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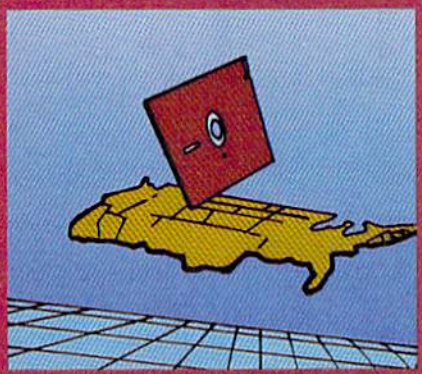

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Commodore Microcomputers, Volume 7, Number 3, Issue 41, May/June 1986, ISBN 0-88731-058-3.

Commodore Microcomputers (ISSN 0744-8724) is published bi-monthly by Contemporary Marketing Inc., 1200 Wilson Drive, West Chester, PA 19380. U.S.A. U.S. subscriber rate is $15.00 per year; Canadian subscriber rate is $20.00 per year; Overseas subscriber rate is $25.00 per year. Questions concerning subscription should be directed to Contemporary Marketing Subscription Department, Box 651, Holmes, Pennsylvania 19043. Phone (800) 345-8112. In Pennsylvania (800) 662-2444.

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Contemporary Marketing also publishes *Commodore Power/Play*.

Application to mail at Second Class postage rates is pending at West Chester, Pennsylvania 19380, and additional mailing offices. POSTMASTER, send address changes to Contemporary Marketing, Box 651, Holmes, PA 19043.

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PUB. NOTE

Dear Subscriber:

Chances are you're already receiving both *Commodore Power/Play* and *Commodore Microcomputers* magazines. An overwhelming majority of our subscribers do. In fact, most of our newsstand purchasers buy both as well.

However, if you only subscribe to one or the other, you may be surprised to learn how similar the two magazines have become. We now routinely cover technical and productivity topics along with games and entertainment in *Commodore Power/Play.* And *Commodore Microcomputers* now routinely covers games and entertainment along with technical and productivity topics.

Effective January 1987, I am proud to announce we will be combining them into a single monthly publication titled *Commodore Magazine.* This means you will receive exactly the same information PLUS MORE! Now you will get more news and reviews of the latest hardware and software, type-in programs and late-breaking Commodore information than ever before.

To assist with the change-over, *Commodore Microcomputers* and *Commodore Power/Play* are currently available only as dual subscriptions. This also means if you have a single subscription to one bi-monthly magazine, you will now start receiving a magazine monthly instead, alternating between *Power/Play* and *Microcomputers*, for the number of issues you pre-paid. In other words, if you have a one-year (six issues) subscription to *Microcomputers,* you will now receive 3 issues of *Microcomputers* and 3 issues of *Power/Play*. Starting with the January issue, you will automatically start receiving *Commodore Magazine* on a monthly basis.

As always, everybody here at *Commodore Magazine* looks forward to hearing your suggestions.

Thank you for making *Commodore Magazine* the magazine for Commodore owners!

Regards,

Robert M. Kenney
Publisher

LETTERS

Reset Master

To the Editor:

While I appreciate your article informing *Commodore Microcomputers* readers of the various benefits obtained from using Master Software's *Reset Master* on their VIC-20, SX-64, or Commodore 64 computers (November/December, 1985, *Commodore Microcomputers*), you should be aware that this unit does not work as intended on all Commodore 64 computers.

I purchased my 64 in June of 1985 and followed up with my order for the Reset Master in July. I received it in early August, and promptly put it to use with my SX-64, which I had with me in my temporary location. It worked fine with this unit, clearing the screen, and then allowing me to reclaim my program by commanding the previously loaded RENEW program to unfreeze my program and making it available to me once again.

However, when I returned to my permanent address some weeks later, and attempted to use this unit on my 64, I found it had absolutely no effect. Referring to the very explicit directions included with the unit, I attempted to make the adjustment with the metal wire, as indicated, but, alas...this procedure had absolutely no effect. The display did not even flicker, let alone disappear momentarily and then reappear.

Realizing the extra distance afforded me by the 2" wire included with the unit, I decided to leave it in the installation in order to utilize the extra socket...and not worry about its primary purpose. This, however, proved to be a mistake—not only did this unit not operate as intended for reset purposes, it created glitches in my printer (MPS-802) output, causing the complete loss of about every fourth character.

Christopher W. Thomas
New Fairfield, Connecticut

Stephen S. Leven of Master Software replies:

Mr. Thomas is correct. Reset Master *may not reset some versions of the Commodore 64. Commodore has made a number of undocumented changes to the 64's electrical circuit-*

Continued on pg. 6

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(Who?)

