulary words. Here, we'll go over the basics of putting together some sample home MIDI systems, ranging from a starter level to semi-pro. Along the way we will go over some guidelines for getting maximum power and flexibility for low cost.

The ST/MIDI Connection

As an ST owner, congratulate yourself. You have already taken the first step towards a low cost/high performance MIDI system. With its built-in MIDI ports, the ST is making quite a name for itself as the personal musician's computer of choice.

Atari itself is fully committed to supporting MIDI applications for the ST. Last summer they became the first computer company to exhibit at NAMM (National Association of Music Merchants), the major domestic music equipment trade show, where they provided showcases for software companies and signed up music retail stores to sell ST computers.

In software, 1987 was a great year for MIDI applications. Currently, there are over 120 programs available for the ST, ranging from player piano programs to professional-level sequencers. This number is constantly growing both from long-term ST supporters and from new converts who are porting over top performers from other computers.

MIDI Equipment Basics

When you enter the world of electronic music, you'll find yourself surrounded by many arcane terms. What are expanders, samplers and outboard effects processors? Is flanging and chorusing something you can do in front of guests? What about the different types of synthesizers: FM, analog, phase distortion?

Let's go through this maze one step at a time. First, if you're relatively new to MIDI, I suggest you look over Tom Jeffries's article on MIDI basics and my review of different kinds of MIDI software in the Spring and Summer 1987 issues of START, respectively. If you need any other terms defined, take a look at "MIDI Spelled Out," on page 67. Finally, for a shopping list of music equipment, read "Synths, Samplers and Drums" on page 82. What we'll cover below are the various kinds of MIDI in-

**Setting up
a home MIDI studio
is a lot easier than
you think.**

struments and their role in making music.

Synthesizers are usually classified by their method of sound generation. There are two broad classes, analog and digital, with various subgroups in each. Analog techniques take a simple starting waveform and put it through a chain of various electronic components (filters, modulators, amplifiers, etc.) to form the complex final sound. Digital synthesis approaches are based on mathematical manipulations of stored waveforms. Different kinds of manipulation lead to various synthesis families such as FM (Yamaha), Phase Distortion (Casio) and Linear Arithmetic (Roland). As you would expect, the various kinds of sound synthesis have their individual strong points, due to the different tone colors they can create.

Sound synthesis technique is not the only factor to consider when looking at a synthesizer. These include the number of notes that can be played at the same time, number of independent voices

that can be played together, types of MIDI controllers supported, and various added sound processing features such as reverb, sequencer and others. The number of notes that can be played simultaneously ranges from one to sixteen, and is often limited by the number of voices played at once.

MIDI implementation charts detail the controller functions supported by a synthesizer. Important ones for musical expression are note-on velocity, volume, modulation and pitch bend. More esoteric (but nice to have) are aftertouch, note-off (release) velocity, sustain and breath control. These features are influenced by different controller devices such as wheels, sliders and keys on the keyboard, and peripherals such as foot pedals and breath controllers.

This leads to the concept of a single master keyboard for all controller functions coupled with multiple independent sound synthesis modules, or expanders. Modules are a very cost-effective way of adding sound sources to a MIDI setup, since you then don't have to pay for redundant keyboards. After all, you only have two hands!

An alternate sound source is a sampler. This device digitally records (samples) a sound, and then can reproduce it shifted up or down in pitch, enabling you to play the sound from a keyboard. Most samplers also include additional processing components to modify the starting sound. Samplers are especially useful for complex sounds that cannot be easily synthesized, such as an acoustic piano or human voice. You can even sample other synthesizers!

Not all synthesizers are for keyboard sounds. Another important instrument is the drum machine. This device typically plays sampled percussion sounds ranging from snare drums to ethnic and orchestral sounds (congas, agogo, gong). Features to look for include the ability to play individual drum sounds from a keyboard via MIDI, velocity sensitivity (to give playing dynamics—such as the

different tones created when you strike a piano key either strongly or softly) and support of MIDI song position/select pointers.

Making music may be the heart of your MIDI studio, but you still need an audio system to hear it. At the simplest level, all you need to do is connect a synthesizer to your stereo set. For anything more complex, however, you'll need a mixer to blend your sound sources into a stereo signal. The type of mixer will be determined by the size of your system and whether you intend to run a pure MIDI system (where everything plays live) or a tape-based system (where you're recording music a part at a time). If you can't use an existing home stereo system, you may need to invest in a set of monitor speakers for your studio.

In between the mixing and the final sound, you can use a variety of out-board processing devices to add extra depth and special effects. The single most important such effect is reverb, which gives a "live" feeling to the sound. Other effects include chorusing (which multiplies the sound of an instrument), flanging (which adds a metallic "bite" to the sound), delay (which adds echoes) and equalization (which cuts or boosts sound frequencies). You can also include protection devices, such as a noise gate (to get rid of background noise), and a compressor/limiter (to maintain a desired dynamic range and prevent sound spiking).

Tips And Traps

Hurray! You made it past the hard part. Now that you have an idea of the building blocks for a home MIDI studio, let's look at ways to use them. Below are 11 rules to keep in mind to help you better enjoy building and using your studio.

1. **Know what you want to do with your studio.** Your needs will dictate your studio's equipment and configuration. The range is from a pure live MIDI setup for a lot of voices playing at once



You can make beautiful music without a lot of cash—just an ST. Here, composer Roy Bachand works in his basement recording studio with his Casio FZ-1, accompanied by his faithful dog Bruin. (Note: your home studio setup may vary. Dog not included.)

to a tape-based studio which allows you to could get by with fewer sound sources by overdubbing parts.

2. **Use a synthesizer with a good MIDI controller selection as a master keyboard.** Sooner or later you will want to use multiple MIDI controllers to add expression to your music. Your options are an expensive master keyboard with

every controller under the sun but no sound itself, or a keyboard synthesizer which may have fewer controllers but may double as a sound source. For home use, the smart choice is a synthesizer.

3. **As much as possible, buy modules.** This is a corollary to Rule 1. Many

continued on page 107

SYNTHS, SAMPLERS AND DRUMS

A SHOPPING LIST OF MUSIC HARDWARE

by **JAN PAUL MOORHEAD**

Putting together a MIDI system for your ST may seem overwhelming at first, but it's also fun! As a musician, it's always more interesting to spend your money on noise-makers, rather than interfaces and cables—the "quiet" technology.

When you're choosing your MIDI equipment, there are a lot of features you have to consider, and many features overlap on different machines. Your budget may be limited so you can only pick up one piece of hardware at a time. But if you think about what you need and how it will all fit together, you can keep your complete finished system in mind.

Remember, there is no "best" piece of equipment—it all depends on what works best for you. Some synthesizers, samplers or drum machines may suit your needs better than others. Let your ear be the final arbiter of what gear you want to buy for your system. If you don't like the sound of a synth, you're not going to be happy no matter how many extra features it has.



The Casio CZ-101 synthesizer.

Shopping for a powerhouse synthesizer? Looking for a drum machine that'll put Phil Collins out of business? How about a sampler, so you can play *The Dog-Bark Sonata*? Then let professional musician and studio owner Jan Moorhead tell you all about the hottest electronic noisemakers—the best equipment for \$1,500 and under!

SYNTHESIZERS

Many people think of any electronic music keyboard as a synthesizer, but that's not really true. A synthesizer is a particular kind of electronic music machine. It starts with a waveform (typically coming from a simple electronic circuit called an oscillator) and then modifies it by subtracting, adding or distorting the waveform.

Synthesizers have grown progressively more complex over the years. There are now analog and digital synths, using techniques such as *subtractive synthesis*, *additive synthesis*, *wave table synthesis*, *phase distortion synthesis*, *frequency modulation synthesis* and *linear arithmetic synthesis*. If you're deeply interested in the electronics of synthesized sounds, there are good books on this stuff. If you just want to make music, you'll find that most synthesizer manufacturers have taken care of the work for you. The patches that handle all the different available parameters for each synth have already been programmed into cartridges or disks.

Much more important for a synthesizer you'll connect to your ST is whether it's MIDI-controlled—will it plug into the MIDI ports on your ST?—and whether it has the sound you want. A Yamaha sounds different from a Casio, which sounds different from a Roland. The differences aren't just matters of price, but of how the sound is actually synthesized. But don't be taken in by buzzwords; the real question to ask is, which one sounds best to you? Since virtually all MIDI synths are compatible with the ST, the sound is the thing to pay attention to.

SAMPLERS

Unlike a synthesizer, a sampler doesn't make sounds. Instead, it records a sound, breaking it down into digital information and storing it in memory. Then you can transpose the sound across your synth keys and play it through MIDI. A sampler can thus emu-

SYNTHESIZERS

Manufacturer:	Akai	Akai	Akai	Casio
Model:	AX60	AX73	VX90	CZ-1
Keyboard/module:	Key	Key	Mod	Key
Type of synthesis:	Sub	Sub	Sub	P/D
Number of keys:	61	73	None	61
Number of voices:	6	6	6	16
Sounds on board:	64	100 Int	100	64 Int, 64 Crt
Polytimbral:	No	B/T	No	Yes
Storage:	Cass	Cass	Cass	R/C
On-board processing:	S/C	S/C	No	Crs
Splits:	Yes	Yes	No	Yes
Layering:	No	No	No	Yes
Velocity sensitivity:	R/O	Yes	R/O	Yes
Aftertouch:	R/O	Yes	R/O	Yes
Display:	LED, N/O	LCD	LCD	LCD
Cost:	\$899.95	\$1199.95	\$799.95	\$1399

Manufacturer:	Casio	Casio	Ensoniq
Model:	CZ-5000	CZ-101	ESQ-1
Keyboard/module:	Key	Key	Key
Type of synthesis:	P/D	P/M	Wvt
Number of keys:	61	49 ¹	61
Number of voices:	16	4	8
Sounds on board:	64 Int, 64 Crt	16 Int, 16 Crt	40 Int, 80 Crt
Polytimbral:	Yes	Yes	Yes
Storage:	R/C	R/C	R/C
On-board processing:	Chs	Chs	No
Splits:	Yes	No	Yes
Layering:	Yes	No	Yes
Velocity sensitivity:	No	R/O	Yes
Aftertouch:	No	R/O	Yes
Display:	LCD	LCD	LED
Cost:	\$1199	\$499	\$1395

Manufacturer:	Ensoniq	Ensoniq	Ensoniq
Model:	ESQ-M	SDP-1	SPM-1
Keyboard/module:	Mod	Key	Key
Type of synthesis:	Wvt	Wvt	Wvt
Number of keys:	None	76	10
Number of voices:	8	10	10
Sounds on board:	40 Int, 80 Crt	12 Int	12 Int
Polytimbral:	Yes	B/T	B/T
Storage:	R/C	None	None
On-board processing:	No	No	No
Splits:	Yes	Yes	Yes
Layering:	Yes	No	No
Velocity sensitivity:	R/O	Yes	Yes
Aftertouch:	R/O	Yes	Yes
Display:	LED	None	None
Cost:	\$995	\$1395	\$895

SYNTHS, SAMPLERS...

late any instrument, traditional or electronic. It can also emulate sounds that aren't musical instruments at all. For example, if you sample the sound of breaking glass, you could play tunes on your sampler using that sound—a sort of “broken-glass-ophone.”

A synthesizer cannot usually read or load sounds from another kind or brand of synthesizer. However, a sampler can have some synthesizer characteristics: once a sample is in RAM, you can manipulate it with synthesizer tools such as filters, envelopes and LFOs (low frequency oscillators).

If you want to emulate traditional in-

**Virtually
all MIDI synths
are compatible with
the ST.**

struments, sampling is the way to go. When you're buying a sampler, listen closely. Also, many sampler characteristics or specs are interrelated—they all use up memory. So when looking at the manufacturer's specs, look at them as a group. Any one characteristic won't necessarily guarantee a good-sounding instrument.

The most important characteristics of a sampler are the sampling rate and the resolution. The sampling rate tells you how often the sampler grabs a chunk of the sound that's being sampled; the resolution tells you how much of a chunk it grabs, and how accurately. Obviously, the faster the sampling rate and the higher the resolution, the more accurately the sampler will be able to reproduce a sound.

As with synthesizers, sampler ▶

SYNTHESIZERS *continued*

Manufacturer: Kawai	Kawai	Korg
Model: K3	K3m	DW-8000
Keyboard/module: Key	Mod	Key
Type of synthesis: Wvt, Add ²	Wvt, Add ²	Wvt
Number of keys: 61	None	61
Number of voices: 6	6	8
Sounds on board: 50 Int, 50 R/C	50 Int, 50 R/C	64
Polytimbral: No	No	No
Storage: R/C	R/C	Cos
On-board processing: 7 F/X ³	7 F/X ³	SDD
Splits: No	No ⁴	No
Layering: No	No	No
Velocity sensitivity: Yes	Yes	Yes
Aftertouch: Yes	Yes	Yes
Display: LED, N/O	LED, N/O	LED
Cost: \$1249	\$849	\$1460
Manufacturer: Korg	Korg	Roland
Model: EX-8000	DS-8	Alpha-Juno-2
Keyboard/module: Mod	Key	Key
Type of synthesis: Wvt	FM ⁵	Wvt, Sub
Number of keys: None	61	61
Number of voices: 8	8	6
Sounds on board: 64	100	64 Prs, 64 Prg
Polytimbral: No	Yes	No
Storage: Cos	RAM, ROM ⁶	RAM, Crf
On-board processing: SDD	Yes	Chs
Splits: No	Yes	No
Layering: No	Yes	No
Velocity sensitivity: Yes	Yes	Yes
Aftertouch: Yes	Yes	Yes
Display: LED	LCD	LED
Cost: \$1120	\$1250	\$1295
Manufacturer: Roland	Roland	Roland
Model: Alpha Juno-1	MXS-50	MT-32⁷
Keyboard/module: Key	Mod	Mod
Type of synthesis: Wvt, Sub	Wvt, Sub	LA
Number of keys: 49	None	None
Number of voices: 6	6	8 ⁸
Sounds on board: 64 Prs, 64 Prg	64 Prs, Prg	128 Prs, 64 Prg ⁹
Polytimbral: No	No	Yes
Storage: Cos	Cos	SEE NOTE 10
On-board processing: Crs	Crs	D/R
Splits: No	No	Yes
Layering: No	No	Yes
Velocity sensitivity: R/O	R/O	R/O
Aftertouch: R/O	R/O	R/O
Display: LED	LED	LCD ¹¹
Cost: \$895	\$749	\$695

SYNTHESIZERS *continued*

KEY TO CHARTS

	Manufacturer: Yamaha	Yamaha	Yamaha
	Model: DX75	DX100	DX27
Keyboard/module:	Key	Key	Key
Type of synthesis:	FM ¹²	FM ¹³	FM ¹³
Number of keys:	61	49 ¹	61
Number of voices:	16	8	8
Sounds on board:	64	192 ROM, 24 RAM	192 ROM, 24 RAM
Polytimbral:	No	No	No
Storage:	RAM CrT	Cos	Cos
On-board processing:	No	No	No
Splits:	No	No	No
Layering:	Yes	No	No
Velocity sensitivity:	Yes	R/O	R/O
Aftertouch:	Yes	R/O	R/O
Display:	LCD & LED	LCD	LCD
Cost:	\$1495	\$445	\$695

	Manufacturer: Yamaha	Yamaha	Yamaha
	Model: DX275	TX7	FB01
Keyboard/module:	Key	Mod	Mod
Type of synthesis:	FM ¹³	FM ¹²	FM ¹³
Number of keys:	61	None	None
Number of voices:	8	16	8
Sounds on board:	192 ROM, 24 RAM	32	240 ROM
Polytimbral:	No	No	Yes
Storage:	Cos	Cos	Cos
On-board processing:	No	No	No
Splits:	No	No	Yes
Layering:	No	No	Yes
Velocity sensitivity:	R/O	R/O	R/O
Aftertouch:	R/O	R/O	R/O
Display:	LCD	LCD	LCD
Cost:	\$695	\$925	\$350

	Manufacturer: Yamaha
	Model: TX81Z
Keyboard/module:	Mod
Type of synthesis:	FM ¹⁴
Number of keys:	None
Number of voices:	8
Sounds on board:	128 ROM, 32 RAM
Polytimbral:	Yes
Storage:	Cos
On-board processing:	No
Splits:	Yes
Layering:	Yes
Velocity sensitivity:	R/O
Aftertouch:	R/O
Display:	LCD
Cost:	\$495

Add	— Additive
B/T	— Bi-timbral
Cos	— Cossette
Crs	— Chorus
CrT	— Cartridge
D/R	— Digital reverb
FM	— Frequency modulation
F/X	— Effects
Int	— Internal
Key	— Keyboard
LA	— Linear arithmetic
LCD	— Liquid crystal display
LED	— Light-emitting diodes
Mod	— Module
N/O	— Numeric only
P/D	— Phase distortion
PLY	— Polyphonic
P/M	— Phase modulation
Prg	— Programmable
Prs	— Preset
P/T	— Poly-timbral
RAM	— Random Access Memory
R/C	— RAM cartridge
R/O	— Receive only
ROM	— Read-Only Memory
S/C	— Stereo chorus
SDD	— Stereo digital delay
Sub	— Subtractive
Wvt	— Wovetable

¹ Mini-keys.

² 32 harmonics out of a possible 128.

³ Includes chorus, delay, tremolo, etc.

⁴ Zone assignable.

⁵ Two oscillators with 4 waveforms.

⁶ Storage on RAM and ROM cards.

⁷ Combination synth/drum module.

⁸ Includes one rhythm part.

⁹ Includes 28 rhythm presets.

¹⁰ Through MIDI only.

¹¹ Backlit display.

¹² 6 operators, 32 algorithms.

¹³ 4 operators, 8 algorithms.

¹⁴ 4 operators, 8 algorithms, 8 waveforms.

SYNTHS, SAMPLERS...

manufacturers offer pre-sampled sounds, usually on disk. That means you can connect it to your ST and start making music immediately, without having to sample a piano, violin, or breaking glass. Pre-sampled sounds also tend to solve the "formant" problem. Suppose you sample your own voice, then transpose it over the entire keyboard. As you get higher on the keyboard, it begins to sound more and more like Minnie Mouse—much higher and faster, like a record that's playing too fast. When you go lower, it sounds equally ridiculous. You can solve the

**A sampler
breaks down a sound
into digital information
and stores it
in memory.**

problem by taking several samples at various pitches—that's the way it's usually done with presampled sounds.

High sampling rates, bits of resolution and sampling at numerous points all use up memory, but they also improve the sound you get from a sampler.

DRUM MACHINES

Drum machines are sequencers with sounds built into them. Most studios use drum machines, although they're probably unnecessary; an ST sequencer can play drum sounds loaded into your sampler, giving you the added benefit of its inherent sound-editing features. However, in normal practice, it's very nice to have a rhythmic "scratch pad" available. Also, the drum machine can play the basic pattern for your song

SAMPLERS

Manufacturer Model	Akai S-700	Akai X7000	Akai S612
Keyboard/module	Mod	Key	Mod
Number of keys	None	61	None
Number of voices	8	6	12
Sampling rate	4kHz-40kHz	4kHz-40kHz	4kHz-40kHz
Bits of resolution	12	12	8
Number of sample points	16	16	N/A
Total sampling time	8.8 Sec	8.8 Sec	8000-1000 M/Sec
Polytimbral	N/A	Yes	N/A
On-board processing	No	No	No
Velocity sensitivity	R/O	R/O	R/O
Aftertouch	R/O	R/O	R/O
Display	LCD ¹	LCD ¹	LED
Cost	\$999.95	\$1399	\$799.95

Manufacturer Model	Ensoniq DSK	Ensoniq DMS-8	Roland S-10
Keyboard/module	Key	Mod	Key
Number of keys	61	None	49
Number of voices	8	8	8
Sampling rate	10kHz-33kHz	10kHz-33kHz	30 kHz Max
Bits of resolution	8	8	12
Number of sample points	16	16	4
Total sampling time	2-6.5 Sec	2-6.5 Sec	4-8 Sec
Polytimbral	Yes	Yes	N/A
On-board processing	No	No	No
Velocity sensitivity	Yes	R/O	Yes
Aftertouch	Yes	R/O	Yes
Display	LED	LED	LCD ¹
Cost	\$1295	\$1195	\$1495

Manufacturer Model	Roland S-220
Keyboard/module	Mod
Number of keys	None
Number of voices	16
Sampling rate	15kHz-30kHz
Bits of resolution	12
Number of sample points	4
Total sampling time	4, 4-8.8 Sec
Polytimbral	Yes
On-board processing	No
Velocity sensitivity	R/O
Aftertouch	R/O
Display	LCD ¹
Cost	\$1395

KEY TO CHARTS

Key — Keyboard
 Max — Maximum
 Mod — Module
 M/Sec — Milliseconds
 N/A — Not applicable
 Sec — Seconds

¹ Backlit

while you lay the other parts down in the Atari. Then you can go back and record an official drum part into the sequencer.

Recording the complete drum part on the drum machine is time-consuming but does have two advantages: it's useful for live-performance gigs and it saves memory in your sequencer.

Velocity-sensitive pads are a nice thing to have in a drum machine, for a more "human" feel. (Depending on how hard you hit the pads, the sound will be either loud or soft.) For this reason,

**It feels better to
whack a drum machine
with a stick than
just poke it with
your finger.**

many studios use separate percussion controllers to do the MIDI data input. It feels a lot better to whack something with a stick than just poke it with your finger when you're trying to do drum parts.

For serious studio applications, separate outputs for individual drums are a must. Putting the same reverb on the bass drum that you might put on the cymbals would give you a very muddy mix. Also, the ability to read sounds from RAM cartridges or cards means that you have at your disposal a much larger palette of sounds.

There are drum machines that sample as well, but this function is usually found only on the more expensive units. In lieu of sampling there are still many ways that sound can be manipu- ▶



The Ensoniq ESQ-1 synthesizer.



The Yamaha DX7S synthesizer.



The Yamaha RX5 digital rhythm programmer.

SYNTHS, SAMPLERS...

lated in the machine in order to customize your sounds (if not program them). Tuning of the drums is a common feature as well as envelope control, equalization, damping and playing the sounds backward for special effects.

CHOOSING AN INSTRUMENT

There are a number of general considerations in choosing a sampler or synthesizer for your ST. First of all, of course, is it MIDI compatible? Without MIDI compatibility, it's really just an electronic musical instrument—it doesn't have the power that your ST can add to it.

Second, do you need a keyboard? The synth or sampler isn't really the keyboard itself—it's just one way of getting information into the music machine. As you'll discover when you look at synths and samplers, many are available with or without a keyboard—and the keys add to the price of the machine. If you don't play piano and you just want to connect the synth or sampler to your ST through the MIDI port, you may not need or want a keyboard. On the other hand, if you're an experienced keyboard player you may want to look for advanced features like splits, overlapping zone limits and being able to control different synths with velocity switching and aftertouch.

Third, are you planning to use the instrument in live performance or in a home studio? And if you're buying a number of music machines, try to get a variety of different-sounding instruments. No one synthesizer is going to be able to get all the variety of sound you can get from different makes, and by layering the sound of different machines you can come up with sounds that are greater than the sum of their parts.

One feature of particular interest is whether the machine is poly-timbral (multi-timbral is the same thing). This means that the synthesizer can receive MIDI data on more than one channel

DRUM MACHINES

Manufacturer:	Alesis	Kawai	Kawai
Model:	HR-16	R-100	R-50
Number of key pads:	16 AS	8 AS	8 AS
Number of voices:	48	24	24
Storage Medium:	None	RAM Crd, Cas ¹	Cas ¹
Pattern memory:	100	100	100 ³
Pattern length:	N/A	99 Beats	N/A
Song length:	N/A	999 P/S	255 P/E
Song memory:	100	100	10
Outputs:	2 S/P	8	2 St, 1 Ind
Velocity sensitive pads:	Yes	Yes	No
Display:	LCD	LCD ²	LCD ²
Cost:	\$449	\$795	\$795

Manufacturer:	Korg	Korg
Model:	DDD-1	DDD-5
Number of key pads:	14 As	7
Number of voices:	18 Int ⁴	29 Int ⁶
Storage Medium:	RAM & ROM ⁵	RAM & ROM ⁵
Pattern memory:	100	N/A
Pattern length:	99 bars	N/A
Song length:	9999 bars or 255 parts	N/A
Song memory:	10	N/A
Outputs:	6	Sr
Velocity sensitive pads:	Yes	Yes
Display:	LCD ²	LCD ²
Cost:	\$999.95	\$599.95

Manufacturer:	Roland	Roland	Roland
Model:	TR-707	TR-727	TR-626
Number of key pads:	16	16	16
Number of voices:	15	15	30
Storage Medium:	Cas & Crd	Cas & Crd	Cas & RAM Crd
Pattern memory:	64	64	48 ⁹
Pattern length:	167	167	N/A
Song length:	999	999	999
Song memory:	4	4	6
Outputs:	10 ⁸	10 ⁸	8 In/O
Velocity sensitive pads:	No	No	No
Display:	LCD	LCD	LCD
Cost:	\$695	\$695	\$695

Manufacturer:	Roland	Roland	Yamaha
Model:	TR-626	CR-1000	RX-17
Number of key pads:	16	None	13
Number of voices:	30	16	26
Storage Medium:	Cas & RAM crd	None	Cas
Pattern memory:	48 Prs, 48 Prg	A/P	100
Pattern length:	N/A	A/P	N/A

and assign different sounds to different channels. You can play different instruments at the same time on a single multi-timbral synth, and that may be exactly what you need in a live performance (though it may be less important for multitracking in a studio).

Study but don't get carried away with the manufacturer's specs. How does the instrument sound to you? If you like the

way it sounds and the MIDI implementation is complete, all the statistics and sales talk are irrelevant.

THE CHARTS

The charts outline some of the machines currently on the market. Many discontinued, although excellent, synths are still in stores, and you can pick them up at a great price. You can

DRUM MACHINES *continued*

Song length:	999	A/P	999 Ports
Song memory:	6	A/P	10
Outputs:	8 In/O	1	St
Velocity sensitive pads:	No	Na	No
Display:	LCD	LED ¹⁰	LCD
Cost:	\$695	\$470	\$375

Manufacturer: Yamaha

Model: RX-5

Number of key pads: 24

Number of voices: 24 Prs, 12 Int RAM, 28 Cr1

Storage Medium: RAM & ROM Cr1¹¹

Pattern memory: 100

Pattern length: 99 Ms

Song length: 999 Ports

Song memory: 20

Outputs: 13¹²

Velocity sensitive pads: Na

Display: LCD²

Cost: \$1195

KEY TO CHART

A/P — All presets

AS — Assignable

Cr1 — Cord

Cr1 — Cartridge

CoS — Cassette

Ind — Individual

In/O — Individual outs

LCD — Liquid crystal display

LED — Light emitting diode

Ms — Measures

N/A — Not applicable

P/S — Parts/Steps

RAM — Random Access Memory

S/P — Stereo pairs

St — Stereo

¹ Includes cassette for storing song information.

² Backlit.

³ 50 preset, 50 programmable.

⁴ Up to 4 ROM cards insertable.

⁵ RAM cards for song information, ROM cards for additional sounds.

⁶ 29 internal, 2 ROM cards for additional sounds.

⁷ Sixteenth notes.

⁸ With 2 additional stereo outs.

⁹ 48 preset, 48 programmable.

¹⁰ Numeric only.

¹¹ RAM cartridge for song data, ROM cartridge for sounds.

¹² 13 individual outs plus stereo pair.

go broke trying to keep up with the latest technical marvel, so don't forget the used market, either. If you're buying a used synth, inspect it thoroughly and try to get an idea of how the previous owner used it. If it was used on the road for three years by a bar musician with a drinking problem, you may want to steer clear of that one.

Finally, I tried to list only equipment

that was below \$1,500, but remember—any price is negotiable. Look for the deal, don't pay list price and let your ears do the walking!

If you'd like to see more articles like this, circle 195 on the Reader Service Card.

Jan Moorhead is a musician who runs a recording studio in Los Angeles. He has written for several magazines, including Antic and Keyboard.

References

The Synthesizer Handbook by David Crombie. Alfred E. Knopf, Inc., \$13.95.
CIRCLE 196 ON READER SERVICE CARD

List Of Manufacturers

- **Akai Professional.** P.O. Box 2344, Fort Worth, TX 76113.
CIRCLE 212 ON READER SERVICE CARD
- **Alesis.** 7336 Hinds Avenue, North Hollywood, CA 91605. (213) 467-8000
CIRCLE 199 ON READER SERVICE CARD
- **Casio.** 15 Gardner Road, Fairfield, NJ 07006. (201) 575-7400
CIRCLE 200 ON READER SERVICE CARD
- **Ensoniq Corporation.** 263 Great Valley Parkway, Malvern, PA 19355. (215) 647-3930
CIRCLE 203 ON READER SERVICE CARD
- **Kawai America Corp.,** EMI Division. 2055 East University Drive, P.O. Box 9045, Compton, CA 90224. (213) 631-1771
CIRCLE 216 ON READER SERVICE CARD
- **Korg U.S.A.** 89 Frost St., Westbury, NY 11590. (516) 333-9100
CIRCLE 217 ON READER SERVICE CARD
- **Oberheim.** 11650 West Olympic Blvd., Los Angeles, CA 90064. (213) 479-4948
CIRCLE 207 ON READER SERVICE CARD
- **Roland Corporation.** 7200 Dominion Circle, Los Angeles, CA 90040. (213) 685-5141
CIRCLE 209 ON READER SERVICE CARD
- **Yamaha.** P.O. Box 6600, Buena Park, CA 90620. (714) 522-9011
CIRCLE 211 ON READER SERVICE CARD

REVIEW

CATCH THE WAVEFORMS, SAVE A THOUSAND SOUNDS

**K3PO + Synth-Droid,
Casio Synth-Droid and
DW8000 Synth-Droid**

by JAN PAUL MOORHEAD

Compu-mates has just released three new patch editors—K3PO+ Synth-Droid, Casio Synth-Droid and DW8000 Synth-Droid, for the Kawai K3, Casio CZ and Korg DW8000 synthesizers, respectively. All three programs are GEM-based and easy to use. Although identical in many ways, each includes powerful features that take advantage of each synthesizer's special functions. From their colorful opening screens to their uncomplicated user implementation, these programs make sound manipulation a joy.

Patching It Up

A patch editor enables you to alter specific values such as pitch, volume and frequency for the various instrument parameters that make up a synthesizer's musical tones. By altering

these values, you can produce a wide variety of sounds—from sonorous trumpets to helicopter *thwaps*. The resultant collection of sound parameters is called a patch.

To alter any parameter using the Compu-mates programs, you simply point to a value, then click the left or right mouse button to lower or raise it. If you hold the button down the value of the parameter changes rapidly, more than making up for the fact that you cannot enter numbers directly through the keyboard.

“Look, Sir—Droids!”

One item that makes these programs stand out from other patch editors is their “droid” feature. In the patch edit page, the “droid” function enters *almost* random numbers into the various pro-

gramming parameters. I say “almost” because you can't enter values that would produce no sounds; the program uses some judgment in generating the numbers.

Another important feature is that all changes are in real time—you don't have to stop and send the patch to the synth. The programs have a feature called “Diddle” that outputs a stream of notes to the synth so you can hear immediately what you've done. This feature usually works very well, but the notes play quickly, so in a patch with a very slow attack, the note-off signal may occur before the entire note has sounded. You can also mask the parameters you do not wish to randomize, in order to control the types of patches the “droid” feature creates—variations of the same percussion patch, for instance.

You can set the envelopes—the general shape of waveforms—graphically on a grid with the mouse, rather than entering numeric values. This makes it much easier to visualize the sound you're creating. You can select the type of background grid you want for the envelope, the grid color and the line thickness for the envelope drawing. When you change the envelope shape, the change in the numerical value for



Compu-mates' K3PO+ Synth-Droid.

each parameter is immediately displayed on the screen.

The librarian functions allow you to store individual patches, bulk patch dumps, and occasionally other machine-specific parameters. For those who are particularly giddy about MIDI, the Compu-mates programs have MIDI monitors for examining MIDI data transmission. You really get a feel for how much memory you can eat up when you wiggle the pitch or modulation wheel on a synth and see how many bytes are spewing down the MIDI cables. (Editor's note: You can also examine the MIDI data stream with the "MIDI View" program you'll find on this issue's START Disk. See "MIDI View" elsewhere in this issue.)

Now that you understand how these programs work, let's take a closer look at the special features of the Kawai K3, the Casio CZ and the Korg DW8000, and how their respective Synth-Droids support them.

K3PO+ Synth-Droid

The Kawai K3 is a wave-table syn-

thesizer; it stores a set of waveforms, or basic sounds, in memory, and builds sounds out of them. It offers more complex waveforms and a much wider array of sounds than many other synthesizers. The K3 also allows you to design entirely new waveforms.

Because of the K3's special waveform features, waveform creation and editing are unique to the K3PO+ package. The K3 allows you to define 32 possible harmonics out of a possible 128. Seeing the relative values of 32 harmonics is impossible on the K3 but it's a snap with this program. K3PO+ gives you three ways of entering values: you can click on individual harmonics (displayed in a bar graph format) to alter their values; you can "draw" the relative values of group harmonics with the mouse; or you can "droid" an entirely new waveform.

One limitation of the K3 has been that you can store only one user-created waveform in memory or on a cartridge at a time. K3PO+ lets you store separate waveforms, patches, waveform/patches and bulk patches. K3PO+ also has archiving tools for naming patches and bank reorganization. This is essential once you have two or three cartridges of patches—otherwise, keeping track of what patch 29 on cartridge 2 sounds like is all but impossible. All in all, K3PO+ is a must for those doing serious sound programming on the Kawai K3.

Casio Synth-Droid

The Casio CZ series synthesizers use a sound creation method called Phase Distortion synthesis, which uses up to eight different waveforms. As you mix waveforms, the program gives you a small graphic representation of each waveform as well as the waveform's number.

The graphic editing of envelopes is very important for CZ synths because you have six different envelopes, each of which has eight different levels and eight different rates. That leaves you

with 96 parameters to keep track of just for your envelopes! The ability to see them and pull them around the screen is a godsend.

The "droid" function is a little more limited in this program than in the others. Casio Synth-Droid was the first program in the series and doesn't have the Patch Droid Edit option. Not being able to select which parameters are being "droided" means that some of the patches end up being more random—and often a bit more weird. Still, you only have to click to generate a new (and presumably more useful) patch. Musicians with a penchant for gambling should love it—click the button and win a patch!

You can also copy envelope values from one envelope to another, which is handy. The program offers "Hold" and "Compare" functions that are great for seeing what changes you are really making. With "Hold" you can store a patch in a buffer and then "Compare" it with your new patch. One small complaint—

**All three
Compu-mates programs
are GEM-based and
easy to use.**

my version left a red screen once I left the program. It's a little irritating to have to reset the color after using it each time. Other than that, Casio Synth-Droid works like a charm.

DW8000 Synth-Droid

The DW8000 synthesizer by Korg is another wave-table synthesizer. Unlike the K3, it does not allow you to design waveforms, and it has a more limited ▶

CATCH THE WAVEFORMS...

selection of factory-designed waveforms. DW8000 Synth-Droid works with all models of DW8000, including older models.

An important feature of the DW8000 is its clean, built-in digital delay (DDL)—a sort of echo effect. DW8000 Synth-Droid allows you to save delay settings independent of the patches. You can also use a wide range of standard effects without reprogramming, and apply them to as many patches as you want.

The program also offers something called an "asymmetrical flanger." Typically, when using DDLs with stereo output, it's not uncommon that the volume of the left and right output will be uneven. The asymmetrical flanger operates in real time to even that output. The program also shows a real-time graphic representation of the operation of the asymmetrical flanger. (When it's running, other functions are disabled since

it's a real-time effect that runs continuously.) There is also a Panic button primarily for live performance use. Should you happen to set the digital delay to some awful continuing echo, you can kill it in a hurry without having to search for the right button or series of buttons to end your embarrassment.

Working On Manual

Normally I have a lot of complaints about software manuals. In the case of the Compu-mates patch editors, I never felt the need to look at the manuals or other documentation. The manual is on the disk (a practice I'm not too fond of), but if you're already familiar with editing patch data, these programs are so intuitive that you won't miss printed documentation. However, Compu-Mates will soon be shipping manuals with the disks instead of on them.

After playing with the programs successfully, I examined the documenta-

tion. The manuals are clear, straightforward and occasionally entertaining. Their primary value is that they'll help you through any problems you might have with initial setup, idiosyncrasies of the program or particular synths. There are a few points where I feel more explanation was warranted. However, as I said, I found the programs so friendly that I didn't need the manuals at all. If you still need help, you can find it on the programs' opening screens—Compu-mates' phone number.

On The Horizon

Compu-mates is working on a sequencer for the ST, as well as ST-based editor/librarians for other synths. If the Compu-mates sequencer works as comfortably and easily as their patch editors, I'll be very pleased. These are solid, useful and creative programs that should help build the ST's position as the computer for musicians. ■

BEAM TEAM'S X SYN SERIES

by JIM JOHNSON

The idea behind Beam Team's Xsyn series of patch editors is to have a single master patch editing program to use in conjunction with a number of separate modules for specific instruments. The editing modules are sold separately, but each package includes patch librarians for the other instruments. Currently, editing modules exist for the Casio CZ series, the Yamaha DX7/TX7, the Yamaha DX21/27/100, Yamaha FB01 and Roland JX series.

Beam Team promises that these patch editors will be only the first elements in a fully integrated MIDI control center for the ST, which will soon in-

clude sequencing and transcription (music scoring) capabilities. Work is also proceeding on editing modules for the Yamaha TX81Z and the Oberheim Matrix 6; for this review, I looked at the CZ101, DX21 and FB01 editors.

Inside Xsyn

The Xsyn patch editors use the GEM interface extensively and are so well designed that, as long as you are familiar with the specific details of your synthesizer and have used a few well-written GEM programs prior to this, you should be able to use most of the program's functions without the manual.

After booting the program, a generic menu bar appears, which includes an option for loading your choice of editing modules. After selecting a module, the Bank Manager window appears. You can display two banks of voices at once out of six to eight banks residing in memory. Voices can be copied from one bank to another and deleted or named by pointing and clicking with the mouse. Banks can also be saved, loaded, and transferred to or from your synthesizer.

One apparent bug in the FB01 version of the program reared its ugly head in the Bank Manager window, though: requesting the FB01 to send a voice bank will occasionally cause it to dump its configuration memory instead, with the result that nothing but garbage appears in the Bank Manager's list of voice names. A call to Beam Team revealed that they were genuinely concerned about fixing the problem, but they were unable to duplicate it. Given the idiosyncrasies of many synthesizers, it's

just as likely that the problem is in the FB01 as in the software.

After selecting a voice in the Bank Manager, you can edit it by selecting the "Edit Voice" option on the menu bar. Each module has its own editing screen, though they are all laid out similarly. Each parameter of the synthesizer's voice has its own slider onscreen, with a number indicating the current value. You can edit envelopes either graphically (by dragging the envelope's break points with the mouse) or with slider bars. Every envelope in the voice is displayed simultaneously, and in the case of the Yamaha instruments, the algorithm is also displayed graphically. This makes it possible to figure out at a glance which components of the voice are affecting any aspect of the sound.

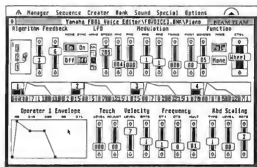
What's Up Front

In a patch editing program, the layout and operation of the editing screen are critical to how easy the program will be to use. Luckily, the Xsyn programs are easy to use, although they have some peculiarities. First, the envelopes displayed in the DX editor weren't accurate. The displays show simple ADSR (Attack/Decay/Sustain/Release) envelopes, though these synths employ ADSDR envelopes (with an added Decay).

Second, each of the programs I reviewed had a few parameters on the screen that had nothing to do with the synthesizer I was using the editor with. For example, the DX21/27/100 editor has a pitch envelope generator on the screen, even though neither the DX27 nor the DX100 has such a function. The Xsyn manual doesn't explain the differences between these instruments, so users of the DX100 or DX27 may be a bit confused by this.

The FB01 editor has a more serious gaffe—two sliders labeled Touch, which supposedly affect the instrument's response to aftertouch. Unfortunately, neither the Xsyn nor the FB01 documentation explain how they're used, and as near as I could tell, they have nothing to

do with aftertouch. In all fairness, though, this is as much Yamaha's fault as Beam Team's, since the FB01 manual doesn't have any information at all on how to program the beast. Finally, when you save your files to disk, you're not given a list of your previously-saved files in a GEM selector box. You just have to type in your new name and save it to disk, running the risk of overwrit-



Beam Team's Xsyn patch editor (main program).

ing a like-named file you actually wanted to keep.

Still, these flaws aren't fatal. Once you get a handle on which features work with which instruments, you'll be creating voices for your synth almost immediately. An aid in this process is a patch randomization module built into the programs called "The Creator." The Creator starts with an existing voice and uses a user-programmable "mask" to determine which parameters of the sound will be randomized. Once you set up the mask, you can generate a new voice, or a whole bank of voices, with a single mouse click. (You should know a little about how the synth works in order to select the appropriate parameters for randomization.)

But Wait, There's More

The Xsyn programs also feature a 512K reset-proof RAMdisk (for 1040 ST and Mega owners) and a mini-sequencer that can store up to 90,000 notes on a one-megabyte ST. This sequencer can only record and playback on one channel, has no editing features, and can

only play back at a few different speeds, but it's completely adequate for its intended purpose—providing a quick way to replay a phrase while editing a sound.

A mouse-activated keyboard can also be brought up on the screen for test purposes when editing, but its response time is so slow that I found it to be of no practical use. Configuration editors for the CZ1 and the FB01 are included with the appropriate versions of the program, and the DX voice editor has function editing built-in.

Finally, the documentation is well-written and complete, with the exception of the omissions I mentioned earlier.

Overall, the Xsyn series is a complete and efficient approach to synthesizer voice management, even though the program is less than perfect. As a stand-alone program, it's more than adequate. When Beam Team completes the task of integrating their MIDI system, Xsyn could become part of an ST musician's dream system.

If you'd like to see more articles like this, circle 193 on the Reader Service Card.

Jan Paul Moorhead is a musician who runs a recording studio in Los Angeles. He has written for numerous publications, including *Keyboard* and *Antic*.

Jim Johnson is a freelance writer, musician and MIDI programmer whose articles have appeared in *Electronic Musician* and *Keyboard Magazine*.

Products Mentioned

- **K3PO + Synth-Droid**, \$99.95; Casio Synth-Droid and DW8000 Synth-Droid, \$79.95. Computer-mates, 8621 Wilshire Blvd., #177, Beverly Hills, CA 90211. (213) 271-7410
CIRCLE 160 ON READER SERVICE CARD
- **The Xsyn Series**, \$99.95 each. Beam Team, 6100 Adeline St., Oakland, CA 94608. (415) 658-3208
CIRCLE 191 ON READER SERVICE CARD

A NEW FACE ON THE ST MIDI MARKETPLACE

by JAN MOORHEAD

With 87 gold and 36 platinum records worldwide, recording artist, engineer and record producer Charles Faris isn't content to rest on his laurels. Besides working with Fleetwood Mac and on the soundtracks of *Indiana Jones and the Temple of Doom* and *E.T.*, Faris has formed a MIDI software company called Compu-mates, which has caught the industry's attention with its line of low-cost ST MIDI hardware and software. START talked to Charles Faris recently to see how he's pulled it off.

START: *How did you get involved in the new music technology?*

CF: I was the chief engineer for four years in the development of the first digital delay and other audio products, with several companies such as Eventide Clock Works. I was curious about the electronic end of music, and I ended up developing studio systems and designing the studios themselves because of my user knowledge and architectural background.

I liked rock and roll more than architecture, so I put my architect career aside. Then I got into computers, and specifically the ST. Since the MIDI software I wanted wasn't available, I started writing stuff I could use in the studio. I was producing a lot of soundtracks and MIDI really helped to pad tracks and solve problems.

START: *Is a music background very important in being involved in MIDI programming?*

CF: Absolutely. You can't get the education from school. In the studio you learn what the rules are and how to break them consciously. All those little nuances you learn from studio experience and as a musician are essential for any company creating MIDI software. Even technically-oriented musicians don't want to deal with technical problems when they're in the studio; they want to be musicians. When I first used the Fairlight (synthesizer), I'd play with it at home. I'd never bring it into the studio until I had everything done. The manual was five feet thick, and I didn't want to deal with that in the studio for \$200 an hour.

START: *What are your feelings about the ST and its abilities for music applications?*

CF: It's the best thing happening until somebody comes out with something better, and that's going to be very difficult. The Mega ST is going to be a killer machine. Using a number of processors makes the Atari really fast. It's how the programs are written that makes most of the difference in MIDI. The ST makes it easier and more fun.

START: *What prompted you to start your own company?*

CF: I was tired of promises from other companies, the high prices and the bootlegging. I was watching new companies trying to build a business with no experience in either music or engineering and then marketing their products way too high. I started Compu-mates as a musician, for musicians. You have to pay your development costs but your manufacturing costs are mainly the label and the disk. Charging \$300 to \$400 for software seems too high to me. I could be wrong. But I'm getting endorsements and free advertising from major manufacturers like Kawai and Korg, so I must be doing something right. We're releasing professional programs, but the average musician can afford to get into them. We're going to do our best to keep it that way.

START: *For many companies, product support can be a problem. How do you handle it?*

CF: If they have a problem I get on the phone and talk to the customers personally. If they fill out their warranty card we let them know when there's an update. All my upgrades are free, with a few exceptions; you pay or supply the disk and postage. If we have too many changes and too many requests we may eventually add a small handling charge, but this is the policy right now.

People should never feel like they're a jerk for having bought a product. They shouldn't have to keep shelling out money for accessories and updates. I also have accessories available for them on bulletin boards and SIGs that they can download themselves. I also give out free patches with the programs—on some, up to 2,000 sounds. Samples are a different story. It takes some doing to get a good sample and I do sell those.

START: *You have a number of products out and a lot more to come. Do you have a general plan for production? How do you decide what's next?*

CF: I rely on consumer response. Unfortunately, not all my decisions are made on the basis of business sense. If I find a machine I like, I may do a package for it for my own use, even if I don't think I'm going to make a lot of money on it. Hilary Kates, the co-owner of Computers, isn't fond of that attitude, but that's why she's the president. A product doesn't have to be a million-seller to be good.