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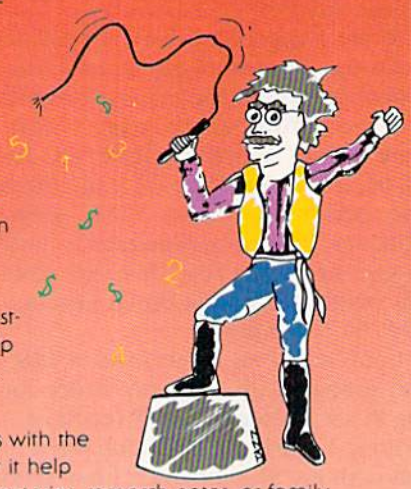

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LETTERS

ry. One of these changes is the addition of resistance in the reset signal line of the serial port, which makes the serial port reset signal line an output only.

Because of this change, Reset Master *may not work satisfactorily with your computer. That is why in the instruction booklet we state that, if the product does not work with your 64, you should return it to the place of purchase for a complete refund. However, since less than one percent of all* Reset Masters *sold have been returned, we presume that only a small percentage of Commodore 64's are affected by this problem.*

Master Software has other products which replace specific features of Reset Master, *should it not work properly with your system.* Modem Master Plus *is a four-foot extender for the user port, which also includes a reset function. (The user port is unaffected by the circuitry change described above.)* Y-Not? *is a six-foot "Y" cable for the serial port. And we also have a six-foot serial port extension cable. We accept returns for refunds on all hardware items, as long as the hardware has not been tampered with.*

Control Your Data Statements

To the Editor:

In the article "Control Your Data" (January/February 1986, *Commodore Microcomputers*), the author said that he would be interested in hearing about other ways to improve control over DATA statements. I have two tips that I would like to pass along to him and your readers.

First in his section "Restore to Specific Location," he used this statement to reset the DATA pointer to a specific section of DATA in a menu-type program:

```
A = PEEK(61) + 256*PEEK(62):
POKE66, A/256: POKE 65, A -
256*PEEK(66)
```

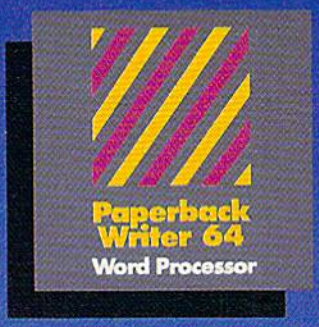
I have used the following shorter statement, and it seems to work just as well:

```
POKE 65, PEEK(61): POKE 66,
PEEK(62)
```

The second tip is a way to achieve RESTORE to a specific program line number on the Commodore 64,

Continued on pg. 8

Solutions!



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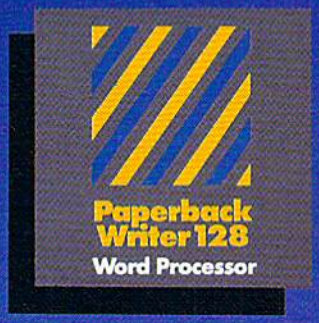

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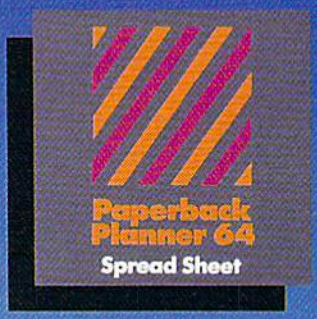

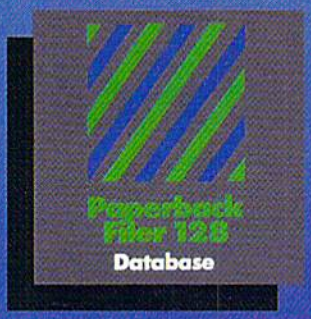

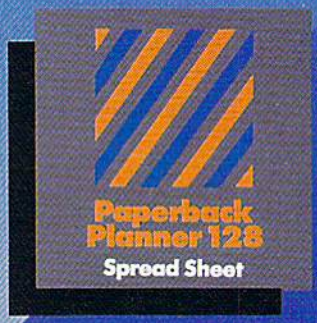

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which does not have this BASIC command. Add this line to the program just before the READ that you want to RESTORE to:

```
150 X = PEEK(65): Y = PEEK(66): REM - Remembers this line number
160 READ .....
```

To RESTORE the DATA back to that line later on in the program, insert this line before the next READ:

```
320 POKE 65, X: POKE 66, Y: REM - Restores DATA to line 150
330 READ .....
```

Russell Gaiser
Batavia, New York

Tale of Two C's

To the Editor:

Contrary to Walt Lounsbery's "Tale of Two C's" (January/February, 1986, *Commodore Microcomputers*), *The Elements of Programming Style* has nothing to do with the C language. All examples are in PL/I or Fortran in that book.