START: *What languages do you use for your software?*

CF: Generally, I like using the Forth programming language. My favorite so far is 4X Forth, the Dragon Group Forth, because of its editing features. You can write real fast routines with Forth, and you can actually write 68000 assembly code in Forth and you can run it right from the editor. This is important in the creative process. You don't have to wait to compile it, link it and all that. When I write for super speed I write in machine language. This really stifles the creative aspects of a program, for the above reasons.

START: *What are some problems you've had in designing software for various synths?*

CF: Generally, you would think that the MIDI data in the manual from the manufacturer would be the bible. I've seen a number of people have problems writing for a particular synth, getting mad at the machine and then bailing out on the project. I had the same problems and finally I realized maybe I'm right and the MIDI data is wrong. In this case, the manufacturer ended up giving me

\$1,000 just to rewrite their MIDI implementation. There seemed to have been a translation problem between Japanese and English.

Nothing is bugless. One of my favorite programmers is Tom Hudson. I think he's on a mercenary mission for eggheads. Even in his marvelous programs, one will find an occasional bug.

START: *So don't necessarily trust all the MIDI implementation information from a company?*

I like
rock and roll more
than architecture.

CF: Right. They're probably not going to spend a lot of time with their best engineer putting out their MIDI implementation chart. They're going to get some kid to sit down and put all that together for their publication. On one system, they had the MIDI bytes for bass and treble reversed, and every program written for it had the same problem.

START: *What other pitfalls might there be for someone starting their own MIDI software company?*

CF: My recommendation would be to go through a reputable company as a developer. I didn't because I only knew one or two when I started and they put a bad taste in a lot of people's mouths. If I had my druthers before I started my own company, I wouldn't have done it. Just take your

time in selecting, because there're a lot of schlock operations out there.

START: *What are some things that are important to look for in MIDI products, such as editor/librarians and sequencers?*

CF: Look for something that works in real time, that's transmitting MIDI while you're making changes. One of the worst things is to work on something and then have to dump it into the synthesizer to hear what you just did. When you're in the studio or on stage and doing serious work, you're not going to have time to do a lot of thinking about what you have to calculate next.

Also, you should insist on getting a demonstration of MIDI software before you buy it, to see if it's what you really need. If you don't get a demonstration, call the manufacturer and tell them the store refused to give one, and ask where you can get a demonstration. Insist on it. Never buy a piece of software or hardware blind.

START: *Where do you feel MIDI and music software are headed in the future?*

CF: Through the roof. There are so many ideas that haven't been tapped yet, it's only going to get better and better. There's no saturation point as far as I can see.

START: *You don't think there's going to be a shake-out for those who aren't clever enough to survive?*

CF: There are a lot of geniuses out there who can design really good products, but if they don't have a good company structure, it's death to that company. That's why I suggest that any would-be programmer who has a good idea to go with one of the established companies, because he could get swallowed up in a pinch. ■

MIDI COMPARISON CHARTS

PATCH EDITOR COMPARISON CHART

GENERAL FEATURES	CZ PATCH	CZ-ANDROID	PERFECT PATCH	DX HEAVEN	XSYN	SYNTH-DROID
Version reviewed	1.0	9/24/86	2.0	1.0	1.0	
Price	\$99	\$99	\$59	\$99	\$99.95	\$79.95-\$99.95
Number of banks stored (SS disk)	87	146	74	43	?	25,000-30,000 patches
Sample patch banks supplied	15	2	1	24	na	2000 patches
Copy protected	yes	yes	yes	yes	no	key
GEM utilization	some	full	full	some	full	some
Allow desk accessories	no	yes	yes	no	yes	yes
Keyboard equivalents to mouse	yes	yes	no	some	yes	same
SET-UP						
Assign MIDI channel	no	yes	yes	yes	yes	yes
Synths supported	CZ	CZ	DX-7/TX	DX-7/TX	CZ, Yamaha DX21/27/100, DX7/TX, Roland	CZ, Karg DW8000
Number of patch banks displayed	4	2	3	4	2	?
MIDI thru/channelization	no	no	yes	yes	thru only	yes/yes
LIBRARY FUNCTIONS						
Display file name for bank	yes	no	yes	yes	yes	yes
Store patch/envelope files	yes/yes	yes/no	yes/no	yes/no	na/no	yes/yes
Move single patch/bank	yes/yes	yes/yes	yes/yes	yes/no	yes/yes	yes
Patch name length	8	16	10	10	10	yes
Hardcopy bank patch names	yes	yes	yes	yes	yes	yes
File edit options	no	D,F,R	D,R	F	no	na
EDIT FUNCTIONS						
Smart editor	yes	yes	yes	yes	yes	yes
Graphical envelope editing	no	yes	yes	yes	yes	yes
Number of simultaneous graphs	3	1	12	1	6	4
Voice edit options	C,SW	C,SW	C	C	C,C,P	C,SW
Envelope edit options	C,SW,ID	C,SW	C	C	C,C,P	C,SW
Envelope scaling	yes	no	no	no	no	yes
Compare edit to original	yes	yes	yes	yes	yes	yes
Unedit	na	yes	yes	yes	yes	yes
AI patch generation	no	yes	no	yes	yes	yes
Test sound from keyboard	yes	no	yes	yes	no	yes

KEY TO CHARTS

AT	=	aftertouch
C	=	copy
CC	=	MIDI controller
CD	=	change drive
CK	=	ST keyboard
CP	=	cut and paste
CZ	=	CZ-101/1000/5000/CZ-1/CZ-230S
D	=	delete file
E	=	event
F	=	format disk
FF	=	fast forward
ID	=	insert/delete
M	=	merge tracks
ME	=	measure counter
MK	=	MIDI keyboard
N	=	note
PC	=	program change
P	=	performance features only
R	=	rename file
RW	=	rewind
S	=	segment
SW	=	swap
T	=	track
TM	=	tempo
V	=	velocity

The ST has become electronic music's favorite computer, thanks to its low price, high power and built-in MIDI ports. These charts compare the features of MIDI programs for the ST; they're compiled from reviews and charts that have appeared in previous issues of START. For ongoing coverage of MIDI software and hardware for the ST, turn to every issue of START, the ST Quarterly—the #1 Guide to MIDI for the Atari ST!

List Of Manufacturers

- **Pro Creator**, \$240. Steinberg Research, distributed by the Russ Jones Marketing Group, 17700 Rayment St., Suite 11, Boston, MA 02118. (617) 353-1815

CIRCLE 262 ON READER SERVICE CARD ▶

PLAYER COMPARISON CHART

GENERAL FEATURES	MUSIC BOX	MUSIC STUDIO	MIDIPLAY	MIDI VIEW
Version reviewed	1.1	—	v425	—
Price	\$49.95	\$59.95	\$49.95	\$49.95
Number of tracks	8	4	1	1
Number of simul. voices	8	15	16	16
Copy protected	no	yes	yes	no
Input sources	CK	CK,MK	MK,PD	MK,PD
Monitor resolution	med/high	low	med/high	low
SET-UP				
MIDI/monitor output	yes/yes	yes/yes	yes/yes	yes/no
Assign MIDI vaicings	yes	yes	no	no
Assign MIDI effects	same	no	no	no
Programmable int synth	no	yes	yes	no
Free memory indicator	yes	yes	no	NA
DATA INPUT				
Real time data recorded	no	no	all	NA
Step time data recorded	N,PC,TM	N	na	NA
Number of time signatures	4	8	NA	NA
Smart measure entry	yes	no	NA	NA
MIDI note range	24-83	0-120	0-127	0-127
Note timing resolution	1/32	1/32	NA	NA
EDITING FUNCTIONS				
File edit options	no	F,D,R	no	no
Segment edit options	CP,I,D	CP,I,D	CP	NA
Transpose/octave range	yes/2	yes/5	yes/1	na
Duration scaling	no	yes	no	NA
Add lyrics/song title	na/no	yes/yes	na	NA
PLAYBACK				
Vary tempo	yes	yes	yes	yes
Set cue point	yes	yes	yes	no
Play selected tracks	yes	yes	NA	NA
Medley play	na	no	yes	yes
Music disks cast	NA	NA	\$19.95	\$19.95
BBS song files	few	many	NA	NA
SCORING				
Single voice score	yes	yes	no	na
Sheet music score	limited	yes	na	na
Add enhancements	text,pic	no	NA	NA

MIDI COMPARISON CHARTS

LIBRARIAN COMPARISON CHART

GENERAL FEATURES	SYS/EX	DATA DUMPSTOR	TR707 DUMPSTOR	PRO CREATOR
Version reviewed	2.0	1.1	1.0	1.0
Price	\$150	\$89.95	\$64.95	\$240
Need TOS in ROM	no	no	no	yes
Copy protected	yes	yes	yes	chip
GEM utilization	no	full	full	full
Allow desk accessories	no	yes	yes	yes
Mouse based	no	yes	yes	yes
Desk accessory version	no	yes	yes	no
SET-UP				
Instruments supported	MIDI 1.0	MIDI 1.0	TR707/727	DX-7/TX
Hard drive supported	yes	yes	no	no
Free memory indicator	yes	yes	NA	NA
MIDI slow option	built-in	yes	NA	no
Support folders	no	yes	yes	no
# MIDI data files displayed	1	20	20	2
REQUEST/MIDI FILE FUNCTIONS				
Request files on disk	no	yes	NA	yes
MIDI data buffer size	350K	310K	NA	NA
Smart "buffer full" recovery	yes	no	no	NA
Create composite MIDI files	yes	yes	NA	NA
Request looping option	yes	yes	NA	NA
File edit options	C,D	D,F	D,F	D
Name individual tracks	NA	NA	yes	NA

- **Perfect Patch**, \$59. Aegix, P.O. Box 9488, Reno, NV 89507. (702) 329-1943
CIRCLE 251 ON READER SERVICE CARD
- **Xsyn**, \$149.95. Beam Team, 6100 Adeline Street, Oakland, CA 94608. (415) 658-3208
CIRCLE 252 ON READER SERVICE CARD
- **SYS-EX**, \$150. Key Clique, Inc., 3960 Laurel Canyon Blvd., Suite 374, Studio City, CA 91604. (818) 905-9136
CIRCLE 257 ON READER SERVICE CARD
- **K3PO+ Synth-Droid**, \$99.95; **Casio Synth-Droid and DW8000 Synth-Droid**, \$79.95. Compu-mates, 8621 Wilshire Blvd., #177, Beverly Hills, CA 90211. (213) 271-7410; (818) 904-0661
CIRCLE 253 ON READER SERVICE CARD
- **MIDI Recording Studio**, \$59; **CZ Patch**, \$99; **DX Heaven**, \$99. Dr. T's Music Software, 66 Louise Road, Chestnut Hill, MA 02167. (617) 244-6954
CIRCLE 254 ON READER SERVICE CARD
- **MIDIplay**, \$49. Electronic Music Publishing House, Inc., 2210 Wilshire Blvd., Suite 488, Santa Monica, CA 90403. (213) 455-2025
CIRCLE 255 ON READER SERVICE CARD
- **EZ-Track**, \$65; **CZ-Android**, \$99.95. Hybrid Arts, Inc., 11920 West Olympic Blvd., Los Angeles, CA 90064. (213) 826-3777
CIRCLE 256 ON READER SERVICE CARD
- **Super Conductor**, \$79.95. MichTron, 576 S. Telegraph, Pontiac, MI 48053. (313) 334-5700
CIRCLE 258 ON READER SERVICE CARD
- **MIDI Magic**, \$39.95. Micro-W Distributing, Inc., 1342B Route 23. Butler, NJ 07405. (201) 838-9027
CIRCLE 259 ON READER SERVICE CARD
- **MIDIsoft Studio**, \$99. MIDIsoft Corporation, P.O. Box 1000, Bellevue, WA 98009. (206) 827-0750
CIRCLE 260 ON READER SERVICE CARD
- **Data Dumpstor ST**, \$89.95; **TR707 Dumpstor**, \$64.95. Music Service Software, 801 Wheeler Road, Madison, WI 53704. (608) 241-5615
CIRCLE 261 ON READER SERVICE CARD
- **The Music Studio**, \$59.95. Activation, Inc., 2350 Bayshore Parkway, Mountain View, CA 94039. (415) 960-0410
CIRCLE 250 ON READER SERVICE CARD
- **ST Music Box**, \$49.95. Xlent Software, P.O. Box 5228, Springfield, VA 22150. (703) 644-8881
CIRCLE 263 ON READER SERVICE CARD

SEQUENCER COMPARISON CHART

GENERAL FEATURES	EZ-TRACK	MIDIPLAY	MIDI REC STUDIO	MIDISOFT STUDIO	SUPER CONDUCTOR
Version reviewed	1.0	425	1.0	2.10	1.3
Price	\$65	\$49.95	\$39	\$99	\$69
# Tracks	20	1	8	32	16
Event capacity (520ST)	27,000	250,000	?	30,000	?
Copy protected	no	yes	yes	no	no
GEM utilization	full	no	some	full	full
Allow desk accessories	yes	no	no	yes	yes
Keyboard mouse equiv.	P	all	P	P	some
SET-UP					
MIDI system commands	no	no	yes	yes	yes
Set instrument modes	yes	no	no	yes	na
MIDI slow option	no	na	yes	yes	na
Sync to external device	na	na	yes	yes	no
Song pointer	no	no	no	yes	yes
Beats/measure range	NA	NA	1-999	1-16	1-99
Tempo (beats/min)	1-480	?	10-999	12-480	40-213
Metronome	a/v	no	a/v	a	a/v
Free memory indicator	yes	yes	no	yes	yes
Format data disk	yes	no	no	no	no
DATA ENTRY					
Caunt-in	na	na	yes	yes	yes
MIDI channels/track	1	1-16	1-16	1	1
Set cue point	no	no	yes	yes	yes
Punch in/out	no	no	no	yes	no
Step-time recording	all	no	all	N,V,PC	all
Filtering	no	no	CC,AT	AT	all
MIDI thru	yes	na	yes	yes	yes
Step-time playback	yes	no	yes	yes	no
Track name length	16	8	8	24	NA
EDITING					
Edit modes	T,S	no	T,S,E	T,S,E	S,E
Track manipulations	C,M	no	C,M,D,R	C,M,D,R	no
Transpose octave range	4	1	5	5	8
Parameter scaling	no	no	all	na	na
Event manipulations	na	na	all	N,PC	all
Time correct location	yes	na	yes	yes	yes
Time correct duration	no	no	yes	yes	yes
Event hardcopy	na	no	yes	no	yes

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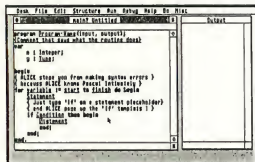
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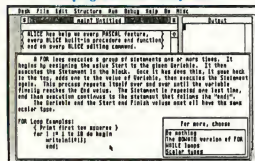
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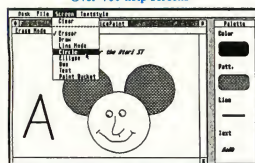
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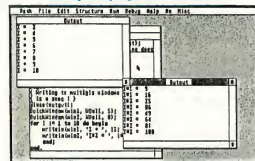
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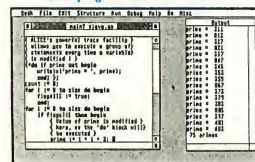
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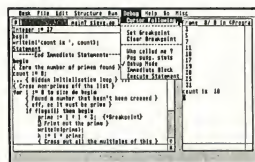
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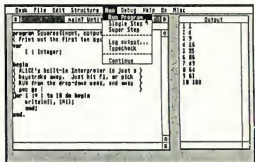
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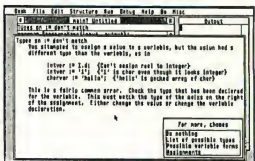
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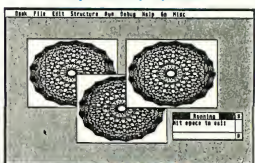
Breakpoints, Single Step



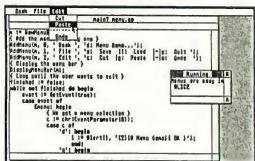
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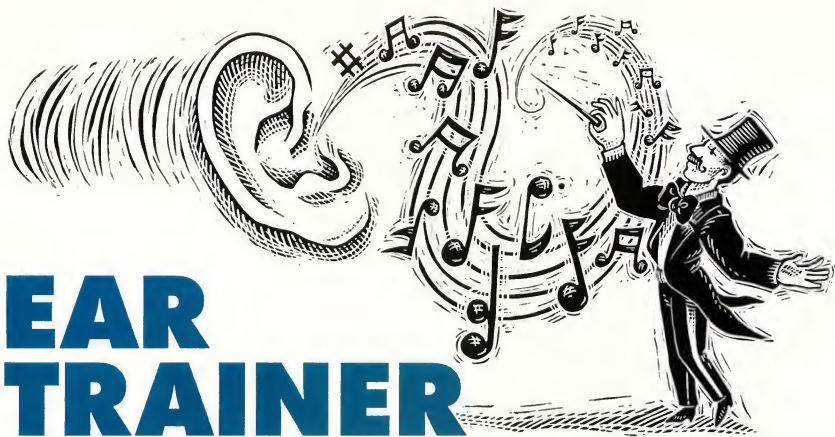
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EAR TRAINER

YOUR PERSONAL MUSIC TEACHER

by DAVID T. JARVIS

When I was in high school and college, I played guitar in a series of rock bands. In an effort to improve my musical knowledge, I took courses in music theory, and spent many hours listening to intervals, chords and scales, which I tried to identify by their sound.

At first it was intimidating; some days a Perfect Fourth sounded like a Perfect Fifth, and I always got the Minor Sixth mixed up with the Augmented Fourth. But I got better, and soon I was writing the bass guitar and keyboard parts for the groups I was in—sometimes without even picking up a guitar to check what I was hearing.

The old notion that playing music by ear is something you're only born with, I realized, is simply not true. You can learn it—and, with practice, you can get better.

What's the use of all this? If you don't play a musical instrument and don't ever plan to, probably not much. But if you're a musician—or just want to

Ear Trainer won't teach you to wiggle your ears at parties. But it can help you learn to play music by ear, and get a better grasp of the sounds that make up songs and symphonies. As you learn to recognize the elements of music, you'll get more out of the music you listen to—and become a better musician. Interested? Then read on—you'll find Ear Trainer on your START Disk!

 You'll find the program for the article in the file *EARTRAIN.ARC* on your START disk

increase your enjoyment of the music you listen to—you may find the program Ear Trainer to be very useful indeed.

Dancing Ears

Ear Trainer doesn't, as you might guess, teach you to perform amusing party tricks with your ears. Instead, Ear Trainer lets you work your way through a series of exercises and practice sessions, teaching you to recognize four

different musical elements: intervals, chords, scales, and melodies. Each exercise has three levels of difficulty, so if you're a beginner you won't be overwhelmed—but as you grow more experienced, you'll still be challenged.

Ear Trainer won't directly improve your ability to play guitar or piano, of course. But with practice you can improve your ability to recognize melodies and background harmonies in music ▶

EAR TRAINER...

you've heard and wanted to play—but didn't have (or couldn't afford, or couldn't read) the sheet music for. It's really true: You can learn to play by ear.

The Five-Minute Musician

You don't need a degree in music to use Ear Trainer, but it helps to understand a few basic elements of music theory.

An *interval* is the distance, or the number of half-steps, between two notes. What's a half-step? Well, a standard musical scale, from one C on the

**The notion
that playing music
by ear is something
you're born with
is not true.**

piano to the next, consists of eight notes:

C D E F G A B C

But it's not the same distance between all the notes. Equally spaced by sound, there are actually 12 half-steps from C to C:

C C# D D# E F F# G G# A A# B C

From C to C# is one half-step. The interval is the distance between two notes, from zero to 12 half-steps.

Table 1 lists the traditional names of the intervals, along with their abbreviations and common memory aids that you can use to identify them. Actually, there are intervals of more than 12 half-steps, but for simplicity, Ear Trainer only deals with the first twelve intervals. However, as difficulty levels increase, intervals may be spaced more than one octave apart. And remember, C to G is a

Intervals

Interval	Short Form	Half-Steps	Example
Perfect Unison	PU	0	Yes, that means the same note. No jokes about the short form, please.
Minor Second	m2	1	The last two notes of the Major Scale (the one you might have played forever in high school band workshops) are a Minor Second apart.
Major Second	M2	2	Think of the first two notes of that same boring Major Scale (the one they sing about in the Do-Re-Mi song). Or think of the first two notes of the Promenade in Mussorgsky's "Pictures At An Exhibition."
Minor Third	m3	3	I'm ashamed to admit I always remembered this one as the first two notes of "Iron-Man" by Black Sabbath.
Major Third	M3	4	The first two notes of the theme from the old "Jetsons" cartoon TV show ("Meet George. . .").
Perfect Fourth	P4	5	For example, G to C. The first two notes of "Here Comes the Bride" are what most people use to remember this one by.
Augmented Fourth	A4	6	Also known as the Diminished Fifth or the "Tritone" (because it is also equal to three "whole" steps). The distance between the first two notes of "Mario," from "West Side Story," is the classic example of the Tritone.
Perfect Fifth	P5	7	For example, C to G. When I went to school we didn't have a good example for this one. Today you have the first two notes of the theme from "Star Wars." Be thankful.
Minor Sixth	m6	8	The first two notes of "Love Story" are a Minor Sixth apart.
Major Sixth	M6	9	The first two notes of "My Bonnie Lies Over The Ocean."
Minor Seventh	m7	10	The first two notes of the theme from the original "Star Trek" TV show.
Major Seventh	M7	11	I don't have a song for this. Don't think you'll make money by being the first to write it, either. This interval sounds as if somebody died trying to reach the next octave.
Perfect Octave	P8	12	The first two notes of "Somewhere Over The Rainbow."

TABLE 1

Perfect Fifth—but so is D to A. The interval is the distance between notes, not the notes themselves.

A *scale* is a series of notes starting from any one and extending to the same note at the next octave. Most

scales use various combinations of half-steps and whole steps to get there. The exception is the *Chromatic Scale*; it consists entirely of half-steps, and as a result it's also longer than the other scales.

There are many scales possible; Ear

Trainer includes many of the most commonly used ones, along with a couple of "exotic" scales. Table 2 lists the scales used in the program along with the sequence of notes, starting from the note C, that produce that scale.

Identifying chords (three or more notes played simultaneously) could get complicated if we didn't limit some of the variables. For this program, you're only asked to identify the seven chords that occur "naturally" by combining notes from the Major Scale that are at least two notes apart.

Each chord is built on a different note of the Major Scale, and each note in the chord is a certain interval away from the first note. The chords are listed in Table 3.

Using The Program

To use Ear Trainer, first copy the file EARTRAIN.ARC to a fresh disk along with ARCX.TTP. Run ARCX, and when the Open Applications box appears type EARTRAIN.ARC and press the Return key. Your disk drives will spin, messages on the screen will tell you the files are being uncompressed, and soon you'll have a runnable version, EARTRAIN.PRG, on your disk. Double-click on EARTRAIN.PRG, and you'll be ready to go.

Ordinarily Ear Trainer makes its music through the speaker on your monitor. But if you've got a MIDI synthesizer, you can connect it to the MIDI Out port on the back of your ST, and Ear Trainer will use it for all the program's practice and test sessions.

Start with something from the Practice menu. It offers four choices: Intervals, Chords, Scales and Melodies. The first three selections are fairly self-explanatory. After you've clicked on one, a dialog box appears with a number of choices that may be selected with the mouse pointer. Each choice (except for Quit) produces one of the sounds you'll learn to recognize. The Chords dialog box also has a button labeled Key; selecting this causes four chords which

Scales Used in Ear Trainer

Scale	Notes
Major	C D E F G A B C
Natural Minor	C D E- F G A- B- C
Harmonic Minor	C D E- F G A- B C
Melodic Minor (but going down, it's:	C D E- F G A B C C B- A- G F E- D C)
Dorian	C D E- F G A B- C
Phrygian	C D- E- F G A- B- C
Lydian	C D E F# G A B C
Chromatic	C C# D D# E F F# G G# A A# B C
Mixolydian	C D E F G A B- C

All scales, except for the Melodic Minor, go back down to the root note (C) after the last note shown.

Sharps are indicated by a # after the note name; flats, by a -.

TABLE 2

identify the key, randomly chosen for this practice session, to be played in succession. (These same four chords are also played immediately after you select Chords.)

The Melodies option requires a little more explanation. For the purposes of this program, a melody is a sequence of note names separated by spaces. Valid note names consist of the letters A, B, C, D, E, F, and G, with an optional # (to in-

dicate a sharp) or - (for a flat). For example:

F# E D E F# F# F#

is a valid "melody," as recognized by Ear Trainer.

The Tests menu lets you test yourself on the sounds you've practiced. The program plays a particular interval, chord, scale or melody, and your task is to recognize which one has been played.

Identifying Melodies is the most challenging, and may be too difficult if you haven't had some training in music before. But it provides a good advanced test once you've mastered the other tests: You must listen to a string of notes and, after being shown the first note's name, identify the other notes.

The dialog boxes for the tests have two other choices: Replay and Give Up. Selecting Replay tells the program you want to hear the problem again before making a choice; you'll only be allowed to do this a limited number of times per problem, depending on the difficulty level. Select Give Up when you just can't figure out a problem.

The Options menu has two choices: Scores and Status. Ear Trainer keeps track of the most recent score for each of the four tests. Selecting the Scores op-▶

TABLE 3

Chords Built on the Major Scale

Name	Note of Major Scale The Chord is Built On
Tonic	First—the "root."
Supertonic	Second (a Major Second from the root).
Mediant	Third note (Major Third from the root).
SubDominant	Fourth note (Perfect Fourth from the root).
Dominant	Fifth note (Perfect Fifth from the root).
SubMediant	Sixth note (Major Sixth from the root).
SubTonic	Seventh note (Major Seventh).

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EAR TRAINER...

tion displays them. Scores aren't saved when you exit the program.

The Status dialog box allows you to change some program parameters. The first one is Difficulty Level. There are three difficulty levels: Easy, Intermediate, and Advanced. The difficulty level affects things like octave range between notes of intervals, number of times you

**You can learn
to play by ear.**

may replay a problem before making a choice, and length of melodies. Playing Speed determines how quickly the program will produce the sounds you'll be asked to identify. You can also disable the sounds the program makes when you answer correctly or incorrectly.

Finally, you can quit the program by clicking on Quit in the Files menu.

A Theory Farewell

Ear Trainer provides some tools for learning about the components of music and identifying them. The best way to improve your listening skills, however, is to practice ear training with the music you listen to every day. Think about the music you're hearing. Try to guess the intervals between notes of the melody, and try to follow the chord changes. Later, try out your ideas on a musical instrument to see how far off you were. As time goes by, you'll improve. Of course, analyzing real music is much more complex than choosing from a list of intervals or chords. But real music is where ear training becomes practical—and leaves the world of theory behind. ■

If you'd like to see more articles like this, circle 193 on the Reader Service Card.

David T. Jarvis is a systems analyst for Ashland Oil who also has a degree in music theory.

COMING IN THE SPRING 1988 START

Personal Finances and Productivity We'll

show you how to build a home budget and do mortgage calculations with your ST. We're even tossing in budget templates on the START disk to get you up and running!

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we know about earthquakes is wrong, and the ST is telling us *why*. Join START as we interview Rick Hansen, of the San Francisco Academy of Sciences, and he discusses his history-making dissection of the 1906 earthquake.

VIP Professional and A-Calc Prime Tax Template Yes, it's that time of year again, when one of the two

inevitable things in life comes due. Let START's tax template take some of the confusion out of calculating your income tax return.

The Succession Wars The king of Thrania is on his

deathbed, and there's no appointed successor to his throne—although you are one of his power-hungry sons. Wheel and deal, plot and scheme in this colorful multi-player strategy game, on the next START disk!

Also, we'll be taking a look at Prolog and artificial intelligence, desk accessories and memory expansion, MIDI celebrities and software reviews, word processors, games and lots more!

HOME RECORDING...

synthesizers come in either keyboard or module form (sometimes called rack-mount version). Buying just the module saves money and studio space.

4. **Avoid onboard synthesizer features that only duplicate your software.** This refers to things like built-in sequencers. They're nice to have, especially for live performance, but for your home studio, why pay for the same thing twice?

**There are
over 120 music and
MIDI programs
available for the ST.**

5. **Look for instruments supported by third-party patch programmers.**

While it's great to be able to get a desired sound out of your synthesizer, most of us are users and not synthesis experts. Many high-quality patches are available at reasonable prices (look at the ads in *Keyboard* or *Electronic Musician*). This applies to drum machines and samplers as well as synths. It's a great way to build a sound library.

6. **Look for software with an upward path.** Several software houses offer their programs at a couple of levels. You can start with an entry level sequencer and, as your expertise and needs grow, trade it in for a more full-featured model.

7. **Look for software in a family.** One thing about MIDI programs—each uses its own kind of file format. For this reason you cannot get a sequencer from company X to work with a scoring program from company Y. Try to pick a company that offers a full product line for your intended uses. The exception to this rule is for programs that operate as desk accessories under GEM.

8. **Beware vaporware.** Computer software companies (and not just MIDI software publishers) frequently announce products well before they become available. A variation on this theme is the continual upgrade process by which originally promised features eventually work their way into the umpteenth program revision. Your best recourse is to follow reviews and not to be afraid to call the software developers—they are often quite honest when questioned directly.

9. **Use different kinds of synths.** As you buy multiple synthesizers, you should acquire ones that use different synthesis technologies (e.g., analog, sampler, FM digital). They will give you a much broader tonal palette to use than if they are all from the same background.

10. **Get a reverb unit early on in your studio.** Reverb is the single most useful sound-processing effect and can really give your music a "captured live" sound. Try using your drum box alone and then through reverb. You will be amazed at the difference.

11. **Keep your perspective.** It's easy to fall into the "new gear trap." You know the feeling—just like when the new model cars come out. Good music

gear does not become obsolete. When you feel that you simply *must* have the new wonder toy, try to remember that the music comes from you, not the equipment. Some of the best music in the world was composed with a single piano, voice or guitar and no special effects.

Sample Home Studios

Let's look at some model home MIDI studios, each designed to meet different needs. For each one, there is a description of its purpose and a table listing the studio components—both hardware and software. I'm assuming you already have an ST computer and the final sound will be heard through your home stereo system. The component prices are given for both retail list and an average price you would pay if you shopped around a bit. You could save even more money by buying at a reliable second-hand instrument store; musicians are notorious for trading in to get the current year's wonder synth.

I. The Absolute Beginner

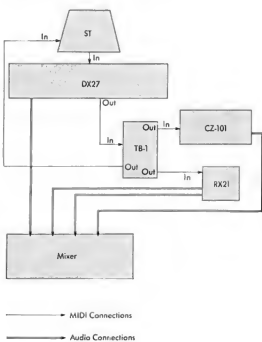
Table I lists a good beginning package. It's built around the CZ-101, an ideal starter synthesizer capable of playing up to four monophonic voices simultaneously. It's probably the most widely supported synthesizer for the home market, with many third-party patches and public domain software available.

To set it up, run one MIDI cable between the CZ-101 MIDI In and the ST MIDI Out and another cable vice versa. Either plug the CZ into your stereo or use headphones and you're ready to go. Of the software, all three programs are extremely well supported with public-domain patches and song files.

II. The Family Studio

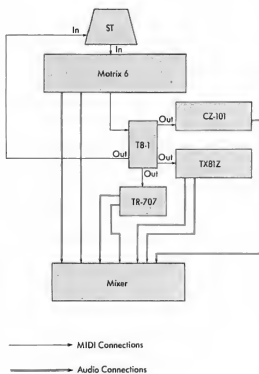
The setup in Table II is a high-end family studio that would also satisfy a hobbyist. A DX27 FM digital synthesizer provides one sound source and also is used as a master keyboard for the system. The CZ-101 provides four addi- ▶

FIGURE 1: The Family Studio



HOME RECORDING...

FIGURE 2: The Home Musician



tional voices and the RX21 is the dedicated drum box. The TB-1 Thru Box is used as shown in Figure 1 to maintain MIDI connectivity, since neither the CZ nor the RX possesses a MIDI Thru port. The audio outs are blended together through the four-channel mixer to be fed into a stereo system.

Both the DX and RX are widely supported with third-party patches and rhythm sequences. The software provides patch editor/librarians for the synths, a librarian for the RX, a sequencer and player program. A nice feature of the Data Dumpster librarian is that it comes with a standalone desk accessory that can load sequence data into the RX while running the GEM-based EZ-Track sequencer.

III. The Home Musician

Table III offers a setup for a serious home music studio. It is built around the Oberheim Matrix 6 synthesizer as a master keyboard. The Matrix 6 has a remarkably complete implementation of MIDI-controller options and is a good analog synth to boot. It provides both note-on and note-off velocity, aftertouch

from the keyboard along with two levers and pedal inputs that can be reassigned to any desired MIDI-controller function. It can do keyboard splits and play two independent voices, and has stereo outputs.

Adding additional synthesizer voicings are the TX81Z (an enhanced module version of the DX27), the ever-faithful CZ-101 and the TR-707 drum machine. These give us three different kinds of sound synthesis: analog, FM and Phase Distortion along with the drums.

On the audio processing side, we are using a more sophisticated eight-channel mixer that allows for individualized volume, bass and treble boost, and panning adjustments. A stereo reverb unit is used for the TR-707 prior to the mixer, with the final audio out assumed to go into your home stereo unit. Although the instruments have sufficient MIDI Thru ports, I favor using the TB-1 as shown in Figure 2 to simplify the MIDI connections and prevent potential timing delays.

The software in Table III stresses music composition rather than entertainment. Patch editor/librarians are provided for the synthesizers, a librarian for the TR-707, and a professional level sequencer (Dr. T's Keyboard Controlled Sequencer, or KCS). The KCS gives a tremendous amount of power to record, edit and fine-tune your music, and is also extremely well suited for use with a master keyboard/module system.

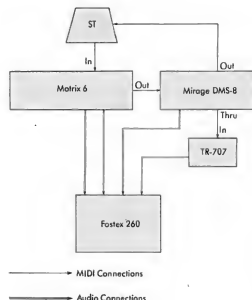
IV. Get It on Tape

A different approach is needed for someone who prefers to work with a tape deck rather than with pure "live" MIDI performances. Typical uses for a tape deck are to make demo song tapes or to add a soundtrack to video. The system given in Table IV provides a powerful tape-based MIDI studio for under \$5,000 based on the Fostex 260 four-track tape deck.

Like the Home Musician Studio, the Matrix 6 is the master keyboard and

analog sound source. If you have a limited budget and the number of concurrent voices isn't important to you, I recommend the Mirage rack mount sampler to replace the other sequencers because it offers the widest possible array of sounds. If necessary, you can use prerecorded samples to have the Mirage reproduce additional synthesizer sounds. At last count there were over 600 prerecorded samples available commercially or through public domain sources, ranging from a full orchestra to a barking dog. The TR-707 is used as a drum source due to its sound quality

FIGURE 3: Get It On Tape



and ability to synch well with a tape deck/MIDI sequencer combination.

On the audio side, the Fostex 260 includes the equivalent of a six-channel mixer along with Dolby C for noise reduction. The MIDIVERB II sound processor is used to provide reverb, chorusing, flanging and delay effects—all selectable under MIDI control. Due to the design simplicity shown in Figure 3, all MIDI connections are made directly between the instruments with no need for a Thru box.

The software provides a patch editor/librarian for the Matrix 6, a sample editor/librarian for the Mirage, a librarian for the TR-707 that can also be used to call up presets for the MIDIVERB II, and a sequencer designed around ▶

Table I
The Absolute Beginner Studio

Item	Source	Retail Price	Typical Price
CZ-101 Synthesizer	Casio	\$499	\$275
2 10' MIDI Cables		20	20
CZ-Android ¹	Hybrid Arts	100	65
EZ-Track ²	Hybrid Arts	65	40
Music Studio ³	Activision	60	35
	Totals	\$744	\$435

¹ Patch editor/librarian.

² Sequencer.

³ Music composition/player program.

Table II
The Family Studio

Item	Source	Retail Price	Typical Price
DX27 Synthesizer	Yamaha	\$ 695	\$ 650
CZ-101 Synthesizer	Casio	499	275
RX21 Drum Machine	Yamaha	315	225
TB-1 MIDI Thru Box	Casio	79	60
5 10' MIDI Cables		50	50
#32-1105 Mixer	Radio Shack	25	25
4 Op Deluxe ¹	Dr. T	129	95
CZ-Android ¹	Hybrid Arts	100	65
EZ-Track ²	Hybrid Arts	65	40
Data Dumpster ST ³	Music Service	90	75
Music Studio ⁴	Activision	60	35
	Totals	\$2107	\$1595

¹ Patch editor/librarian.

² Sequencer.

³ Librarian.

⁴ Music composition/player program.

synching to a tape deck. At press time, SMPTE Track ST is the only ST sequencer that truly caters to tape-based systems and supports SMPTE code synchronization. (Editor's note: See the article "The ST In Hollywood" in the Winter 1987 issue of *START* for a full description of SMPTE and its uses.) The Genpatch ST librarian sports a desk accessory that can be called within the SMPTE Track ST sequencer to load patches, samples, etc. to any of the MIDI equipment.

Closing Notes

I hope I've whetted your appetite for musical adventures with your ST. Bear

in mind that there are still many more musical avenues that MIDI can be applied to than are covered here. For example, I focused on keyboard synthesizer control, but it's also possible to go at it with a guitar, drum set or wind instrument-based controller.

Right now, however, for less than the price of a hard disk, you can buy a home synthesizer and start to explore MIDI. But it's addictive—you may find your music equipment overtaking your computer gear! Whatever your musical interests may be, you'll find the ST/MIDI connection has got you covered. ■

If you'd like to see more articles like this, circle 197 on the Reader Service Card.

Jim Pierson-Perry is a research chemist and semiprofessional musician with an interest in all things MIDI. He lives in Elkton, Maryland.

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HOME RECORDING...

Table III
The Home Musician

Item	Source	Retail Price	Typical Price
Matrix 6 Synthesizer	Oberheim	\$1595	\$1200
TX81Z Expander	Yamaha	495	390
CZ-101 Synthesizer	Casio	499	275
TR-707 Drum Machine	Roland	695	350
TB-1 MIDI Thru Box	Casio	79	60
6 10' MIDI Cables		60	60
BX-800 8 Channel Mixer	Roland	460	330
Microverb	Alesis	249	190
Matrix 6 Tricks ST ¹	Dr. T	129	95
4 Op Deluxe ¹	Dr. T	129	95
CZ-Andraid ¹	Hybrid Arts	100	65
KCS v 1.5 ²	Dr. T	225	160
TR-707 Dumpster ³	Music Service	65	65
	Totals	\$4780	\$3335

¹ Patch editor/librarian.

² Sequencer.

³ Librarian.

TABLE IV
Get It On Tape

Item	Source	Retail Price	Typical Price
Matrix 6 Synthesizer	Oberheim	\$1595	\$1200
Mirage DMS-8 Sampler	Ensoniq	1695	1000
TR-707 Drum Machine	Roland	695	350
4 10' MIDI Cables		40	40
Fostex 260 Tape Deck	Fastex	995	800
Midiverb II	Alesis	399	340
Matrix 6 Tricks ST ¹	Dr. T	129	95
Mirage Sonic Editor ¹	Sanus	245	175
SMPTE Track ST ²	Hybrid Arts	575	475
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REVIEW

MUSIC MADE EASY

The Music Studio and Music Construction Set

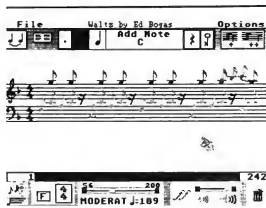
by STEVE PANAK

I've gone through most of my computer-owning life without a music composition program. That changed recently when I received two of these marvels—The Music Studio, from Activision, and Music Construction Set, from Electronic Arts. Both programs let you compose then play back simple tunes, and help you learn the fundamentals of music.

The Music Studio

The Music Studio is a music composition tool that lets you enter musical scores via a sophisticated interface. You can enter individual notes on the program's colorful workscreen, letting your creativity soar. With the powerful block operations you can highlight a portion of your score and then copy, move or delete it. If you want to get more sophisticated, you can change a block's characteristics; for example, you can raise or lower each note a step, or modify a note's duration.

The display focuses on the treble and bass staves. Along the top and bottom of the screen are a number of pull-down and pop-up menus through



The Music Studio

which you set such basic parameters as time and key, tempo and volume.

Others allow you to insert notes or rests, select the duration of each and add ties, dots, sharps and flats. A message area at the top of the screen keeps you updated on the current option, as well as providing a rudimentary help facility. The FILE menu accesses sound and song files stored on diskette, while the OPTIONS menu affects lesser-used parameters, such as MIDI values and instrument design.

You can modify the amplitude and duration of the attack, decay, sustain and release of notes with the slide bars

on the complex instrument-design window. You can create up to 15 instruments, each represented by its own color. Even though a couple of the shades are a little too close in hue to tell apart quickly, this color-coding approach makes keeping track of active instruments very easy.

Pressing the right mouse button switches you into paint mode, which gives you even greater flexibility to splash notes freely onto the staves. In paint mode, notes are represented by rectangles, rather than traditional notes. The size of the rectangle determines the note's duration; the color, the instrument being played. You can fill the screen with notes of every color and size, quickly switching parameters using one simple menu. Also available is a track mode, in which you are able to lay up to four tracks, each of which may have the same note being played at the same time (although typically using a different instrument).

For composition, the program supports most common time signatures and all key signatures. You can add lyrics to your song, and print everything ▶

MUSIC MADE EASY...

out on an Epson-compatible graphics printer. A scroll bar and column counter underneath the staff allow you to move to a different portion of your composition, as well as monitor its total size and current window position. The screen display is logically designed and easy to navigate, although the program itself was a little hard to learn.

I found the manual cryptic, although when I finally discovered the connection between the numbers following key commands in the text and the numbers on the reference card, I learned to operate this complex program much faster. The lack of an index was only partially remedied by the sparse table of contents, and the instructions were wildly inconsistent in the level of user skill assumed. One moment there would be exact instructions on how to load the program; the next made a mystery of how to tie two notes together properly.

Like Electronic Arts's Music Construction Set (below), The Music Studio has only three voices—it allows you to play only three notes at any one instant. Unlike MCS, it lets you place up to 15 notes vertically on the staff. You can avoid this three-voice hardware limitation by playing your composition through a MIDI device. But when it comes to input from a MIDI keyboard, the inability to use the computer keyboard to select note duration constrains the Studio—moving to drop-down menus is so slow.

I wish The Music Studio had more features, such as checking to make sure the correct number of notes have been placed on the staff in each measure, as required by the time signature (which Music Construction Set does have). The Music Studio also limits you by allowing only one time signature per song. But overall, it's a nice musical teaching aid, and lots of fun.

Music Construction Set

Music Construction Set (MCS) lets either the new or advanced composer write music effortlessly, precisely plac-

ing individual notes one by one, or spraying a riff of eighths down the scale. Like The Music Studio, MCS uses familiar options allowing you to save and load files, change composition formats, or cut and paste sections of a musical score.

You start a composition by setting key and time signatures, selecting these from menus at the top of the screen. You can select a note or rest from the

**Create up
to 15 instruments,
each represented by
its own color.**

palette on the left portion of the screen, and place it anywhere on the treble clef or bass clef staff, which both occupy the bulk of your screen. Modify notes with sharps or flats, or add triplets, quintuplets or tie notes together. And if you make a mistake, select Erase to remove the offending note. As you place your notes on the staff, each will sound off, enabling you to compose by ear. And, of course, double-clicking on the play icon will send your composition through the powerful ST sound chip and out into your room.

Since I couldn't compose my own songs, I decided to enter someone else's—in this case, "Afterglow" by Genesis. After a couple of minutes of fooling around, I was able to get started with only a glance at the manual for reference.

You can enter notes in any of three ways. Select the note (either by pressing a function key or choosing one from the palette), and then move the note with the mouse to a line on the staff. You can also click on a key on the onscreen key-

board, and a note will appear on the staff. This makes entering sharps and flats easier, since you don't have to select the note modifier from the palette and then deselect it for the next note. Finally, if you have a MIDI device it can feed notes directly into MCS. However, using either of the latter two methods still entails selecting the proper note length, most easily done with the function keys.

The program makes use of a full range of musical notation. You can dot notes, or raise or lower their octave. You can add repeats for choruses, or increase the tempo—the arsenal of editing commands makes changes quick and easy. First, highlight a block of music to work on, then cut and paste or copy it. You can raise or lower its octave or jump each note up or down a step. You can choose to lengthen or shorten the duration of a block of notes, or play it using a different instrument. The program will check your work, telling you where your music has too few or too many beats. You can store the title and notes about your score for future reference, while a status command tells you how much room you've got left and how long your tune will play.

As with The Music Studio, you have three voices to play with, and therein lies my main complaint. Using three voices, you are only able to play three notes simultaneously. Some of the music I was working on called for chords, along with a single bass note, and I was forced to truncate the chords to only two notes. Each voice is assigned an instrument, chosen from a menu containing the 16 current instruments. With the waveform editor, you can invent additional instruments and then store and recall them at will. Control vibrato, sustain and noise to create any simple sound on this planet—or any other.

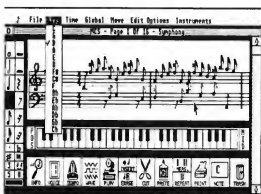
Additional features include the ability to print out scores and to make use of the ST's MIDI In and Out ports. Using these ports and a MIDI device, you can enter a score directly from a keyboard,

or play your composition through your synthesizer. Another utility program with MCS allows you to play a score through a standard desktop accessory, and another will display DEGAS and NEOchrome image files as your "jams" blast forth. Expert mode allows MCS to work with you, eliminating many intermediary help messages.

The 35-page manual gets you started by describing the basics, then segues into a tutorial, leading you through the many features of the program. A handy reference section keeps the myriad of commands only a glance away, and appendices contain descriptions of the various utility programs. The main drawback of the manual was its total lack of illustrations, which may have shortened my learning curve on this complex program. An index would have also been welcome. As it stands, everything is there, but sometimes it's just a

little hard to find.