Bob Trent
Hardinsburg, Kentucky

Author Walt Lounsbery replies:

It is a fact that Elements of Programming Style *does not use C in its examples, but it is nevertheless closely associated with the language through articles and book references. For instance, the book provided with the C Power Compiler* (C Primer Plus) *references this style manual. I did not intend to recommend* Elements of Programming Style *for learning C.*

There is a more serious error, however, later in my review. The interface between C Power and machine code is NOT detailed in C Primer Plus, *which is a generic book. The language C is detailed in the* Primer, *and the interface is detailed in the C Power manual.*

Control Your World

To the Editor:

I read the article "Control Your World" by Jerry Houston in your January/February, 1986, issue of *Commodore Microcomputers*. The article held a very special interest to us here at CGRS Microtech because we were not mentioned as a supplier. We manufacture a line of A/D converter boards specifically for the Commodore computer.

At the present time, we manufacture three boards: Mini-Diadacs 1, Diadacs 1, and Fast Diadacs 1. Fast Diadacs 1 has the following features:

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Not only is this a board of superior quality, but the price is very reasonable: $350.

In addition to our hardware controllers, we have a software package called *Control Mode. Control Mode* has the following features: Database Modification, Analog Device Display, Contact Input Display, Contact Output Display, Contact Output Control. Sequence Control allows the user to build complex control sequences for home security, energy management and many other applications. Additional features are being added.

Carol A. Walz, Marketing Manager
CGRS Microtech
Langhorne, Pennsylvania

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Children improve their math skills, gain confidence in working with numbers, and develop strategies in this exciting game of racing robots. With multiple levels of play, kids with different skills can compete equally.
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A stimulating drill program introduces and reinforces spelling and vocabulary practice, which can be timed or untimed. In the timed drills, a small bee moving across the screen serves as a timing device.
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Six programs help children have fun while practicing essential reading-readiness skills, such as identification of letters, alphabetical order, letter/sound correspondence, and memorization.
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Elementary concepts of economics come to life with these enjoyable programs. Youngsters make decisions as they control simulated business ventures in which they try to earn a profit.
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This colorful simulation enables youngsters to assume the roles of fish trying to survive in a freshwater lake. Children learn fundamental concepts of life science while exercising their problem-solving skills.
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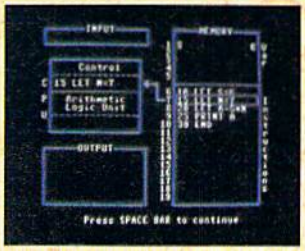

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A unique simulation depicts how computers work internally, interpreting simple BASIC statements and showing what the computer does with them. Children learn concepts useful in later programming.
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Amiga Games

Epyx has released three games for the Amiga: **Winter Games**, **Rogue**, and **Temple of Apshai Trilogy**. In **Winter Games**, up to eight players can compete for the Olympic gold in a preview of the 1988 Winter Olympics. **Rogue** was originally a mainframe game, and **Temple of Apshai Trilogy** contains all three games in the **Temple of Apshai** series. Prices were unavailable at press time. (Epyx, 1043 Kiel Court, Sunnyvale, CA 94089)

Original Amiga Titles

Electronic Arts has released three original titles for the Amiga that use its exceptional graphics, sound and music capabilities.

Arcticfox is a combat tank simulation in the style of **Skyfox**, Electronic Arts' flight simulator. The player sits in the cockpit of the Arcticfox, a tank of the future, as he attempts to save the planet Earth from intelligent alien forces. An on-board control panel maneuvers the tank through a three-dimensional Arctic world.

Return to Atlantis is an underwater adventure game with 21 different game-play scenarios. The player attempts to solve the mysteries of the deep to find the fabled lost city of Atlantis. Aiding the player is an underwater robot named RUF.

Instant Music is a music-making program, which turns the Amiga into a musical instrument to compose or jam with. It features actual digitized instrumentation and built-in guides that keep you in the right key and tempo. The program can be used with either the mouse or keyboard.

Arcticfox and **Return to Atlantis** both retail for $39.95, and **Instant Music** retails for $49.95. (Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403)

Other titles for the Amiga now available from Electronic Arts:

- **Skyfox** (flight simulator)
- **Adventure Construction Set** (graphic adventure generator)
- **DeluxePaint** (graphics)
- **DeluxeVideo** (compatible with DeluxePaint)
- **DeluxePrint** (compatible with DeluxePaint)
- **Dr. J and Larry Bird Go One-on-One** (simulation)
- **Seven Cities of Gold** (adventure game)
- **Archon** (chess)
- **Financial Cookbook** (financial planner)

Screen Dump

Screen Dump, Etc. is a utility program for the Commodore 64 that defines the eight function keys for specific tasks. For example, the screen dump-to-printer function key allows a dot-addressable printer to print any screen displayed by the Commodore 64. There are no restrictions on the screen—it can be low resolution, high resolution, multicolor, extended color, use custom characters and sprites, and can be located anywhere in memory. The program will also print split screens generated by raster-interrupt programs.