Overall, Music Construction Set is a nicely-designed, easy-to-use program to



Music Construction Set

teach you the basics of music composition. There are some things it can't handle—odd times like 5/8, 9/8 or 7/4, or playing more than three notes at a given time. And I'm sure that advanced composers will find even more limita-

tions. But as far as most of us are concerned, The Music Construction Set will let you and your ST make beautiful music together.

If you'd like more articles like this, circle 184 on the Reader Service Card.

Steve Panak is an attorney living in northeastern Ohio. In his spare time, he plays lots of Atari games, both 8-bit and ST.

Products Mentioned

- Music Construction Set, Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, (415) 571-7991, \$54.95
CIRCLE 161 ON READER SERVICE CARD
- The Music Studio, Audio Light, distributed by Activision, Inc., P. O. Box 7287, Mountain View, CA 94039, (415) 960-0410, \$49.95.
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BREACH

"I was moving a squad of four of my best through the *kehst*-beridden jungles of Kiskismok, when suddenly Darrow's detector picks up what looks like a couple of life forms 50 meters out."

"'Nothin', but a couple of those brachiators,' he says to me. Just then Darrow takes it through the chest."

"We all drop into the mud, flipping through our helmet displays trying to find out where the shot came from when I hear this rumbling. More like I *feel* this rumbling. An' then there it is. A battle robot."

"Hsiang shoots the thing in its sensory grid with a bolt, but it doesn't do much good 'cause he's a psionic talent and they don't give 'em half-way decent guns. It starts tracking him with its dual guns and suddenly he takes some hot plasma too. Now it's just me and the kid, Yamaguchi."

"'Guchi,' I said, 'Direct your fire into the lifters so it can't move. These things are pretty lousy about protecting their undersides.' So like he was a vet of 20 drops, he rises to one knee and hits the thing right in the lifters. And then he does it twice more."

"'One battle robot: out of action,' he says. I toss an energy grenade at the hulk just to make sure and then we start the long job of carrying the boys north, where we know the landing boat'll be."

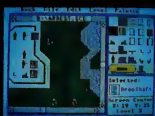
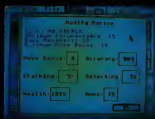
The Serayachi Campaign—Sgt. Robert Sherwood, FVSWF Ret.

Breach is a single-player tactical-level combat game for one person. It features:

- Smooth animated movement and combat.
- Macintosh™ version includes digitized sound.
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- A campaign of several scenarios included with the game.
- Up to 40 opponents per scenario—ranging from vicious beasts to marines as intelligent and well-equipped as your own. Six different classes of opponents in all: marine, alien, beast, overlord, autogun, and battle robot.
- Equip your marines with 20 different types of objects—including rocket launchers, demolition charges, first aid kits, and cracking units to break into enemy computer systems.
- Four different classes of marine: marauder, infiltrator, scout, and psionic talent.
- Your squad leader is independent of any scenario—play **Breach** just like a role-playing game or as a single session wargame.
- Build-up your squad leader for special advanced training—all of his combat experience is saved!
- **Breach** includes a **Scenario Builder**—create your own scenarios or modify existing ones!
- Scenarios can have several different victory conditions which can be mixed together to form extremely complex battles.
- Additional scenario disks available soon!

Breach is available for the Atari ST, Macintosh, IBM, and Amiga. Photos are for the Atari ST version.

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Tanglewood



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We've worked overtime to make Antic software the best you can buy for your Atari. Why? Because we live and breathe the Atari line of computers. We were there at the beginning, are there now, and will always be there—supporting the Atari user. We design our software *exclusively* for the Atari machines and know Atari hardware inside and out.



*Gary Yost and Jack Powell (the product development team) are 'brainstorming' specs for a new CYBER add-on. Gary and Jack have been Atari users since 1981, and have been with Antic since 1983. Gary may be found, almost nightly, on CompuServe's SIG*Atari, talking with Atari users and programmers, fielding questions, and uploading demos—keeping his finger on the pulse of the Atari community. Jack bases his experience on years with the Antic Editorial department. Instrumental in the development of ST Resource and STart, The ST Quarterly, Jack has kept in touch with readers' problems and needs—particularly in the area of written technical information.*

Because we've been here the longest, we know the most people—and they know us. We've got the best Atari software because we've got the best Atari programmers. Simple. Tom Hudson's been writing programs for Atari computers for as long as we've been in business. He's not just a programmer, he's a close friend.



Darrel Anderson is far more than a contest winner. He's a professional artist who knows the graphics possibilities of the ST computer. And professional means he's flexible and he's fast with results. And the faster he is, the sooner you get your program. Want clip art for CAD-3D? Darrel creates FUTURE DESIGN DISK, the most complex CAD-3D objects we've seen on this system. Want to show what CYBER STUDIO can really do? Darrel blows everyone away with CYBERSCAPE. What if you've got a 512-color paint program you want to show off? Just turn the page and check out the SPECTRUM 512 art.

And, yes, we've got an unfair advantage: *Antic* magazine and *STart*, *The ST Quarterly*. We're not only a resource to the Antic community. The Antic community is a resource to us! In 1985 we sponsored a \$2,000 DEGAS art contest. This was how we met Darrel Anderson.

And, when the beta testing is finally complete, the documentation typeset, and the package design finished, it's time to get the final product to you.

Have you noticed our new 800 number? That's right, we've moved our 800 operators in house.

Now, you when you call and ask for a "Bifurcated Cyber Diphlex," your operator will know what you're talking about, because an Antic staff member is not just an answering service. (And remember, our toll-free number is for orders only.)



Once your order is taken, it's processed as quickly as possible. Fidez Bitulin handles the paperwork because she is accurate. She also has a background in accounting, so she knows what's being entered in that computer. When Fidez processes your order, you get the right program — and you get it now!



We used to have an outside company package and ship our products. We'll never do that again! They couldn't handle it, and they really didn't care. We can and we do. All our packaging and shipping is now done in-house, supervised by Frank Ciminesi. Frank's got a thing about secure packaging, and he's got a thing about quick turnover. He can't stand having orders cluttering up his mailroom. Frank will have your shipment snugly packed, in the truck, and on its way.



Once your software is shipped, our job has just begun. Antic has the best follow-up and customer support of anyone in the Atari software business. Our customer service people are ready for your calls. Our technical resources are second-to-none. (If Scot Tumlin can't answer your technical question, he can always turn to the Editorial programmers: Patrick Bass, Charlie Jackson, or Frank Hayes.)

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We're the most active Atari company on CompuServe, and have our own online service, ANTIC ONLINE (type GO ANTIC).

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One of our customers recently had a problem with one of our products (okay, okay, we're not perfect), and left us a message on CompuServe. We contacted the author, who solved the problem and mailed a fix to the owner within a week. That's not only goodwill, it's good business.

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Who needs an AMIGA?

SPECTRUM 512™

The Omni-color Paint Program

by Trio Engineering



"Ellen" by Darrel Anderson

SPECTRUM 512 is the paint program you've wanted since you bought your ST. It gives you 512 colors to be creative with. *All at the same time.*

When we first saw this program, we couldn't believe our eyes. But there it was — a rock-solid, low-resolution screen displaying rich colors composed of a chock-full palette of 512 colors. No flicker, no faking, no fooling. We couldn't stop playing with it.

512 colors means a lot more than just bright rainbows. Perceived resolution is increased *threefold*. Anti-aliasing

replaces staircase zags — even in your old pictures. And the anti-aliased line mode creates an automatic, no-zag, french curve — smooth as a baby's bottom. Subtle shading and highlighting effects become possible for the first time, automatically.

48 Colors per Scan Line

The standard way to put more than 16 colors on the Atari ST screen is through "raster interrupts" — color registers are changed with each scan line. But this gives you only 16 colors each scan line, and this limited color arrangement causes "banding,"

where horizontal bands of similar colors streak across your picture. Pretty restrictive.

SPECTRUM 512 gives you *48 colors per scan line!*

And you don't have to stop to think about it because SPECTRUM 512 does it for you. Just pick any one of 512 colors and draw. If your chosen color or exceeds the 48-color limit on any scan line, SPECTRUM 512 automatically adjusts the entire scan line of colors for a "best fit" — on the fly! The end result is, for all intents and purposes, you can place 512 colors anywhere on the screen!

How did they do it? The SPECTRUM 512 engineers hooked an oscilloscope to the Atari ST MMU chip and reverse-engineered its timers. Using this information, they designed a brilliant method to manipulate those timers and stuff more colors into extra simulated bit planes, before the signal even gets to the video shifter chip!



The SPECTRUM 512 work screen, including the user-defined palette

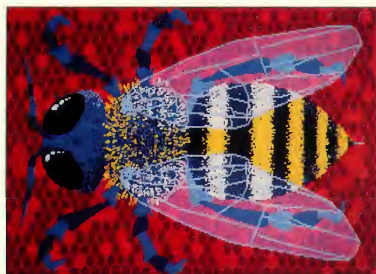
We sent SPECTRUM 512 to professional artist Darrel Anderson. As you can see from these pages, he went wild. Imagine what SPECTRUM 512 can add to your CAD-3D, DEGAS or NeoChrome pictures! No question, if you use a color monitor and have any interest in graphics, you will love SPECTRUM 512.

Look at all these tools!

Drawing:

- Freehand "pen" drawing
- "Rubber line" and "French curve" mode (no jaggies)
- Polygon (no jaggies)
- Circle/ellipse (no jaggies)
- Fill—patterned or solid
- Fill New—fill over any existing patterns or colors!
- Patterns—20 predefined, 20 user-defined
- Brush
 - 38 brush shapes, solid or patterned
 - User definable brushes
 - Auto-align patterns, or pixel offset for overlap

ST Graphics



The DEGAS Bumblebee, before



and after SPECTRUM 512

- Airbrush—four sizes, nine flow speeds
- Undo buffer erases mistakes

Anti-aliasing:

- Zag-Out—Anti-aliasing DEGAS/Neo pics for smooth edges
 - Full screen
 - Local box
 - Brush
- Blur—Adjustable neighboring pixel averaging
 - Full screen
 - Local box
 - Brush
- No Zag—Anti-aliasing and auto-curve for:
 - Lines
 - Polygons
 - Circles

Colors:

- Select colors from:
 - 512-color system palette
 - 1 to 192-color user-defined palette, or
 - Any color on screen
- Save and load custom palettes
- Fixed or floating color menus for auto-color adjustment
- Change last painted color to any of 512

Works with all ST paint programs, plus CAD-3D 1.0 (ST0214) and CYBER STUDIO (ST0236).



"Laserbee" by Darrel Anderson

- Auto-create smooth color ranges between any two or more colors
- Color cycle paint flow through any range of colors:
 - Brush (solid or patterned)
 - Airbrush
- Fantastic color edit mode includes:
 - Search and replace one color with another
 - Search and replace several colors with several others
 - Add or subtract red, green, or blue values of one or more colors
 - Increase or decrease luminance of one or more colors
 - Perform any of the above functions globally (full screen), or locally with cursor control
- Magnify window for all functions
- 12-screen (1-meg) scrollable cut & paste buffer
- 4-way flip, and scale
- Programmable slideshow program to display your SPECTRUM 512 art

- Detailed manual includes advanced screen photography techniques
- Load IFF Amiga pics

Public Domain

SPECTRUM 512 pics!

The pictures on this page, plus *many more*, by Darrel Anderson and Richard Berry, are available for only \$12.00 on the SPECTRUM 512 SLIDE SHOW DISK (PD9100). See our ST PUBLIC DOMAIN LIBRARY on page 20.

SPECTRUM 512 ST0249 \$69.95

REQUIRES: Color monitor. 520ST's built before 12/85 may require \$30 MMU chip upgrade from auth. serv. center.

DEGAS™ Electronic Arts NeoChrome™ Atari Corp.



Monday-Friday MasterCard, VISA Only
All 50 states 6AM-6PM PACIFIC TIME

ST Cyber Family

"Antic's CAD-3D is one of the best programs I've seen for the Atari or anything else."

— Jerry Pournelle *Byte Magazine*

THE CYBER STUDIO™

Featuring CAD-3D 2.0



Works with all ST paint programs, and the CYBER family.

Tom Hudson's STEREO CAD-3D 2.0™

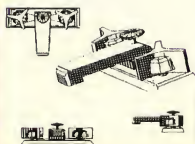
Hidden within your Atari ST is a professional 3D workstation. A 3D design system that is intuitive — yet powerful enough for professional artists, advertising agencies, or design firms.

Design and walk through your dream house with CAD-3D 2.0. Programmers use our system for dimensional tasks like flight-simulator scenic design; artists create accurate perspective foundations for their DEGAS or NeoChrome pictures; engineers find CAD-3D 2.0 the perfect sketchpad for conceptual design; and VCR owners use the CYBER STUDIO to create 3D titles and cartoons for home videos.

We made version 2.0 an open-architecture system, so that any programmer can easily write custom applications for CAD-3D 2.0 that run as desk accessories: motion control choreography (CYBER CONTROL-ST0250), advanced rendering/ray tracing, finite element analysis, texture mapping, custom modeling tools... There's no limit. CAD-3D 2.0 will never become obsolete.

The Original... Tom Hudson's CAD-3D™ 1.0

520ST-compatible




"A remarkably powerful modeling system."

Computer Graphics World

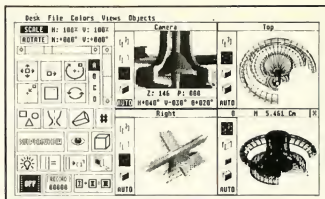
If you own a 520ST and are interested in computer graphics, many of the features of CAD-3D 2.0 are included in this original version—even a basic animation system.

CAD-3D 1.0

ST0214 

REQUIRES: 512K RAM

Now! \$2995



Let your creativity soar with all these new features:

- Icon control panel — fast, intuitive interface
- All new, DEGAS-style color design system permits custom-color lines, edges and backgrounds, plus multi-colored objects
- Real-time display mode for instant response (uses 3D math developed by Jez San for Starglider)
- Supports (optional) STEROTEK 3D glasses (TH9020) for 3D viewing
- Dimensioning (feet/inches or meters/centimeters)
- Graphic lighting control — drag lights anywhere
- GDOS output supports laser and dot matrix printers
- Compatible with Generic CADD 2.0 from Generic Software
- User-selectable pivot points for articulated rotations
- Enhanced Spin, Extrude, and Join tools
- Load DEGAS pics into CAD-3D background

Mark Kimball's CYBERMATE™

The CAD-3D Animation/Editing language CYBERMATE is a "post-production" animation editing language that gives you control over:

- Sequence looping, cuts, fades & dissolves
- Color cycling animation
- Sound effects (created with the G.I.S.T. editor, on pg. 19)
- Title generation and text display

CYBERMATE features editing power plus full programmability. At your fingertips is the most efficient real-time playback system for 3D graphics on any microcomputer. And it's fast! Up to 60 frames-per-second.

CYBERMATE transforms your one-meg ST into a TEN-MEGABYTE frame buffer. And because it's a real programming language, CYBERMATE can adapt to new technologies, like the new digital video tape recorders from Japan, RGB-to-NTSC converters, MIDI, and SMPTE time code.

THE CYBER STUDIO

STEREO CAD-3D 2.0 plus CYBERMATE (2-disk set)

ST0236 \$89.95

REQUIRES: one-megabyte RAM

Upgrade from CAD-3D 1.0 for only \$60 (plus original disk and \$5 shipping)

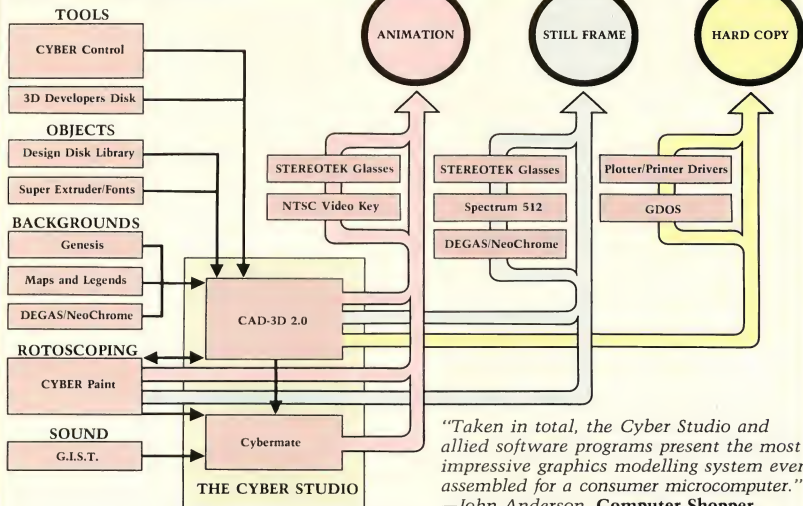
Starglider™ Firebird Software

DEGAS™ Batteries Included

Generic CADD 2.0™ Generic Software

ST Cyber Family

THE CYBER FAMILY



So many products are being added to the ever-expanding CYBER FAMILY, we drew a flow chart to help you understand how they work together:

Here's a typical use of the CYBER FAMILY, which you can follow using the flow chart: Using CYBER CONTROL, you write a program to control several unique cameras in CAD-3D 2.0 for an animation sequence which uses skeletons from the HUMAN DESIGN DISK, being assembled in front of a molecular background provided by GENESIS. Your completed animation may be immediately viewed from CAD-3D 2.0 without even firing up CYBERMATE. And then, you may want to touch up some of the frames with CYBER PAINT — perhaps add

some tweened Aegis Animator sequences. This time you check out your new animation directly from CYBER PAINT. If you want to add some wild G.I.S.T. sound effects, and eye-catching color cycling, the editing program, CYBERMATE, comes into play. Finally, you send the resulting, real-time animation straight out your 1-meg 520ST into your VCR, splicing it into your 45 minute budget presentation to, say, the National Science Foundation. And you did it for less than a



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tenth the cost of any other 3D animation system.

Online CYBER CONNECTION

To back up our growing CYBER family of products, we've begun an online feedback service on CompuServe. It's called the CYBER CONNECTION, and includes the latest CYBER STUDIO animation demos, upgrades, public domain premieres, and more. Much of the new material posted here will not be available anywhere else. Send messages directly to the authors like Tom Hudson and Mark Kimball. And check out their replies as they respond to other users. CYBER CONNECTION includes hints, tips, and suggestions from the best.

The CYBER CONNECTION is easy to find: At the CompuServe prompt, type *GO ANTIC*. When the first menu appears, select *Online Cyber Connection*, and you're in!

Composite Video Cables

For those of you who own a 1-meg 520ST with composite outputs, Practical Solutions sells a special monitor cable (\$15) that has composite video jacks which avoid the noisy (and VCR-incompatible) RF signal output.

NOTE: Those with 1040ST's will soon be able to use The Video Key, an RGB-to-composite converter with a much higher quality NTSC signal, available from Practical Solutions (602-884-9612).

CYBER CONTROL™

The CAD-3D Motion Control Language

by Tom Hudson

Works with
CYBER STUDIO



Tom's latest brainstorm: CYBER CONTROL, The CAD-3D Motion Control Language—a desk accessory programming language, with built-in GEM text editor. When you want to simulate a real event with articulated life-like animation, plug in to CYBER CONTROL.



CYBER CONTROL is an animation scripting language that locks in to CAD 3-D 2.0, controls all of its functions, and magnifies its already powerful capabilities. Whether you're a hobbyist or a scientist, you can create animated 3D models in a single afternoon. Simulate particle physics; 3D animation for entertainment or education; 3D financial analysis; animated, fully dimensional math models; event reconstruction of P.I. litigation; human factors engineering... you name it!

Now, you can write code to control any feature of CAD-3D 2.0—plus powerful new features not in CAD-3D 2.0! With the new *hierarchical control*, you can create graceful birds with wings of many pieces, soaring in beautiful harmony. Or a complex clockwork mechanism of linked parts, moving in offbeat syncopation... But we'll let Tom describe his newest baby:

As CAD-3D 2.0 grew into a powerful animation system, I realized that truly complex animations would require a scripting language for proper control. I purposely designed CYBER CONTROL as a BASIC-like language so anyone could pick it up quickly.

When activated in CAD-3D 2.0, CYBER CONTROL takes over full control of all functions, creating and manipulating objects and cameras (yes, three different ones). Its primary use is as a cinematic motion-control script language, but its flexible nature makes it an ideal "front-end" for CAD-3D so you can write your own BASIC-like programs that use CAD-3D as a "graphic engine!"

Language features include:

- FOR/NEXT for full Loop control; Conditional IF/THEN; GOSUB/RETURN.
- Labels instead of line numbers
- Numeric expression handling; *floating point*; logical AND and OR; parenthesized expressions; function library including sine, cosine, tangent, square root, and more!

- Up to 128 user-defined, alphanumeric variables, significant to 8 characters! Hardcopy Print statement for debugging.

Other features include:

- Two new cameras! Now, move your camera *anywhere* in the CAD-3D universe — fly *through* your scenes!
- Real-time animation preview mode!
- Hierarchical Connectivity. Attach objects to each other for fluid, connected movement — walking skeletons, or hinged mechanisms.
- Smooth 3D splines:
 - Move cameras along realistic flight paths
 - Apply natural movement to articulated models
 - Build new types of models (coils, fractals, etc.)
- Layer foreground and background images for cel animation.

I hope you enjoy CYBER CONTROL. Your ST can automatically create animations that would take you days to complete — in a matter of hours. Start the program and walk away, as your computer does all the work!

— Tom Hudson

CYBER CONTROL ST0250 \$59.95

REQUIRES: CYBER STUDIO
Recommended: CAD-3D version 2.02

CAD-3D 2.02 is available only in The Catalog's CYBER STUDIO package (ST0236), which also includes CYBERMATE.

HOLOGRAM CONTEST!

You can win a CAD-3D hologram signed by Tom Hudson! What's that? A CAD-3D hologram?

That's right! Using a revolutionary new production process, Advanced Dimensional Displays, Inc. has developed reflective, laser disk holograms that *float* holographic images above the disk! (Like an inanimate version of: "Help me Obi-wan Kenobi...") And this incredible new process uses CAD-3D images as objects!

The three best monoscopic and stereoscopic animations (six total), designed using CYBER CONTROL, will earn their respective authors a five-inch hologram, generated by CAD-3D and autographed by Tom Hudson. Contest deadline is midnight, January 31, 1988.

Note: This contest is only available to registered CYBER CONTROL owners. Limited to one entry per owner, and you must include the contest entry blank enclosed in the CYBER CONTROL package.



Monday-Friday MasterCard, VISA Only
All 50 states 6AM-6PM PACIFIC TIME

ST Cyber Family

CYBER PAINT™

Pro Animation Studio
by Jim Kent

Sometimes 3D animation just isn't enough. The classic Disney animations were painted, cel by cel, in a flowing, two-dimensional brilliance of color. Some of the best animation is still created this way. Thus, CYBER PAINT.

CYBER PAINT is a frame-by-frame animation/paint program with a lot of extras. You can use it by itself to create 2D animated fantasies, or...

...load in a three-dimensional CYBER STUDIO animation and add classic animation flourishes.

Say you've just created a CYBER STUDIO animation of a rocket launch, and it looks great — a realistically shaded 3D space vehicle lifting off. But now you want to add flickering exhaust flames, smoke, and some alien trees waving in the breeze. CYBER PAINT lets you do it fast. And it's fun!