Other function-key tasks include saving screens to disk, loading screens from disk, displaying BASIC memory allocations, converting decimal/hexadecimal, a help key, and a user-definable key. All function key routines can be performed at any time, even during execution of a BASIC or machine language program. After the routine is completed, the interrupted program will continue as if nothing happened.

Screen Dump, Etc. is available for $24.95, which includes shipping costs and a backup copy of the disk. There is also a manual for details of program operation and suggestions on how to use it. The program is sold with a 15-day money-back trial period. To order, contact IRQ, P.O. Box 457, St. Charles, MO 63302.

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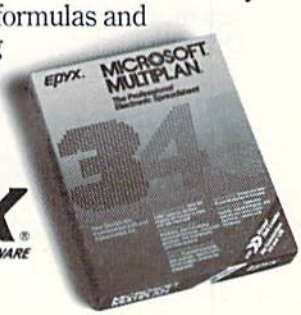

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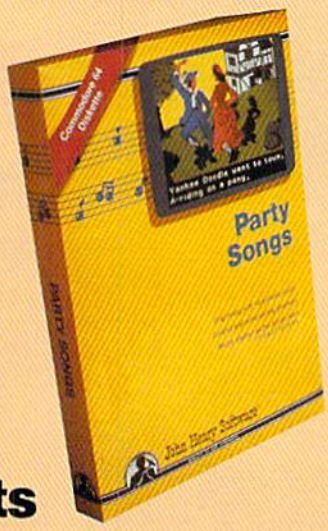
128 Programs

Free Spirit Software has released three programs for the 128: **The Great War**, **BASICally Simple 128**, and **Postmaster 128**.

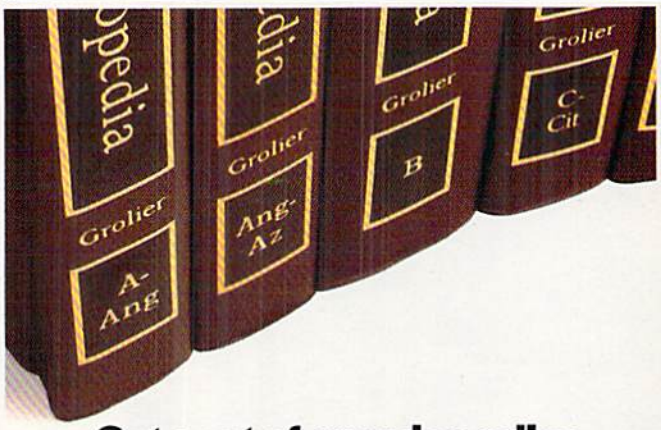
The Great War is a World War I strategy game. Several hundred units of infantry, cavalry and artillery, representing the armies of 16 nations, are maneuvered over a map of 1914 Europe. The player's military strategy must take into account terrain, political considerations, troop strengths, weaponry, lines of supply, and weather. The player may command the Central Powers or the Allies versus the computer or another player. The game retails for $19.95.

BASICally Simple 128 is an upgrade of **BASICally Simple**, a BASIC programming tutorial program for the 64. **Postmaster 128** is an upgrade to the **Postmaster** program for the 64. **Postmaster 128** stores, retrieves, and sorts names, addresses, zip codes, and phone numbers. **BASICally Simple** retails for $19.95 and **Postmaster 128** retails for $9.95. (Free Spirit Software, 5836 S. Mozart, Chicago, IL 60629)

Party Songs for the Commodore 64/128



John Henry software has released **Party Songs** for the Commodore 64/128. **Party Songs** features 18 traditional favorites arranged in three-part harmony. The words to each song appear in time with the music. The user decides which songs to play or sets the computer to play them all. The user also controls the speed of the music. **Party Songs** includes songs like "For He's a Jolly Good Fellow," "Oh! Susanna," "Yankee Doodle," "Goober Peas," "Oh My Darling Clementine," "Who Threw the Overalls in Mistress Murphy's Chowder?," "Auld Lang Syne," "My Old Kentucky Home," and "Red River Valley." **Party Songs** retails for $15.95. (John Henry Software, 1252 Crestwood Hills Drive, Vandalia, OH 45377)



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Robotics Kits

Access Software has introduced four robotic construction/experimenter sets for use with the Commodore 64 and 128. Called Multibots, the sets include the Multibot S100, which features practical experiments and projects in speech digitization and playback, and digital voltmeter hardware and software; the Multibot M100, which features digital storage oscilloscope and digital voltmeter hardware and software; the Multibot MB220, which, in addition to containing everything found in the S100 and M100 sets, also contains snap-together connectors, gears, shafts and other components, with two electric motors; and the Multibot MB330, which contains everything in the MB220 plus additional plastic components, gears, shafts, interface connectors for use with Lego, Robotix and Capsela sets, and three electric motors.