Designed by Jim Kent, author of Aegis Animator, CYBER PAINT lets you touch up individual frames, or add smooth, tweening effects — automatically — to any range of frames. And, with CYBER PAINT, you can merge your Aegis Animator animations directly into the 3D CYBER Universe!

And, since CYBER STUDIO isn't required, you can use CYBER PAINT as a stand-alone 2D animation/paint system. The possibilities are limitless.



3 frames of CYBER STUDIO animation before CYBER PAINT



The same 3 frames after a CYBER PAINT touch-up

Works with all ST paint programs, plus CYBER STUDIO (ST0236), and AEGIS ANIMATOR.



Just a few of CYBER PAINT'S many features:

- Automatic mode for cel registration
- ADO-style special effects
- Fly animations on multiple axes or paths
- Real-time "scratch video"
- Cut & Paste, Stretch, Flip & Rotate
- Overlay or underlay entire animation files, portions, or single pics.
- Multiple brushes + Airbrush & Stipple
- Pen, Line, Polygon, Circle, and Box

- Tweening operations on selected areas
 - Time menu for global or local tweening
 - Flood fill and Color Separation
 - Real-time Magnify, active at any time
 - Color Cycle, Tint, Inverse, Change
 - Intuitive mouse or keyboard control
- CYBER PAINT**
ST0251 \$69.95

REQUIRES: One-megabyte RAM & color monitor
Aegis Animator™ Aegis Development
DEGAS™ Electronic Arts
NeoChrome™ Atari Corp.

CYBERSCAPE™ A 3-D "feature film"

on disk
by Darrel Anderson

Skim the fantastic, 3-dimensional terrain of the mind! Metamorphosing metallatons and transforming tubular time slots! This full-color, animated feature was created by professional



artist Darrel Anderson, to show what can be done with CYBER STUDIO (ST0236). An incredible tour de force of computer graphic power, this demo is a guaranteed autolobotomy of the very first order!

CYBERSCAPE DS
(1 double-sided disk)
SB0104 \$10.00

REQUIRES: Double-sided drive and 1 megabyte RAM



FUTURE DESIGN DISK™

by Darrel Anderson

Get a fast start on your three-dimensional explorations with the CAD-3D FUTURE DESIGN DISK.

Everything you need to create spacecraft, stations, bases, vehicles, robots, and androids. Model your future then populate it with androids and CAD-People. Bring it to life with CYBERMATE; detail it with any popular paint program. Includes:

- Blueprints
- Complete models
- Component parts
- Construction tips

FUTURE DESIGN DISK
ST0232 \$29.95

REQUIRES: CAD-3D 1.0,
or CYBER STUDIO

HUMAN DESIGN DISK™

by Richard Berry

Populate the CAD-3D Universe. Bring to life your CAD-3D creations with the CAD-3D HUMAN DESIGN DISK. Complete modular male and female prototypes, in skeletal anatomy forms, are included. Complex



head and hand details add realism to your figures. Modify your figures to create the infinite variety of the human form, pose your figures, detail the images with any popular

paint program, or bring them to life with the CYBERMATE Animation System. Includes:

- Blueprints
- Tips on the dynamics of human anatomy.

HUMAN DESIGN DISK
ST0242 \$29.95

REQUIRES: CAD-3D 1.0,
or CYBER STUDIO

ARCHITECTURAL DESIGN DISK™

by Darrel Anderson

Create CAD-3D renderings of your Dream House or build an entire CAD-3D City from the ground up. Component parts including: Doors, Windows, Arches, Roofs, Walls, Stairways, and a wide variety of architectural accoutrements.

Create your own CAD structures and populate them with HUMAN DESIGN figures. Build "sets" for your CYBERMATE animated movies.



NOTE: The ARCHITECTURAL DESIGN DISK can be used to visualize and render real world architecture. It is not intended for use as an architectural engineering tool. Includes:

- Blueprints
- Complete models
- Design tips

ARCHITECTURAL DESIGN DISK
ST0243 \$29.95

REQUIRES: CAD-3D 1.0,
or CYBER STUDIO

Now you can write the next hit 3D program!

3D DEVELOPER'S DISK

For CYBER STUDIO

by Tom Hudson

Works with most popular ST C's plus machine language

While Tom was rewriting CAD-3D, he quickly realized that it was impossible to add *everything* and still release a product in this century. Plus, who wanted CAD software that required a 4 megabyte machine? So he opened up the system—by providing a programmer's 'pipeline' through desk accessories.

Opportunity Knocks!

The 3D DEVELOPERS DISK clearly explains to programmers and developers how to access the pipeline. Included on the disk are full-featured source and object code examples, plus detailed instructions by Tom Hudson showing you how to hook into CYBER STUDIO. Create your own 3D applications—with no knowledge of 3D math. There's no licensing fee required.

3D DEVELOPER'S DISK
ST0244 \$29.95

REQUIRES: CYBER STUDIO



3D-FONT PACKAGE™

by Tom Hudson

Works with CAD-3D 1.0 and CYBER STUDIO

Design your own 3D greeting cards, signs, logos, and letterheads with CAD-3D. Over 250K of serif and sans-serif letters. At the heart of this packed disk is Tom Hudson's Super Extruder Tool, which doubles as a 3D Font Editor. With it, you can create new kinds of complex, multicolored 3D objects (such as those

seen in the 3D DESIGN DISKS) that can't be built with CAD-3D alone.

3D-FONT PACKAGE
ST0224 \$24.95

REQUIRES: CAD-3D 1.0,
or CYBER STUDIO

3D PLOTTER & PRINTER DRIVERS™

Supports Hewlett-Packard pen plotters (and compatibles), plus Gemini/Star, Epson, Okidata, IBM, Color, NEC, Panasonic, C-Itoh dot-matrix printers.

PLOTTER DRIVERS
ST0225 \$24.95

REQUIRES: CAD-3D 1.0,
or CYBER STUDIO

ST Stereoscopy

True stereoscopic 3D graphics for your Atari ST STEREOTEK™ 3D GLASSES by LC Technologies



Put on the STEREO TEK glasses and jump into a new universe. Discover a magical world that you always knew existed. That extra dimension—depth. Now you can add depth to your computer graphics with STEREO TEK Liquid Crystal Shutter glasses. Solid, realistic, 3D images you want to reach out and touch. STEREO TEK glasses plug into your Atari ST cartridge port to provide absolutely realistic 3D graphics in full color or high-res monochrome. Your STEREO TEK depth-view system includes:

- One pair electronic Liquid Crystal Shutter glasses with six-foot cable (can be comfortably worn over eyeglasses)
- ST cartridge interface unit—supports six sets

- of glasses (additional sets optional)
- DE GAS Elite Stereo Desk Accessory
- Stereo CAD-3D animation and stereo slide show by Tom Hudson
- For programmers: Complete developer's instructions plus source code for adding stereo to your own programs (C or GFA BASIC)

The secret to full-color stereo images on a computer screen is electronic Liquid Crystal Shutter (LCS) glasses. Two optical shutters in eyeglass frames are connected electronically to the ST. Every time the ST screen refreshes (60hz/color, 70hz/mono), one shutter closes and the other opens.



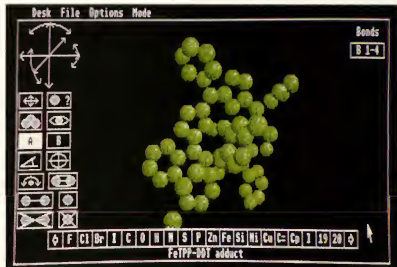
The monitor displays alternating right and left eye views synchronized with the shutters. The alternating views appear farther than the eye can see, and your brain translates the normally flat monitor image into one of startlingly realistic depth.

STEREOTEK 3D SYSTEM
TH9020 \$149.95
ADD-ON GLASSES
ONLY
TH9021 \$99.95

Satisfaction guaranteed or your Money Back!
(during 30-day warranty period)

LC Technologies is a venture of Tektronix, Inc.

GENESIS™ The 3D Molecular Modeler by Scott Legrand



The atoms of life: carbon... nitrogen... hydrogen... oxygen... phosphorus...

This is the stuff we're made of. But until now, only research scientists in large universities could actually *image* the building blocks of matter.

Imagine creating the basic elements yourself, then watching as they come to life. And with a pair of STEREO TEK glasses, this miraculous process unfolds in 3D stereoscopic depth.

Using GENESIS and your mouse, you can:

- load and display amino acids, hydrocarbons, and sugars
- create your own molecules onscreen or build them with data from pre-stored libraries
- Explore X-ray Crystallography

Rotate 3D molecules on any axis — X, Y, or Z, using real-time control. In *stereo*, hexagonal carbon rings and delicate fingers of hydrogen burst right out of your monitor.

With two molecules on-screen, you may:

- create your own rules for molecular bonding, then animate the chemical reaction between them
- derive the new empirical formula and print hardcopy data for reference

GENESIS offers the same type of iconic control panel and intuitive human interface pioneered on the Atari ST with CYBER STUDIO (ST0236). Three different display modes for every imaging need:

- 1) STEREO TEK LCS glasses (TH9020)
- 2) Red/blue anaglyphic glasses
- 3) No-glasses (monoscopic)

And with data provided on the program disk, you can create virtually any known molecule using the on-line periodic table of elements.

GENESIS
ST0239 \$79.95

REQUIRES: One-megabyte RAM



Monday-Friday MasterCard, VISA Only
All 50 states 6AM-6PM PACIFIC TIME

ST Stereoscopy



Now available for use with StereoTek Glasses



LCS WANDERER™
Deep space has never been so real!

by Pyramide Software

LCS WANDERER is the first ST game designed for full-depth stereo. Written in France, but set in outer space, this stunning arcade adventure transports you through galactic Space sectors, Black holes, and Limbo. Startlingly realistic, stereo point-of-view animation puts you in the cockpit as you swoop and dive through star fields while dodging enemy aircraft.

This is no ordinary space shoot-em-up. The bizarre, complex plot involves the ruthless kidnapping of every cat on earth. As you wander through space,

collecting pilfered pussy-cats, you run across the Heads of State of the Planetary sectors with whom you must play interstellar poker. LCS WANDERER is a complex, multimodular program—really several games in one. Journey from the dogfights in the Space sectors to the interstellar poker strategies, from the Battlezone-style of the Planetary sectors to the stereo tunnel of the Black holes, and Limbo... well, there's always Limbo.

The liquid crystal clarity of the StereoTek glasses transforms LCS WANDERER into a multi-colored micro universe within your monitor. Includes a completely redesigned solid-surface cockpit, full 16-color displays, and reduced eye fatigue compared to the original red/blue version.

LCS WANDERER
ST0238 \$39.95

REQUIRES: Color monitor and StereoTek Glasses
Battlezone™ Atari Corp.

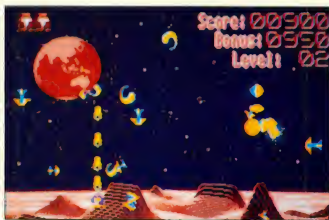
\$5,000 CONTEST

Antic and LC Technologies are co-sponsoring a competition to search for the most innovative stereo application program. We're going to pay \$5,000 in cash (advance against royalties) for the winner, plus a continuing royalty upon publication here in The Catalog.

For an official entry blank and competition details, write to: STEREO COMPETITION, The Catalog, 544 Second Street, San Francisco, CA 94107, or call (415) 957-0886.

A new perspective in Arcade Action! **SHOOT THE MOON™** 3D Alien Invaders

by Mountain Fresh Software



You've been in worse fixes — but you can't remember when. Aliens! Floating down from the sky, dropping bombs. And not just overhead... and not just to the right... and not just to the left... but *way down back there, and right up front here!*

Fortunately, your three years of *depth* indoctrination at the Leadership Cadet Spaceways (LCS) institute has handily prepared you for exactly this kind of vile, humanity-threatening situation. With the LCS STEROTEK glasses (TH9020) firmly affixed to your face, you correctly perceive the precise Z-space location of each ugly little alien beastie, manipulate your Kronos-Smithfield servomotor laser tractor beneath the erratically twitching horror, and blow the abhorrent critter out of the sky. But, no time to enjoy the view, Depth Cadet! There's plenty more space nasties where that thing came from. And, if you clear this sky, it's on to another world — where the monsters get smarter.

SHOOT THE MOON is a colorful, high-speed shoot-em-up in the classic arcade tradition, with fabulous animation, original sounds, and one big difference — *stereo*. The floating aliens menace you from multi-depth levels as you maneuver your ship beneath them, find the right depth level, and pulverize them.

Beyond the sheer entertainment value of SHOOT THE MOON, we've found stereo games to be excellent training tools for children requiring ocular muscular exercise, or training in depth perception.

And, for those who want their traditional arcade games to remain completely traditional, you can play SHOOT THE MOON in 2D without the glasses. The game play is just different enough to make it a whole new challenge. Master the double-dimension version before moving on to the STEROTEK universe, or, if you already have STEROTEK glasses, master both versions.

SHOOT THE MOON
ST0252 \$39.95



Monday-Friday MasterCard, VISA Only
All 50 states 6AM-6PM PACIFIC TIME

*The world on a disk.
Maps for everybody!*

MAPS AND LEGENDS™ The Cartographer Enhanced Version

by Harry Koons and
David Chenette



Hold on a second. Now that you've word-processed, spreadsheeted, databased and telecommunicated with your Atari ST, aren't you looking for something different?

How about Cartography? Until now, mapmaking has been a unique art mastered by only a few talented people. With MAPS AND LEGENDS, your Atari ST becomes a personal desktop cartography system.

Show your children exactly what the world looks like—with or without political boundaries. And in STEREO, the world globes appear to be floating in front of your monitor. Or print an impressive custom map to go with your travel itinerary. We use MAPS AND LEGENDS all the time at the office for sales and marketing maps. And since it's based on the GEM interface, it's GEM-easy to use!

MAPS AND LEGENDS 3.0
ST0202 \$34.95
(upgrade is \$15)

LET'S GET TECHNICAL
Packed with features, including: Stereo Compatibility, Built-in 9000-Coordinate Database, 11 Different Map Perspectives, Plotting from any altitude, Works in all 3 screen modes, Built-in Paint System (and compatible with DEGAS and NEO), Multi-font Labeler, Custom Overlay Plotter (create your own maps—build your own map databases), Auto-locate Mode (reads coordinates, distance and bearing from maps) and so many more that we don't have room to list them all.

DATAMAP COLLECTION™ Expand Your Maps and Legends Database!



NATIONAL POLITICAL BOUNDARIES

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Australia, Canada, China, U.S.S.R.

PLUS HISTORICAL MAPS AND MORE!

DATAMAPS
ST0227 \$24.95

REQUIRES: MAPS AND LEGENDS 2.0 or greater

Now! A professional flight planner for the ST!

THE NAVIGATOR™
by Scott D. Stephenson
Works with MAPS AND LEGENDS

Sometimes, you really need to know *exactly* where you're going. Have you ever wondered, while boarding your plane, how the pilot will find his way to your destination? The answer is navigation. The pilot follows a detailed flight plan created by his navigator.

Now, accurate computerized navigational planning is available on the Atari ST. THE NAVIGATOR is a professional, automated flight planner created specifically for the ST by professional navigator Scott D. Stephenson. Private pilots, military pilots, navigators (ocean-going as well as air), and commercial operators can use this amazing program to create accurate, detailed flight plans.

Amateurs, arm-chair flyers, teachers and students of navigational theory can discover how the professional navigator plans his flight, compensates for wind direction, establishes waypoints, and calculates times and distances. And we've included a special MAPS AND LEGENDS overlay function which creates custom map overlays, graphically displaying your flight paths.

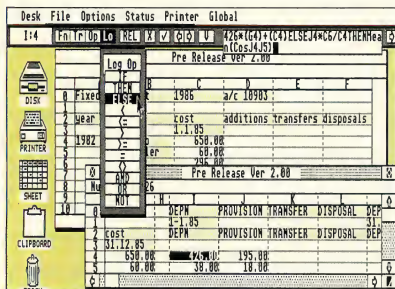
- **Private Pilots:** You'll love THE NAVIGATOR'S printed flight plan and extensive ICAO waypoint database.
- **Armchair Pilots:** Generate your own flight plans for subLogic's FLIGHT SIMULATOR.
- **Teachers:** Show your students the rudiments of navigation. Use THE NAVIGATOR plus MAPS AND LEGENDS to measure the earth!
- **Sailors:** Plan for currents or winds—taking fuel flows and times into consideration.
- **THE NAVIGATOR** comes complete with these databases: European ICAO, Asian ICAO, and US ICAO.



2 PROGRAMS IN 1!
Included with THE NAVIGATOR is THE NAVIGATOR TOOLKIT, a bonus program of computer navigation tools which performs sophisticated data management operations on your waypoint databases. Create new data files or modify existing files using its advanced random-search technique.
THE NAVIGATOR
ST0245 \$49.95

Byte tests show A-Calc almost twice as fast as Microsoft Multiplan on the Mac Plus! A-CALC PRIME™

by Kuma Computers, Ltd. UK



That's right! In the February 1987 review of the Atari 1040 ST, Byte magazine selected A-CALC 1.0 to test the Atari against the Amiga and the Macintosh Plus. On recalculation of a 25 x 25 cell spreadsheet, A-CALC was the clear winner at 4.7 seconds, compared to 7.5 on the Mac Plus, and 6.5 on the Amiga (using Lattice Unicalc).

And now, you can have all the speed of the original GEM-based spreadsheet plus the powerhouse features of the next generation: A-CALC PRIME—it blows away the competition.

Features that made the original A-CALC 1.0 the easiest-to-use spreadsheet ever:



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All 50 states 6AM-6PM PACIFIC TIME

"This is the easiest to use spreadsheet that I've ever seen." —W. Krieger, **Computer Shopper Magazine**

- Up to five windows open at once
- WIDE VIEW option to see 50 percent more of your worksheet at once
- SEARCH for character strings
- Powerful PRINTER FORMATTING commands
- .DIF file compatibility
- Exclusive A-CHART compatibility
- Sparse-matrix design maximizes available RAM

And now, PRIME adds dozens of special features:

- Row and column lock
- Conditional expressions (IF, THEN, ELSE, etc.)
- MACROS
- Labels
- 8192 rows x 256 columns
- Color/pattern coding of formula, text, value, etc.

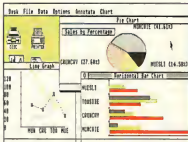
- SORT and FIND
- Trig functions
- Sideways printing (for Epson FX 80)
- High-speed SMOOTH updating
- Complete printer control from within the spreadsheet
- Password-protected cells (hide and unhide)
- Additional ease-of-use features:
 - Off-screen scrolling with the mouse
 - Out-of-the-way convenient edit window
 - Cell and range reference by pointing with the mouse (even reference cells in inactive windows!)
 - Ten clipboards
 - Illustrated manual and on-disk examples

In short, PRIME gives you premium spreadsheet power for the rock-bottom price of \$59.95. And, for A-CALC 1.0 owners, the upgrade is only \$20.00 (plus \$5.00 shipping. Enclose your original ver. 1 disk).

A-CALC PRIME
ST0235 \$59.95

Make your next presentation the one they remember.
A-CHART™

by Kuma Computers, Ltd. UK



A-Chart

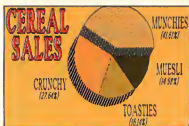
When was the last time you were excited about your spreadsheet? A-CHART makes working with figures fun and intuitive.

A-CHART automatically turns your A-CALC (or A-CALC PRIME) spreadsheets into beautiful graphs that are DEGAS-compatible. And, if you don't have a spreadsheet, A-CHART's built-in editor will help you organize those numbers into a super-sharp presentation.

View your data in eight different chart styles—change styles instantly with one mouse click. Drag and size multiple charts in each window, define your own fill patterns and line styles. The flexibility of the graphic presentation of your numbers will give you an entirely new perspective on your business or home budget. And A-CHART grows as you do, with the capability of storing up to 50,000 data points in a 512K machine and 150,000 datapoint in a 1 meg machine. Full statistics menu for detailed analysis includes Mean, Median, Variance, Standard Deviation, Skewness, T-test, F-test, and much more.

A-CHART
ST0230 \$39.95

Epson Compatible Printer from A-CHART
Multi-printer compatible from DEGAS



Degas Enhanced

File Compatible with BASE-TWO, PHASAR and A-CALC PRIME

PHASAR™

Professional Home Accounting System and Register

by Marksman Technology

PHASAR: A friendly, GEM-based, single-entry accounting system that will make your life easier. PHASAR is fast, sophisticated and contains the best interface programming design we've seen in any ST applications program.

GENERAL FEATURES

- 130 expense/income categories
- 40 accounts (VISA, checking, etc.)
- Up to 500 transactions per month
- Custom check printing
- A.I. parser predicts input, minimizes typing
- Instant help messages with right mouse button
- Relational design integrates financial data

TRANSACTIONS

- Automatic transfers between accounts
- Split-category transactions
- Create transaction macros for repetitive entries
- Point-and-type spreadsheet-style relational summary update

FINANCIAL ANALYSIS

- Easy budget setup and maintenance
- Analyze loan/savings plan
- Display multiple loans simultaneously for easy comparison

RECONCILIATION

- Display outstanding transactions for any account
- Confirm transactions with a single keystroke

IBM and Amiga users say: "The first home accounting package I have found in five years that is actually usable." — Mark Baldwin, Littleton, CO

"I am enjoying your tutorial almost as much as I admire the power and versatility of the software itself." — Joe Joyce, Huntington, VT

PHASAR is the standard by which other financial packages will be measured



REPORTS

- Clearly formatted printed reports include:
 - Account Summaries
 - Category Summaries
 - Net Worth Statement
 - Tax Calculations
 - And more . . .
- Display or print total income/expenses, monthly or year-to-date
- Sort categories in any order
- Built in data graphing
- Compatible with A-CHART (ST0230)

DATE/ADDRESS ORGANIZER

- Store up to 250 names, addresses and phone numbers
- Integrated scheduler stores special occasions
- Display calendar with highlighted special occasions
- Optional auto-alert reminds you of important events

TAX

- Design your own tax forms—never out of date
- Calculate tax liability in less than one minute
- Project tax liability at any time

**PHASAR
ST0237 \$89.95**

BASE TWO™

The GEM Database by the Authors of DBMASTER ONE

The next step in databases!

by Dan Matejka and Stanley Crane



It's no fun re-learning your database commands every time you boot it up. And those simplistic "filecard" databases just don't have the power to do the job. Or, maybe you've just created your custom database, entered 5,000 records, and now you want to print a report. . . good luck. You need a degree in programming just to get some decently formatted hard copy.

Dan Matejka and Stanley Crane have eight combined years of experience writing databases on computers ranging from the IBM PC to the Apple Macintosh. And their databases range in complexity from the extremely powerful and complex IBM PC DB MASTER to the familiar, introductory

DB MASTER ONE on the Atari ST. They've watched the ST database market grow—and they've spotted a gap: until now, ST databases have been either too simple, or too complex. Until now, ST owners were limited to easy-to-use, inflexible "mailing lists," or involved, programmable "throw-backs" to the CP/M or MS-DOS world. Until now, there was no intuitive, yet powerful database featuring an adaptable report generator. *Until now.*

BASE-TWO fills the gap. Entirely GEM-operated, DB MASTER ONE owners will find it familiar, yet far more powerful. Look over some of the features and see if it solves your problem:

INSTANTANEOUS SORTING!

size	number records	sort time
512K	5,000	5.1 sec
1 Meg	10,000	9.7 sec
2 Meg	20,000	19.2 sec
4 Meg	50,000	46.1 sec

Using a sample eight-field mailing list.

- Variable field types:
 - Implicit (default)
 - Alpha
 - Numeric
 - Date (calculable)
 - Formula
- Formula fields automatically calculate results from several fields in same record
- Adjustable numeric decimal placement
- Re-edit database at any time without losing data
- User-definable .DIF file creation for software compatibility (with A-CHART, for example)
- DB MASTER ONE conversion program
- On-line Help screens
- Optional mouse or keyboard control
- 64 character label length
- 100 fields per record
- Multi-level Search and Sort
- Totally RAM-based for instant action
- Format disks from within program
- Optional, automatic date, time and page numbering
- Print reports to screen, printer, or ASCII disk file for word-processor editing
- Optional subtotal printout
- Adjust number of records per page
- Double-line report headers
- Place "comment" text anywhere
- Customize with printer control codes
- "Soft" field borders for autofield truncation
- Single-sheet or continuous feed option
- Store 10 custom reports for each file
- Up to 100 unique fields per report

BASE TWO
ST0246 \$59.95

DB MASTER ONE is a registered trademark of DB MASTER Associates.

The intuitive BASE-TWO Report generator includes:

- Multi-line field word-wrap, screen and printer
- Completely adjustable label or column-format report



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All 50 states 6AM-6PM PACIFIC TIME

How To Order

DON'T LET THIS HAPPEN TO YOU!

"I ordered FLASH and got these funny purple things!" "Shipping and handling! What shipping and handling!" "Why did I get ST software! I wanted XL/XE software!" "My software was delivered where!"
Sounds alarming, doesn't it! We don't want this to happen to you!
Take a moment to read the ordering information below,
so that we may ship you your order as fast and accurately as possible.
Thanks for ordering from The Catalog!

Lisa Wehrer
 Manager, Customer Service
 The Catalog



ORDERING INFORMATION

1. Check for any hardware requirements at the end of each product description (e.g., REQUIRES: one-megabyte, color monitor, etc.).
2. Make sure the programs you are ordering are for your machine. The first three letters of the Item Number will tell you which machine each program is for.

FOR THE ATARI ST
 ST0 PD9 SD5 SB0
 TH9 BB9 ST9

FOR THE ATARI XL/XE
 AP0 PD0 ADS
 TH0 BB0

3. \$20.00 minimum order, on all orders.

ORDER BY MAIL

1. Use the attached order form if possible. If you do not have one, please:
 - a. Clearly print your name, address and telephone number.
 - b. List Quantity, Item Number, name of item, price of item and total.
 - c. Add correct amount for shipping and handling charge (see below). California residents must add 6.5% sales tax on merchandise total (shipping and handling are not taxed).
 - d. Enclose check, money order or credit card information. We accept MasterCard and Visa only. Please indicate MasterCard or Visa, include account number and expiration date.
2. No C.O.D.'s. Do not send cash.
3. Overseas Customers, order by Visa, MasterCard, or check or International Money Order in U.S. funds drawn on a U.S. bank only. No wire transfers. \$40.00 minimum order.

ORDER BY TELEPHONE

WHEN TO CALL

Ordering by phone is quick and easy. If you call in the afternoon, you will get fewer busy signals. Orders are taken from 6am to 6pm Pacific Time Monday through Friday.

HOW TO ORDER

1. Have the item number ready for each item you wish to order.
2. Phone orders are payable by Visa or MasterCard. Please have your account number and expiration date handy.

CALL TOLL FREE

(orders only) All 50 states Monday through Friday 6am-6pm Pacific Time

800-234-7001

SHIPPING AND HANDLING CHARGES

Disks	Domestic	Foreign	Canada/Mexico
1-5	\$3.00	\$10.00 Air	\$4.00
6-10	\$6.00	\$15.00 Air	\$7.00
11 or more	\$9.00	\$20.00 Air	\$10.00
Books	\$3.00 per book	\$10.00 per book Air	\$3.00
Magazines	\$1.00 each	\$5.00 each	\$1.00 each

For Order Inquiry and Technical Support, please call: (415)957-0886
 Monday through Friday 8am to 4pm Pacific Time (closed for lunch 1pm-2pm)
 CompuServe™ subscribers enter: GO ANTIC
 We regret we are unable to accept technical support or order inquiry calls
 on our 800 number. The 800 number is for orders only.

Prices and availability subject to change without notice.

HOW TO ORDER

WANT TO SELL YOUR ST SOFTWARE?

HERE'S HOW:

We market a wider variety of software than anyone in the ST marketplace. Whether you're a first-timer, veteran, or a major software firm, we have a place for you in The Catalog. We also distribute through over 1,000 retailers. So, if you're looking for broad distribution and understanding support, send us your program and let us take a look. Worried about security? So are we. Just send us a description of your software and we'll arrange the necessary non-disclosure agreements.

THE CATALOG
 Product Development Department
 544 Second Street
 San Francisco, CA 94107
 (415)957-0886

BYTE picks FLASH
— Top Atari terminal program!
FLASH 1.5™

The Most Popular ST Terminal Program

by Joe Chiazzese and Alan Page

If you own a modem you should be using FLASH. Why? Because FLASH is the best. It will simplify your online time and make telecommunicating more enjoyable and less expensive.

And now, with version 1.5, FLASH just got a whole lot better — for a whole lot less (effectively \$15 after subtracting the \$15 CIS time). Check out the new features:

- Enhanced GEM Word Processor
 - Automatic, adjustable word wrap
 - Search and Replace
 - Reformat text blocks

- Supports CompuServe's B protocol for faster, more convenient file transfers (in addition to color Vidtext graphics).
- Now includes VT100/VT52 line-drawing character set
- New Script language functions
- Command line history
- Faster Type-ahead lets you scroll thru previous lines and resend them
- YMODEM batch file
- Ability to run other ST programs from inside FLASH

Ask Anyone

If you're looking for an ST terminal program, ask any online veteran about FLASH. FLASH is so GEM-intuitive, you feel right at home the first day you use it. Imagine turning on your ST, and with *one click* from the GEM desktop, beginning an online session on your favorite BBS. Watch FLASH dial the number, log on, and *automatically* browse through the most recent messages or files. Then, edit some email in the *built-in text editor*, and upload it right from the capture buffer, instantly! And FLASH is programmable, so you have total control for full customization.

"FLASH is my #1 choice on the Atari ST."

— Ron Luks, Founder of CompuServe's SIG*Atari and Atari Developer's Forum.



LATE FLASH!!

Order now and get an additional \$18 FREE Genie time!

FLASH has a barrel-full of terminal emulation, so it's compatible with a wide range of mini or mainframe systems. And talk about bulletproof transfers! It's got the *most reliable XMODEM around!*

PACKED WITH FEATURES!

In addition to the new features, here are some of the original, solid standards. See for yourself why Byte magazine chose FLASH as the top Atari terminal program.

- Programmable "script" language (70 plus commands)
- Unlimited Macro keys
- Mainframe VT100 terminal emulation
- XMODEM (CRC), ASCII and DC2/DC4 file transfers
- Totally configurable to *your needs!*

FREE! Try FLASH now and get \$15.00 of CompuServe access time.

FLASH 1.5
 ST0220 ~~\$39.95~~
Now!
Only \$29.95

(* Free upgrade with original disk and \$5.00 shipping.)

"FLASH is the fastest, most complete, most reliable terminal program I've used..."

— M. Ratcliff,
 ANALOG Magazine

BBS and Kermit Accessory for Flash!
REMOTE CONTROL ACCESSORY & KERMIT PROTOCOL™

by Joe Chiazzese and Alan Page

Instant Kermit protocol within Flash with this custom desk accessory. Plus Remote Control accessory turns Flash into a mini-BBS.

REMOTE/KERMIT ST0226 \$24.95

REQUIRES: FLASH ST022

Soup up your modem... in software!
QUICKTRAN™ The Modem Accelerator

by Adrian Jovanovich Works with FLASH, or by itself.

Your 1200-baud modem can now transfer files at over 2000 baud... 2400 baud now flies at 4000 baud... The telephone company can't stop you. It's totally legal!

QUICKTRAN comes to you as two disks, each with an identical desk accessory. One QUICKTRAN accessory shrinks the file you're sending — in real time, using one of four automatic compression schemes. The second accessory — on the receiving end — expands the file to its original size as it's coming in over the phone lines. Why spend hundreds on a faster modem when you can transfer files in almost half the time with QUICKTRAN? QUICKTRAN (2-disk set) ST0247 \$34.95



**The program that
created the sounds
in CYBERSCAPE!
G.I.S.T.TM**

G.I. Sound Tool

by Lee Actor &
Gary Levenberg
for Synthetic Software

Works with C Compilers,
CYBER STUDIO (ST0236),
and Dr. T's MIDI
Recording Studio



If sound has always fascinated you... or if you're a programmer or developer... take a look at G.I.S.T., the sound editor. G.I.S.T. was created to establish a standard of sound generation on the Atari ST that far surpasses the abilities of the built-in sound chip. G.I.S.T. is really two programs:

- 1) GEM-based editor
- 2) Sound Driver

As you can see from the screen display, the G.I.S.T. editor gives you real-time mouse control over any sound shape. The key to G.I.S.T.'s power is dynamic control of the GI chip. Each voice has three ADSR (envelope) controls and three LFO's (low frequency oscillators). You'll be creating sounds like a professional engineer—Near Synthesizer Quality (NSQ) sound.

For programmers, the Sound Driver is linkable object code that can be used in your own software. Adding superior sound effects to any program... it's interrupt driven, so it won't impact the speed of your software. In fact, it's already

**NOW! Compatible with
GFA BASIC &
PERSONAL PASCAL!**

built into CYBER
STUDIO—just one of
many useful applications.

LET'S GET TECHNICAL

- Volume ADSR to shape attack, decay, sustain, release
- Volume LFO for Tremolo effects and AM (Amplitude Modulation)
- Frequency ADSR—frequency shifts up to ± 3 octaves!
- Frequency LFO for Vibrato effects and FM (Frequency Modulation)
- LFO delay lets you add effects at any point in the sound
- MIDI-compatible! Use your keyboard to play the GI chip
- Three sound windows may be open at once

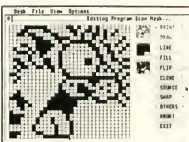
**Add sound effects to your
CYBER STUDIO
animations!**

GFA BASICTM Michtrom
Personal PascalTM O.S.S.
G.I.S.T.
ST0233 \$34.95

**Start Icon Editor
Hits "Big Time!"**

**P.I.E.
Professional Icon
Editor**

by Alex Leavens



It began as a hot little desk accessory in START, The ST Quarterly—you know, "Customize Your Desktop Icons!" or so was the copy read. And it was a lot of fun. You could

redesign your Trash Can to look like a paper shredder. But the programmer, Alex Leavens, just couldn't leave it alone. He kept adding things.

Now, the Desktop Icon Editor has graduated. P.I.E. is the Professional Icon Editor—for programmers as well as desktop artists. Alex has added icon code generation so you can now design icons for your own programs. And while he was at it, he added a bunch of graphics improvements to delight the artist in you.

New features include:

- Generates Resource Construction Set code for icon images; P.I.E. can be used from within the Resource Construction Set to create and edit icons for the resources you're currently working on!
- Improved Editing Features:
 - Faster Print and Line Modes
 - New Image Cut & Paste Functions
 - Selectable Fill Patterns
 - Nine-level Bi-directional Undo buffer
 - In-program Desktop Icon Preview mode
- Improved Keyboard Resource

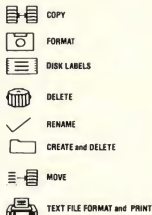
P.I.E.
ST0248 \$29.95



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**Add a world of DOS
Icons to all of your
GEM programs.
CRYSTALTM**
(It makes GEM
shine...)

by Jim Thompson



These are the DOS Icons Digital Research forgot when they wrote GEM. It's too bad Atari didn't put CRYSTAL into the TOS ROM's, because for about 30K of code, CRYSTAL gives TOS the most powerful features of MS-DOS. Plus, you never lose the look and feel of GEM. And since CRYSTAL is a desk accessory, it's always available.

In fact, these eight icons will eliminate all the frustration you feel from not having powerful DOS functions available from within your favorite GEM program (or the desktop)...

Of course, CRYSTAL is compatible with all monitors, all disk drives, and all printers.

Make your favorite personal version of GEM shine—for \$24.95.

CRYSTAL
ST0229 \$24.95

"The best utility buy of the year, without a doubt."

— Current Notes

**CAD-3D
COLLECTION II**

More fantastic 3D objects! Includes the NEW TV STAR TREK ENTERPRISE, detailed Space Shuttle with working bay doors; Israeli Lavi Fighter; Advanced "F-24" Swept-Wing Fighter; complete Atari Logo; and Darrel Anderson's CYBERSCAPE DISKCRAFT!

PD9101 \$12.00*REQUIRES: CAD-3D 1.0 or CYBER STUDIO***MISFIRE**

MISFIRE is by David Snyder, and it's the first user-submitted (1.5 minute long) CYBER STUDIO animation. MISFIRE is a frighteningly real scenario of a next decade SDI nightmare featuring multiple scenes and special effects. Who will survive? This disk is completely self-contained and needs no other program. Just boot it and amaze your friends.

PD9102 \$12.00*REQUIRES: DS drive, 1-meg. RAM, and color system***SPELL/Writer's Tools**

SPELL, written by Eric Bergman-Terrell in Personal Pascal, is a simple spell-checker for ASCII or

1st-Word files. It scans your document, reporting incorrect words and allowing you to add them to the program's unlimited-size dictionary.

PD9093 \$12.00**TOM HUDSON'S
PD3DCTL**

This is the early, public domain version of Tom's motion control language desk accessory for CAD-3D 2.0 — a subset of the powerful CYBER CONTROL (ST0250, elsewhere in The Catalog). Create your own programs to control CAD-3D 2.0 and automatically create CYBER STUDIO (ST0236) animations.

PD9095 \$12.00*REQUIRES: CYBER STUDIO***DARREL
ANDERSON'S
SPACE PROBE**

This superb CYBER STUDIO (ST0236) animation demo with sound effects was created by Darrel Anderson, author of CYBERSCAPE (SB0104), for the Contact Aliens Lifetime PBS special. Complex space probe enters space in the foreground before diving to the distant planet's surface.

PD9096 \$12.00*REQUIRES: One-megabyte RAM, DS drive, color***DARREL
ANDERSON'S
SPACE DOCK**

Another fabulous CYBER STUDIO (ST0236) animation demo by Darrel.

This one features a deep-space hydro-wing launch from one of the Future Design craft.

PD9097 \$12.00*REQUIRES: One-megabyte RAM & DS drive***TOM HUDSON'S
STEREO
STEELYBOINK**

Incredible, animated ray-tracing demo by Tom Hudson shows off the amazing properties of the STEREOTEK glasses as reflective balls bounce in three-dimensional space.

PD9098 \$12.00*REQUIRES: STEREOTEK GLASSES, one-megabyte RAM, DS drive, color***SPECTRUM 512
SLIDE SHOW**

Professional artists Darrel Anderson and Richard Berry contribute to this colorful collection of SPECTRUM 512 (ST0249) pictures. (Includes pictures from SPECTRUM Catalog ad.) Show your friends what the Atari ST is really capable of. Or, if you don't have SPECTRUM and want to see what it can do, we've included a special slide show program on this disk. *You don't need SPECTRUM to display these 512-color pictures.*

PD9100 \$12.00**XLISP**

XLisp, written by David Betz, is a version of the LISP programming language based on the Common LISP standard with extensions for object-oriented programming.

PD9084 \$12.00**ARCHive Collection**

A collection of tools for manipulating archives—multiple files combined and compressed into single library files for later extraction and use.

PD9094 \$12.00**CAD-3D
COLLECTION I**

The first collection of complex objects created by Tom Hudson with CAD-3D.

PD9085 \$12.00*REQUIRES: CAD-3D***PROFF**

PROFF is a text formatter similar to popular mini-computer tools like RUNOFF and TROFF. PROFF takes input from standard ASCII text files with embedded formatting commands and produces fully-formatted output files.

PD9089 \$12.00**STEREO STARS &
SLIDE SHOW**

Float through stereoscopic space with this hypnotic, animated starfield demo. Plus, over ten full-stereo slide pictures! Show your friends, then load them into DEGAS Elite and touch them up!

PD9099 \$12.00*REQUIRES: STEREOTEK Glasses and DS Drive***MicroEMACS
COLLECTION**

MicroEMACS, originally developed by David Conroy, is a popular implementation of a useful subset of the EMACS text editor used on mini-computers.

PD9090 \$12.00**ST Software Bargains**

See pp. 30-31

STart Back Issues

See p. 29



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All 50 states 6AM-6PM PACIFIC TIME

47

of the best
Atari 8-bit
programs
available
today!

SOFTWARE FROM
THE CATALOG
AN INFORMATION TECHNOLOGY COMPANY





*All-time best-selling Atari
paint program*
RAMbrandt™
Atari Design Studio
by Bard Ermentrout

Imagine... the ultimate point software. For under \$20! Sit down with RAMbrandt and enter a design studio with the tools to make anyone a creative artist. It took our technical staff three hours to step through each of RAMbrandt's features. Use the built-in toolkit to enhance your own programs or picture files. Or just doodle for the joy of it! We barely have enough room to list all the power, but here goes:

- 5 graphics modes (7, 7+ (ANTIC E), and GTIA 9, 10, 11)
- Works with joystick, Koolo Pad/Touch Tablet or both

- Horizontal and vertical coordinates always displayed
- Box, Circle/Ellipse, Rubber bond line, Freehand plot, Text (4 sizes, any font—3 fonts included), Zoom, Mirror (vertical, horizontal, 4 way)
- Fill (solid, pattern, random, user-defined patterns)
- Unlimited user-defined brushes (5 pre-defined)
- Quills and Tiles (user-definable color patterns—5 of each pre-defined)



BEST SELLER!

- Point or Fill with any pattern, quilt, tile, or font
- 128 colors in any mode with easy one key DLI access
- Random/Probability/Exclusive-Or/Transparent "colors"

FREE BONUS! Order now and get a **FREE DISK** of pictures and extra character fonts.



*A 3-D Solid Object
Modeler for RAMbrandt*
**SOLID OBJECT
MODULE**
by Bard Ermentrout

Now you can easily create 3-D objects with RAMbrandt. Start with 8 different primitives: Sphere, Torus, Cylinder, Spool, etc. Combine them to make complex structures. Then flip into RAMbrandt to complete your picture. This module will not rotate the objects, but it will do just about everything else: 4, 8 or 16 level greyscale. Halftones (random or up to 64 dithered patterns). Backlighting or point source lighting. Clipping window to use parts of objects. Undo command. Much, much, more. If you use RAMbrandt, you need the **SOLID OBJECT MODULE**.
AP0182 \$15.95
REQUIRES: 48K RAM, RAMbrandt

- Color Hunt Mode (point over only the color you choose)
- Animole mode (up to 32 frames at any speed)
- Window mode—any or all of your picture: Rotate, vertical or horizontal flip (T-shirts), wipe, animate, scale (larger or smaller), cut and paste, rubber stamp
- Printer dumps for Epson, Star (Gemini), C. Itoh, NEC and compatibles
- Okimate 10 color printer dump supports color fine-tuning
- Load pictures from Movie-maker, Microllustrator, Micropointer, and Computer Eyes formats
- 130XE RAMdisk Support!

RAMbrandt
AP0157 \$19.95
REQUIRES: One Joystick and/or Koolo Pad or Atari Touch Tablet



Monday-Friday MasterCard, VISA Only
All 50 States 6AM-6PM PACIFIC TIME

PROGRAMMABLE spreadsheet for the XL and XE computers CALC MAGIC

by Metamorphosis Development



This is a full power, fast spreadsheet presented in a much easier-to-use programmable, multi-menu package. Now you can have sophisticated facilities to really control a spreadsheet—and get a solid grip on your budget or business.

Features include:

- Built-in plain-English programming language. Build templates to reduce your keystrokes.
 - Quickly test multiple "what if" conditions and determine actual effects.
 - Pop-up menus let you choose commands easily, avoid complex command sequences.
 - Supports DIF file transfer.
- CALC MAGIC**
AP0177 \$24.95
REQUIRES: XL or XE Computer, 64K

LIMITED STOCK

Organize ideas with the only outline processor for the Atari. Compatible with Word Magic, Atari-Writer, Paperclip and other word processors.

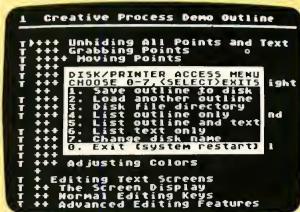
CREATIVE PROCESS Version 1.8

by Dave Thorson

LIMITED STOCK

Outline processors have become indispensable authors' tools (you've seen them advertised for the Macintosh and IBM). CREATIVE PROCESS on the Atari is a tremendous aid in report writing—for business or school. Capture your ideas and turn them into pro-

and for organizing everything. Pop-up command windows let you concentrate on ideas. Undo key, adjustable screen colors, utilities package, and 130XE RAMdisk support are only a few of CREATIVE PROCESS'S huge list of features. Comes preconfigured for



THE ENHANCEMENT DISKS (A 2-disk set)

by Robert Wilson

Ever since B/GRAPH—the most powerful Atari business/graphics software ever—was released, rumors persisted that its co-author, Robert Wilson, had created a collection of super utilities and enhancements for the original program that, combined, made the whole set comparable to business-presentation systems worth hundreds of dollars on other computers.

Those rumors were true. For several years, Robert Wilson created, debugged, polished, and reworked his collection of utilities until they became four packed disk sides of programs and documents. Although it is possible to use many of these programs without owning B/GRAPH, THE ENHANCEMENT DISKS are primarily designed to run with B/GRAPH—which is available from Batteries Included.

THE ENHANCEMENT DISKS

features include:

- Bubble charts for market segmentation analysis
- Opposed bar charts
- Segmented horizontal bar charts
- Loan amortization schedules
- Instant switching of plotted variables
- Covariance and correlation matrices

And THE ENHANCEMENT DISKS support the Atari 1020, Radio Shack CGP115, and Monnesmann Tally Pixy plotters for the ultimate in clear presentation. Plotter features include:

- Exploded pie charts
- Floating bar charts
- Plotting of algebraic expressions
- 17 factors per graph with overlays
- Left and right side scaling

THE ENHANCEMENT DISKS

AP0190 \$19.95
REQUIRES: Atari BASIC
Recommended: B/GRAPH
 B/GRAPH™ of Batteries Included

essional documents. Reduce the time needed to get out a document, because speed is the key feature. It can help you manage your projects, make sense out of long meetings, and monitor works in progress. Plus, it's so flexible that it can be used as: an address and phone number filer, calendar, recipe data-base,

single and enhanced density. Capable of supporting your double-density DOS's as well. 100% compatible with Word Magic, Atari-Writer and Paperclip.