Suggested retail prices range from $59.95 to $199.95. (Access Software, 2561 South 1560 West, Woods Cross, UT 84087)

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Q: What can I now do in a game that I couldn't before?
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The Infinity Machine is brought to you at $24.99 by Mastertronic, producers of incredible value Commodore 64/128K software such as Slugger, 5-a-side Soccer and The Last V8 all available at $9.99.

Contact the Mastertronic hot line for the secret of eternal life on 301-695 8877.
Mastertronic International Inc., 7311b Grove Road, Frederick, Maryland 21701

Reference Guide for the Plus/4

Scott, Foresman and Company has released the **Programmer's Reference Guide for the Commodore Plus/4** by Cyndie Merten and Sarah Meyer. The book includes extensive reference material and practical programming examples. It reviews major programming techniques, explains how to use the machine-language monitor, 6502 assembly language, peripherals and operating system, and includes information not found in the Plus/4 user manual. The appendices provide the Plus/4 memory and register maps. The book retails for $21.95. (Scott, Foresman and Company, 1900 East Lake Avenue, Glenview, IL 60025)

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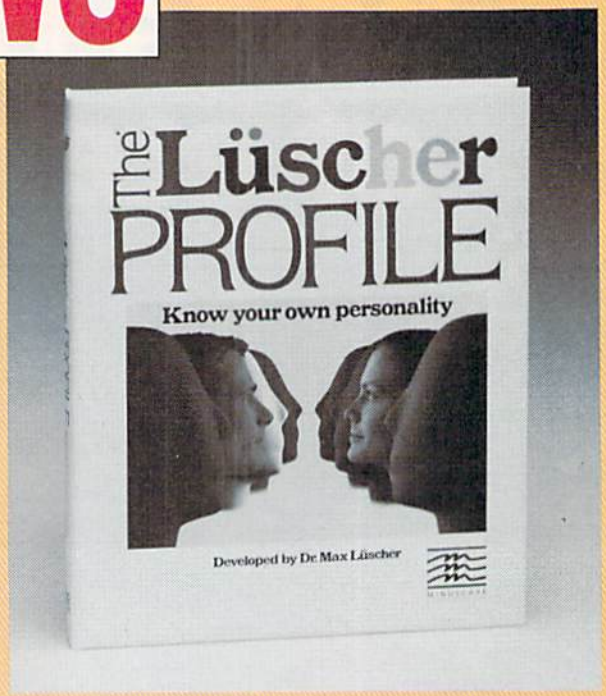


Psychological Profile

Mindscape has released **The Luscher Profile**, a program for the Commodore 64/128 that draws a psychological profile based on your reactions to colors and shapes. Developed in cooperation with Dr. Max Luscher, author of the book **The Luscher Color Test**, **The Luscher Profile** uses a ranking of color and shape preferences to reveal the user's basic nature. It retails for $39.95. (Mindscape, 3444 Dundee Road, Northbrook, IL 60062)

"Grasp" Software

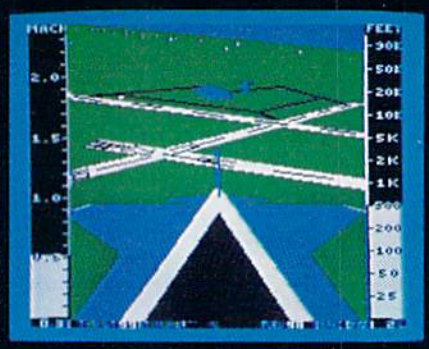
ShareData has announced the availability of "grasp" technology for the Commodore 64/128. Developed by VPL Research of Palo Alto, California, it consists of a visual programming language that is operated by a patented glove input device. The glove looks and feels like an ordinary lightweight glove. While wearing the glove, the user can handle images on the screen as if they were real objects. Unlike conventional programming, the "grasp" programming language relies on pictures, sounds and animations to produce visual, real-time results. "Grasp" will also enable non-programmers to modify glove-based programs or create original programs. (ShareData, 7122 Shady Oak Road, Eden Prairie, MN 55344)

Classical Music Disk

Free Spirit has released **Music of the Masters**, a collection of classical music for the Commodore 64/128. Three hundred years of classical music are represented, including screen commentary about the composer as his music is played. The disk provides about 45 minutes of over 20 works for $9.95. (Free Spirit Software, 5836 S. Mozart, Chicago, IL 60629)

F-16 Dogfight with Enemy MiG-23 Fighters

F-18 on the Deck of a Nimitz-Class Aircraft Carrier (Control Tower View)



F-16 High-G Pullout over Detailed Wargame Scenery (Rear View)

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From the author of Flight Simulator II comes a new dimension in realism. Jet simulates two fast and maneuverable supersonic jet fighters, a land-based F-16 or a carrier-based F-18. The simulator includes modern electronic flight instrumentation and the most advanced weaponry available. Jet's simulation sophistication, combined with excellent visual attitude references, makes it truly enjoyable to fly.