CREATIVE PROCESS
AP0151 \$19.95

Optional: Printer, Word Magic

SPELL MAGIC

by Blue Collar Software

Spell it right—every time, with this 34,000-word integrated dictionary. Get started fast with an-line help and simple menus. Install SPELL MAGIC and Word Magic together on one disk. Also—check documents created by other word processors such as Paperclip and HomePack, and AtariWriter. Check in context: SPELL MAGIC always displays your document in a

Also works with Atari-Writer and Paperclip!

window in the upper half of your screen. Add an unlimited number of expandable personal dictionaries (up to 10,000 words each). Updates your personal dictionary automatically while checking words. Counts words. Works with single or double drive systems.

SPELL MAGIC
AP0144 \$19.95

Great moves... for all level players

Colossus Chess 3.0

The *Ultimate* Computer Chess
by Martin Bryant English Software UK

BEST SELLER!



Here's a chess program with all the moves of a chess master, a great chess tutor or a master tournament opponent. Whether you're a beginner or a pro, COLOSSUS CHESS 3.0 is for you.

Dare to challenge the program that *outplayed* 20 of the best computer chess programs available.

- Unique two-screen dual display—current game and unique view of COLOSSUS's "brain." Watch COLOSSUS consider thousands of moves.

- On-screen elapsed-playing-time clocks add realism, excitement to Tournament mode (full tournament play).
- COLOSSUS teaches you to be a better chess player with simulation modes (infinite mode, problem mode, equality mode, overage mode, all-the-moves mode, blindfolded mode). Adjust playing speed and style.

COLOSSUS CHESS 3.0
AP0161 \$15.95

REQUIRES: 48K RAM

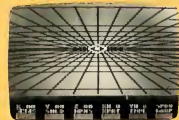
Note: Colossus Chess was named "... one of the best buys in chess programs today" by Analog Magazine (Nov. '85).

Star Raiders was a great game... for its time.



XTAL(CRYSTAL)—AN ADVENTURE IN SPACE

by Dave Reese



A planet-threatening Ion Radiation storm has developed in the peaceful Conosion section. Your mission: destroy that storm.

The EXCALIBUR comes equipped with impulse and warp drives, transporters, phasers, communicators, shields, quadrant map display, and a spectacular 3D cockpit/navigation viewscreen.

XTAL (CRYSTAL)
AP0158 \$15.95
STAR RAIDERS™ Atari Corp.

Joystick-busting
Kung-Fu Action

CHOP SUEY
by English Software UK

BEST SELLER!

An action-packed martial arts competition simulation. For anyone who likes thrill-o-minute competitive games. One or two players. Eight progressive levels, two speeds—normal and (for the insone) superfast. Killer scorpions odd on

unpredictable element. Fast, smooth animation and 29 on-screen colors odd to the excitement.

CHOP SUEY
AP0162 \$15.95
REQUIRES: One Joystick per player
"... one of the best Atari buys of the year. Go get it grasshopper!" Atari User Magazine (UK)



The card game of royalty... and society

BLUE TEAM BRIDGE

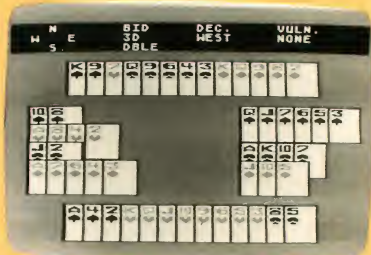
by Walt Huber

A complete, tournament-level computerized bridge simulation. Now you can learn to play and play more often. Improve your game.

can learn new bidding conventions to sharpen their skill. All will have a worthy competitor when you "can't get our foursome together." Your favorite game is always at your fingertips.

BLUE TEAM BRIDGE
AP0178 \$15.95
REQUIRES: Joystick

New players can learn to play right. Intermediate players can learn on advanced style of bidding. Advanced players



Your computer can teach you the language of the ST.

DEEP BLUE C COMPILER

by John Palevich



MATHLIB

by Frank Paris

DEEP BLUE C is faster and more powerful than BASIC. C is one of the most transportable languages—runs on other computers with minor modifications. This all-purpose language is the *de facto* standard for the new generation of 68000-based machines like the Atari ST. Pointers, recursive functions, and high-level control structures make complete software systems easy to design, implement and maintain.

MATHLIB is a complete library of math functions for DEEP BLUE C. The 32 functions provide access to Floating Point and Trig operations. Now you can get both disks for the price of one!

DEEP BLUE C and MATHLIB AP0188 \$19.95

REQUIRES: Text Editor like Word Magic

INTERLISP/65

by Special Software Systems

The Catalog is proud to offer INTERLISP/65, version 2.5, from Special Software Systems. LISP (LIST Processing) is the symbolic language of artificial intelligence applications, designed especially to logically manipulate structured symbols. It's different from any language you've ever used on the Atari!

INTERLISP/65 is a subset of the standard "INTERLISP" dialect of LISP. This version includes special enhancements so you can take advantage of the Atari's graphics and sound capabilities. Over 70 pre-defined functions are included, plus these features:

- Eight-digit, floating point arithmetic, including multiplication, division, exponential, and logarithms.
- PEEK, POKE, and XIO functions for access to monitor and hardware functions.
- STICK and STRIG for game controller input.
- Sequential disk file functions, including OPEN, CLOSE, PR#, IN#, NOTE and POINT.
- PAGE and TAB screen control functions.
- Debugging facilities include BREAK and BACKTRACE.
- Example LISP programs on disk include the famous "Towers of Hanoi" puzzle which provides an excellent example of the power of recursive programming, plus "Doctor," a classic example of artificial intelligence applied to conversational programs.

And now, version 2.5 includes 21 new functions, a special graphics-buffer initialization sequence, plus the new TRACE utility for detailed debugging.

INTERLISP/65 AP0191 \$19.95

BASIC VIEW

by Softview Concepts

This is a utility all BASIC programmers will want. Beginners will learn programming faster, and veterans will find BASIC VIEW invaluable for debugging. Written entirely in machine language, BASIC VIEW provides a window showing the actual execution of your program code while the program is running. Even if your program uses full graphics displays, you can instantly switch—without program interruption—to the BASIC VIEW window, and then back to your program display. Beginners quickly see which line of code is affecting the program while it actually happens.

Features include:

- Joystick controlled for ease of use.
- Current line highlight during program execution.
- Adjust program execution speed using joystick "throttle."
- Variable Display shows updated contents of variables during program execution.
- Stop, skip to any line, then restart your program of any point.
- Variable Menu displays all variables, arrays, strings in alphabetical order.
- Examine dimensional array structures and elements, and memory locations.
- "Find" command for instant search of any variable or array element by name.

BASIC VIEW AP0192 \$19.95

Power combo for Assembly language programmers

LIMITED STOCK

FLOATING POINT PACKAGE

by Louis J. Chorich III

EXTENDED D.D.T.

by Jim Dunion

FLOATING POINT PACKAGE makes math with MAC/65 as easy as BASIC. It gives you the tools to use the precision of Floating Point operations. Also includes Floating Point array management and Trig functions.

REQUIRES: Moc/65

EXTENDED D.D.T. (EXDDT) is the best debugger, made even better. The improvements include:

- Symbolic disassembler
- EXDDT completely relocatable
- NEXT instruction for single stepping past subroutines
- Includes mini-assembler
- Complete source code and all assemblers

FLOATING POINT PACKAGE

and EXTENDED D.D.T.

AP0189 \$19.95

MAC/65™ Optimized Systems Software, Inc.

Ideal partners for MAC/65. Use FLOATING POINT PACKAGE to speed development.



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THE FAMILY TREE

by Harry Koons

Record and access up to 6 generations of historical family data with THE FAMILY TREE. Enter names, dates, places and facts; then print out an actual pedigree chart of your own lineage (on any printer). Use the joystick or keyboard to select any relative. Display three windows of pertinent information about that family member instantly. All his-

torical data can be displayed and edited on-screen. Save up to 24 generations on one disk. Send printed charts to distant relatives—get their help in completing each family member's history. Preserve your family tree for posterity!

THE FAMILY TREE
AP0133 \$19.95
REQUIRES: Atari BASIC
Optional: One Joystick

Finally, a flexible, full-featured database

DATA MANAGER XL

by William Bartlett

Here's a flexible, integrated data base manager/mini-word processor that's easy to use. Highly flexible features include: color-coded files, program handles up to 100 fields (indexable categories), each field as large as 120 characters. Quickly make changes with easy add and delete options. Print custom reports from existing files. An Index Manager function allows sorting and file rebuilding.

Use with compatible Atari-Writer and/or Word Magic for mail merge, form letters, or other letter/list processing needs! A special "Tools Manager" section features: database diagnostics and utilities plus a disk drive speed checker! How-to instructions are complete and detailed.

DATA MANAGER XL
AP0129 \$19.95
REQUIRES: Atari BASIC



SHERLOCK 1050

by Dan Moore and Steve Ahlstrom

Get a fighting chance to restore crashed disks. Examine or edit any byte in any sector of your single or enhanced density disks (in HEX or ASCII). Disassemble (from the disk itself) any machine language file or

autoboot disk and learn its secrets. Restore deleted files and salvage broken files with the Trace option.

SHERLOCK 1050
AP0155 \$19.95

PRINTER DRIVER CONSTRUCTION SET

by John Eric Hinckley

Now AtariWriter is totally compatible with every printer. Comes with drivers for FX-80/MX-80, 10X/SG-10, NEC 8023, Prowriter, 1027, HR-25. Build your own drivers for other

printers.
PRINTER DRIVER CONSTRUCTION SET
AP0131 \$19.95
REQUIRES: AtariWriter cartridge

CHAMELEON CRT TERMINAL EMULATOR

Version 4.03

Written in machine language
 by John Palevich

Turn your Atari into a variety of computer terminals! Five popular types: Glass TTY, ADM-3A, DEC VT-52, IBM 3031, ASCII, plus a test terminal. Software supports tab, backspace, line feed (on/off), form feed, bell signal, speeds up to 9600 bps, plus a lot more! Wide-screen 80 and 132 column emulation. You've never seen anything as fast and smooth as the vertical and horizontal fine scrolling. All these features make CHAMELEON flexible enough to use with UNIX operating systems. Perfect for logging

on to non-standard systems, such as MCI MAIL and DELPHI, because you can customize all terminal parameters. Auto-dials and stores up to 16 phone numbers. Supports file transfers and features on all Atari 850-interface, 835, 1030, and XM301 modems. Version 4.03 includes Columbia University's Kermit file-transfer capability, in addition to total compatibility with the popular Xmodem protocol.

CHAMELEON CRT TERMINAL EMULATOR
AP0113 \$19.95
REQUIRES: 48K RAM



The only programmable modem software available BACKTALK 1.2

by Steve Ahlstrom, Dan Moore and Dan Curtis

BEST SELLER!

Designed by the authors of Paperclip, Synfile +, and Sherlock 1050, BACKTALK is powerful and easy to use. "Script" files can be executed with the touch of a button. Or they can run automatically—even in the middle of the night while the phone rates are lowest. Now you can wake up in the morning and read your email—with your morning paper—without having to download anything yourself! Bulletproof file transfer. Three protocols: Xmodem (with or without CRC), Amodem, and Xon/Xoff. Supports 300, 1200, 2400 baud modems, ASCII/ATASCII translation, full and half

duplex. CB "chat" window provides uninterrupted communication during on-line conferences. Smooth scrolling text reduces eyestrain. Friendly pop-up menu makes entering commands a snap.

Now you can use BACKTALK with every modem. Supports Hayes-compatibles and Atari 1030/XM301. There's even a way to load your own modem handlers. 130XE users will love the way they can download files into the RAMdisk.

BACKTALK 1.2
AP0154 \$19.95
NOTE: Some early 810 disk drives will not work reliably with BACKTALK's high speed I/O.

This 2 DISK SET gives you complete command of your dot matrix printer.

PICTURE PLUS 3.0 and LISTER PLUS 1.5

Non-Standard Magic!

by Chef Walters

BEST SELLER!

PICTURE PLUS is the total graphics utility combined with the ultimate ATARI screen dump. Now Version 3.0 is foster and works with nearly any DOS. It even works with RAMdisks.

Translate pictures between Micrallustrator, SuperSketch, Paint, Fun With Art, B/Graph, Movie Maker, Micrapainter, Atari Light Pen, Atari Touch Tablet, Kaolo Pad, LOGO, Computer Eyes, DrawIt, RAMbrandt (when converted), Graphics 7, 7+, 8, 9, 10, 11, and 15.

Work with the entire picture or just the area you want. PICTURE PLUS will merge two pictures, reverse a picture left to right (far T-shirts), turn it upside down, move it in any direction, make a negative, or change colors. Add text anywhere on the picture, in any

color(s) and any font(s), in 6 sizes.

PICTURE PLUS will print screens in 4 sizes from 3" x 4" to 8" x 14". Directly supports printers compatible with Epson, Gemini, Prowriter, Okidata, color IDS, and color Mannesmann Tally. Custom printer installation program handles most others.

LISTER PLUS will print anything exactly as it appears on your screen including control characters, inverse letters, custom character sets, and character graphics. These two packages formerly sold for over \$30 each.

PICTURE PLUS and LISTER PLUS

AP0179 \$19.95

REQUIRES: 48K RAM, Atari

BASIC

Optional: Dot Matrix Graphics Printer

Simulate a trip to the Moon.

ORBIT — A TRIP TO THE MOON

by John D. Reagh

BEST SELLER!

Dock with the Space Station to get supplies, then head for the Moon. Establish a low altitude orbit, detach the landing module and descend to the lunar surface. This is a serious simulation of a true

mission. Fuel consumption, life support systems, orbital position, altitude, rocket burn time, thrust vectors, radial velocities, orbital constants—keep track of them all. On-board ship's computer instantly plots new courses.

Designed and written by a Lockheed aerospace engineer. Complete with documentation that's educational too.

ORBIT-A TRIP TO THE MOON

AP0168 \$15.95

REQUIRES: Joystick



The RAMbrandt of character graphics

ENVISION

by Darren Schebek

Create giant, multi-screen, 8-way scrolling pictures. Build effortless animations (up to 128 frames at 10 speeds). There has never been anything like ENVISION before. Did you think character graphics were blocky, ugly substitutes for the real thing? Take another look at this screen shot. Graphics O. And in real life, it's animated.



ENVISION has over 50 commands giving you total control over the Atari's 6 incredible text modes. Print out your pictures, do fancy typesetting. ENVISION also supports GTIA modes 9 & 11. A special utility converts microsreens to character graphics that are indistinguishable from the original. ENVISION is a brand new art medium and much more. It will create stand-alone pictures or produce BASIC and Assembler SOURCE CODE, a programmer's dream come true. On the 130XE, ENVISION supports 16 simultaneous fonts.

ENVISION

AP0185 \$19.95

REQUIRES: Joystick

Optional: BASIC, MAC/65,

SynAssembler, Epson-compatible printer



Mercator Projection

Perfect for Geography, Science, HAM Radio, History, Current Events

EARTH VIEWS

by R.G. Wilson

EARTH VIEWS is a world atlas—an electronic globe—an exciting adventure game. Yes, it's all three in one. Call up many different maps and views of the Earth instantly. Includes detailed hi-res maps and projections linked to a "Gazeteer" of world place names.



Rotating Globe

In the game: you fly into the Bermuda Triangle and go on quests to exciting places. Detailed screens display longitude and latitude, lots of colorful information.

EARTH VIEWS

AP0141 \$19.95

REQUIRES: Joystick



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8-Bit Public Domain

All programs in this series sold as is. There's almost no documentation included, except what's built into the programs themselves. Therefore, you may need some expertise in order to use the products properly. Because this is public domain software, the Customer Service Department cannot provide the same type of service as for programs we publish ourselves (i.e., copy-righted Antic software). However, all programs have been tested at Antic and will perform.

TRIVIA QUIZ

The ultimate Trivia Game! 100% machine language. Play alone or with 2 friends (2 on XL/XE). Plus create your own Trivia Files (over 350 questions per disk—730 with double density). Includes instructions and Assembly SOURCE CODE.
PD0072 \$10.00

THE RAMBRANDT COLLECTION

Now you can design your own special effects slide shows for RAMbrandt pictures. Choose a different dissolve for each picture: horizontal or vertical wipes, pixel dissolve, spin, telescope, and five others. Change the speed of the dissolves, mix graphic modes, repeat pictures or dissolves in any order. Supports 130XE RAM-disk, comes with a selection of the best RAMbrandt art. (RAMbrandt not required.)
PD0073 \$10.00

FIX XL (PD TRANSLATOR)

Run early 400/800 software on your XL or XE.
PD0026 \$10.00

DOS 4.0

by Michael Barall
Here it is—the DOS that Atari, Inc. spent over \$100,000 on and never released. Code named QDOS, it supports single, 1050 (enhanced), and double density drives. Single drive systems require minimal disk swapping. Docs included in Atari's 100 screen online (Help) system. DOS 4.0 is fast—two times faster than DOS 2.0, three times faster than DOS 2.5.
PD0067 \$10.00

ICON GRAPHICS EDITOR

by Gregg Tavares, The NightHawk Group
Draw your own Print Shop icons with this advanced paint program. Use this fabulous "MacPaint"-style program to create your own libraries of icons. Full-featured drawing program includes user-definable fill and a smart brush which can AND, OR or XOR with the background.
PD0088 \$10.00
REQUIRES: Print Shop
Print Shop™ Braubund Software

VT100 TERMINAL EMULATOR

Turn your Atari into a DEC-compatible 80 column VT-100 graphics terminal. Works with Hayes-compatible modem and interface. No other hardware needed.
PD0037 \$10.00

ANTIC FORTH

Learn the fast, compact FIG-FORTH language. Double-sided disk includes tutorial and editor.
PD0020 \$10.00

RADIO & ELECTRONICS (JACE)

Another great JACE collection. This one will teach you Ohm's law, satellite orbit prediction, and Morse code. It also in-

cludes a YAGI antenna designer, three resistor design programs, an LC circuit computer and HAM programs.
PD0064 \$10.00

130XE HI-RES DESIGNER

For 130XE owners only. R-DRAW, a powerful new Mode 8 paint program that has lots of goodies like spray paint, auto-artifacting, 4 text sizes, star fields, L-R reverse (for T-shirts), and more. R-DRAW is so good that, if it had run on all the machines, it would've been accepted for APX.
Special: includes the BASIC SOURCE CODE for this compiled program.
PD0070 \$10.00

AMIS XM10.BBS from M.A.C.E.

A full-featured bulletin board for the 835, 1030 and XM301 modems. Version 4.5PD supports the auto answer on the XM301. The other modems will require an easy-to-build ring detector (instructions included). Join the telecommunications revolution with this easy-to-use and easy-to-maintain BBS.
PD0080 \$10.00

COMPUTER USING EDUCATORS SOCIETY (C.U.E.S.)—San Mateo

Official Education Packages from teachers who use Ataris. EDPACK #1 includes world geography, states and capitals, French and English Hangman, math games. EDPACK #2 has spelling bee, metrics, advanced math, and the famous Function Machine.
C.U.E.S. EDPACK #1
PD0044 \$10.00
C.U.E.S. EDPACK #2
PD0045 \$10.00

1030 EXPRESS/TSCOPE 850 EXPRESS/TSCOPE MPP EXPRESS/TSCOPE

Keith Ledbetters's brilliant modern program, now available for all modems: 1030 EXPRESS for Atari 835, 1030 and XM301; MPP EXPRESS for the Supra/MPP 1000 series; 850 EXPRESS for modems using the 850 (or compatible) interface. **Bonus:** each comes with the correct version of TSCOPE/MSCOPE so you can access the R.L.E. VIDTEX graphics on Compuserve.
1030 EXPRESS/TSCOPE
PD0081 \$10.00
850 EXPRESS/TSCOPE
PD0082 \$10.00
MPP EXPRESS/TSCOPE
PD0087 \$10.00

ASTRONOMY & METEOROLOGY (JACE)

The Jacksonville Atari Computer Enthusiasts (JACE) have collected these wonderful programs for amateur astronomers. Includes an observation simulator for tracking objects in the solar system, a planetarium prototype, a planet tracker, and much more.
PD0063 \$10.00

PD MICROPAIN ARTIST

(A.C.A.O.C.)—BBS:
714-731-6523

Improved clone of the original high-power graphics program for Ataris. Full documentation.
PD0053 \$10.00

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JANUARY THRU JUNE 1984 ADS8401	JULY THRU DECEMBER 1985 ADS8502	JANUARY THRU JUNE 1984 AMS8401	JANUARY THRU JUNE 1986 AMS8601
JULY THRU DECEMBER 1984 ADS8402	JANUARY THRU JUNE 1986 ADS8601	JULY THRU DECEMBER 1984 AMS8402	JULY THRU DECEMBER 1986 AMS8602
	JULY THRU DECEMBER 1986 ADS8602	JANUARY THRU JUNE 1985 AMS8501	

*Available only in the six month sets shown above.

Individual back issue disks and magazines are available for July 1983 through the current issue. September 1984 magazine is sold out.

Individual disks are \$5.95 each, magazines are \$4.00 each. Remember to include shipping and handling charges (see ORDERING INFORMATION, page 17).

Ordering individual magazines or disks is easy! AMS stands for Antic Magazine. ADS stands for Antic Disk. Follow these product codes with the month and year you want. For example, to order the March 1987 disk and magazine, write:

AMS0387
For ANTIC MAGAZINE
MARCH 1987

ADS0387
For ANTIC DISK MARCH 1987

ST ARCHIVES

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to a good START.

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back issues

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START #3 WINTER '86	SMS1286	SDS1286
START #4 SPRING '87	SMS0387	SDS0387
START #5 SUMMER '87	SMS0687	SDS0687
START #6 FALL '87	SMS0987	SDS0987

All magazines only
\$4.00 each.

Disks are \$10.95.

ST RESOURCE
programs (from Antic)
on 3 1/2" disk

ST RESOURCE
COMPENDIUM

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COMPENDIUM #3	2/86—5/86	SB0102
COMPENDIUM #4	6/86—9/86	SB0103
COMPENDIUM #5	10/86—2/87	SB0106
	3/87—7/87	SB0107

Compendium disks
only \$10.95 each



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Bargains

High quality software at blow-out prices! All items are sold on a first-come, first serve basis from limited stock, so order now! Software bargains exclusively from The Catalog.

DISK SALE!

25 5-1/4" HIGH QUALITY DISKETTES ONLY \$9.95.

Single-sided single-density, we use them as double-sided "flippies".

Bulk erased overstock, disks at this price must be sold "as is". BB0013

THE BOOKSHELF for the Atari XL/XE

BEST OF ANTIC ANTHOLOGY

298 pages of material from ANTIC's first year. Original magazines are now out-of-print collector's items!

BB0004 WAS...\$12.95 NOW ONLY...\$3.95! WITH DISK BB0005...\$6.95!

ATARI PLAYER-MISSILE GRAPHICS IN BASIC

Create professional-quality Atari special effects.

BB0007 WAS...\$14.95 NOW ONLY...\$5.95! WITH DISK BB0008...\$8.95!

ATARI COLOR GRAPHICS

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Thank you thank you thank you thank you thank you thank you (etc.).

Michele Gray
Sausalito, CA

Thank you and keep in touch!

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