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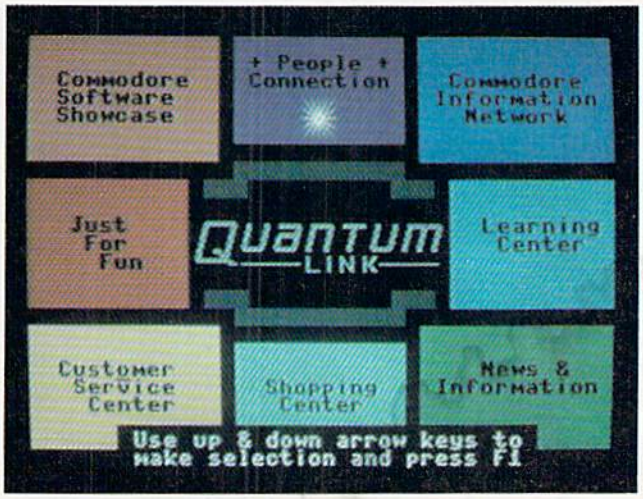

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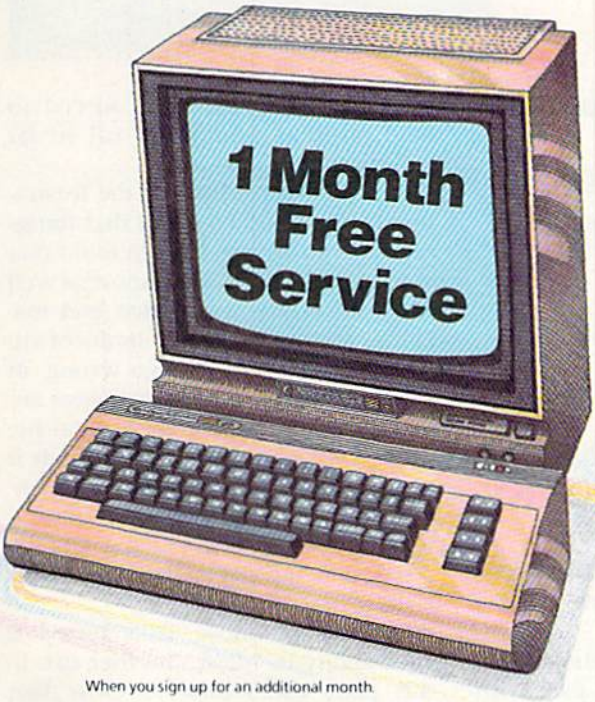

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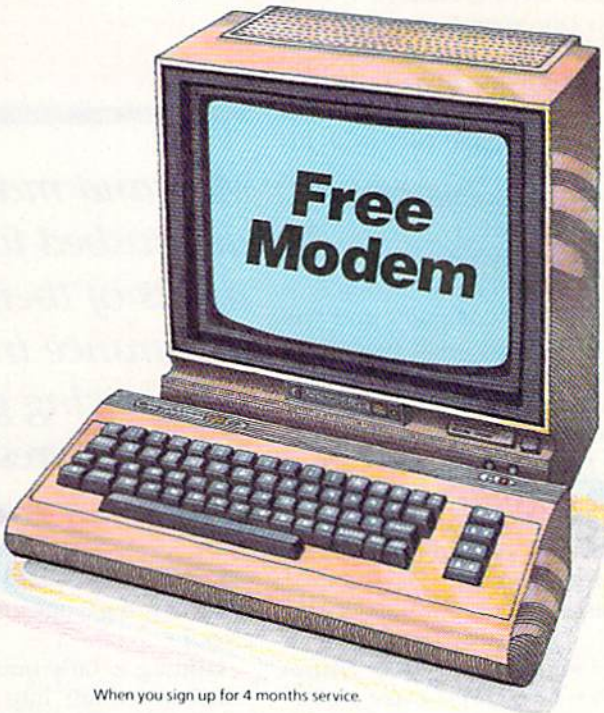

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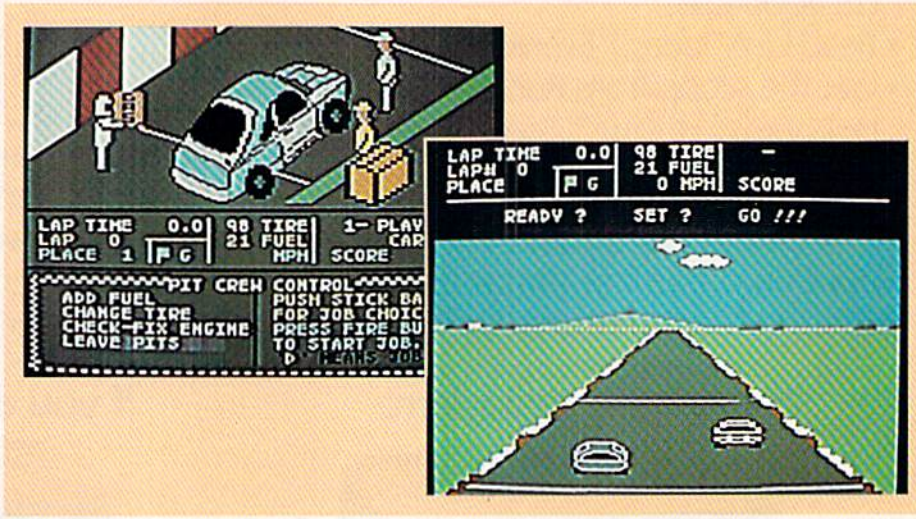
REVIEWED BY ERVIN BOBO

Richard Petty's Talladega

Computer: Commodore 64
Publisher: Cosmi
415 N. Figueroa Street
Wilmington, CA 90744
Medium: Disk
Price: $19.95



In *Richard Petty's Talladega*, it's not enough to jam your foot on the gas pedal and lean hard into the turns. In fact, that's the worst thing to do, for there are 18 drivers on the track, each with his own style and each with his own tricks.

First select a track from the menu: the Tri-Oval, which is a fixed track you can run at any time, or the Random. As its name implies, Random is generated by the computer and will never be the same track twice in a row (unless you select Random Repeat). Each race is 30 laps, and a smooth scrolling action works continuously to show the next section.

Pushing your joystick forward adds speed, and pulling it back slows you. The fire-button engages the Turbo-Boost feature, and side-to-side movement controls your position on the track.

But before you can race against Richard Petty, you must make a qualifying run, racing against a clock. Make it, and according to your qualifying time, you are given a starting position and a number of bonus points. Fail and you win only the right to try again.

At all times, during racing and qualifying, the upper one-third of the screen displays your status—not only your position on the track, but the condition of your tires, amount of fuel remaining, next driver to pass, and accumulated points.

Tires wear if you drive on the shoulder of the road (easy to do when some clown is léaning on you), and they must be changed if you are to avoid a blowout and a crash. Gas is used at a fair rate, but can be squandered by overuse of the Turbo-Booster. (Boost only on straightaways. Try it on a curve and you'll drift off the road, costing yourself both fuel and tires.)

Men and machines are pushed to the limits of their endurance in this auto racing game that captures the essence of racing.

Drifting is only one of the real-life conditions built into the game. Another is that you must know how to "cut" or "take a line through" a curve, otherwise you stand little chance of qualifying and an even slimmer chance of winning.

Add to this the fact that mechanical objects fail under stress. This means you will experience car malfunctions or can come suddenly upon an opponent sitting dead on the track. If the trouble is with your car, try to make it to a pit lane—the same option you'd use for low fuel or bald tires.

Enter the pit lane and the screen flips to show an overhead view of your car in the pit area. Select from a menu the service needed, and as soon as it's done, use the exit option to get back on the track. The other guys aren't sitting still waiting for you. (If possible, wait until the yellow caution flag is showing before heading for the pits. With the other cars forced to hold position, you won't fall so far behind.)

Now, if you're thinking the frustration factor is too high and that things can only go wrong, bear in mind that auto racing is an adverse sport as well as an adversary sport. Men and machines are pushed to the limits of endurance and things do go wrong, of course. But because these things are incorporated into the game, and because your car behaves as though it has mass and momentum, programmer Robert Bonifacio has captured more of the essence of racing, and the result is a fun game that tests your skills.

And among those skills tested is your ability to "draft" another car. In this play, you follow so close that your opponent takes the brunt of wind resistance. (Another theory has it that the lead car creates a vacuum that pulls you along.) In either case, the result is fuel savings.

The only thing that keeps *Richard Petty's Talladega* from being a simulation as opposed to a game is viewpoint. You are above and slightly behind your car. If you were looking through the windscreen and had an instrument panel before you, it would be a simulation.

Though the third playing of the theme song is wearying, and subsequent repetitions even worse, all sound effects and graphics are quite good—about what we've come to expect of Cosmi. And because the game demands strategy as well as arcade skills, I give *Richard Petty's Talladega* high marks.

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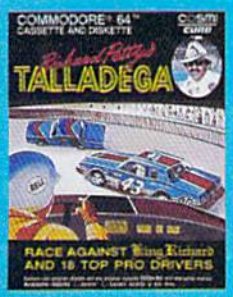

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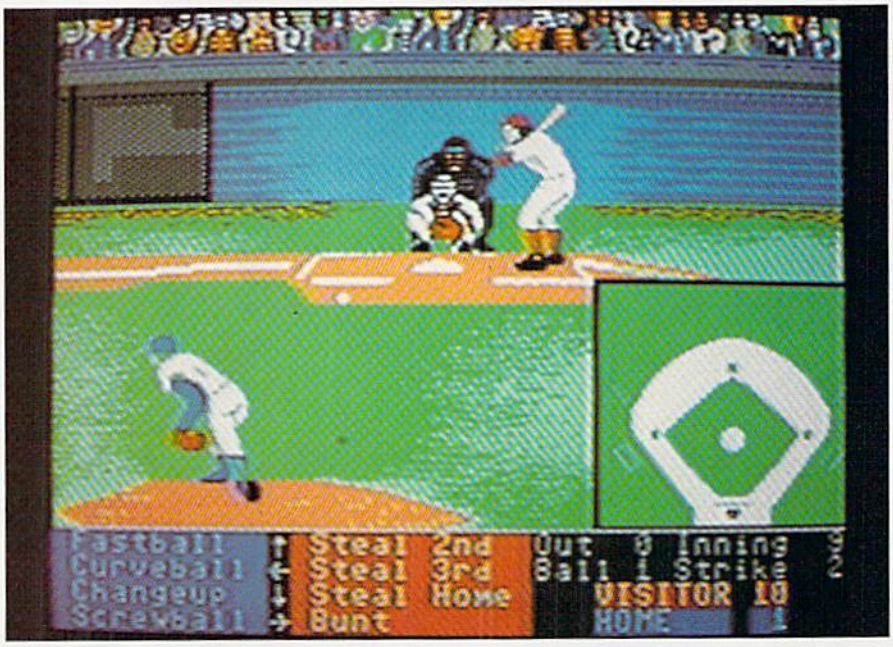
REVIEWED BY RICK TEVERBAUGH

Hardball

Computer: Commodore 64
Publisher: Accolade
20863 Stevens Creek
Boulevard
Cupertino, CA 95014
Medium: Disk
Price: $29.95



Graphically, *Hardball* is more realistic than a Nolan Ryan fastball zipping under your chin. It features four different perspectives. One puts you behind the pitcher, one covers left field, one covers right field (both from behind home plate), and one shows both lineups and the scoreboard. Control is through a joystick. You choose your lineup from the scoreboard screen. The other team is controlled by either the computer or another player. If you choose to be the home team, you now take your position as pitcher. From the mound you select from four different types of pitches. Now choose exactly where you want the ball to go. Depending on the pitcher, some locations will almost always produce strikes while others will be balls.

If the ball is hit, the scene shifts to behind the plate, and the proper fielder is automatically activated. After that, it's just a matter of moving him in the right direction. The ball can be hit on the ground or in the air, the shadow of the ball indicating how high it's hit and how far. Be careful though, because if it's hit to right field, the first baseman may be activated, but if you start him backpedalling, a shift of control to the right fielder can send him away from the ball rather than toward it.

If the ball is caught in the air, that's it. If it's hit on the ground to the infield, you're required to throw to one of the bases. When a man reaches base, there's a screen insert in the lower right-hand corner showing where the runners are and what they're doing.

Offense is the hardest thing to master in this game. Not only is it necessary to time the swing correctly (with the button on the joystick), but, to make solid contact, you also need to select a swing that's high, low, inside or outside. In fact, I've yet to defeat the computer, though I did rally for two runs in the bottom of the ninth once to send it into extra innings. The computer opponent can be a bit frustrating to play, for it has no adjustable skill level. That means it never throws to the wrong base, though it often makes some pretty silly substitutions.

If an arcade approach to baseball is what you enjoy, plant your spikes here.

Unlike some computer baseball games where memorization of controls is the most important trait to success, there are on-screen prompts to remind you in what direction you want to point the stick for a given action.

The movement of the runners is fluid and vividly drawn. For the most part, the ball movement is realistic. The only exception is the compressed outfield. Instead of giving the impression that center field is farther away than right and left fields, it gives the illusion of being closer. The ball also seems to be in slow motion at the beginning, then picks up speed as it gets to the infield.

Overall, it doesn't beat a real seat at the ballpark, but if an arcade approach to baseball is what you enjoy, plant your spikes here. C

Hardball Hints

- When on the mound, mix up your stuff, especially when playing against the computer. Don't ever "groove" a fastball down the middle. It will either be a foul ball or a home run. Use everything the pitcher has to offer.
- Watch your hurler closely for signs that he's tiring. When pitches aimed to paint the corners start missing all together or start finding a large section of the plate, rest up or you'll be sorry.
- When at the plate, don't initially worry about adjusting the swing. Instead, just concentrate on timing the swing.
- Don't be over anxious at the plate. If you get ahead in the count, do like a major leaguer and look for a particular pitch. If it's not there, let it go. But when you get two strikes, hack away at almost anything.
- Most of all, have fun. Take your lumps and learn at the hands of the computer and then invite over your friends to beat the living daylights out of them. C

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REVIEWED BY JOHN JERMAINE

Koronis Rift

Computer: Commodore 64
Publisher: Epyx
1043 Kiel Court
Sunnyvale, CA 94086
Medium: Disk
Price: Not available

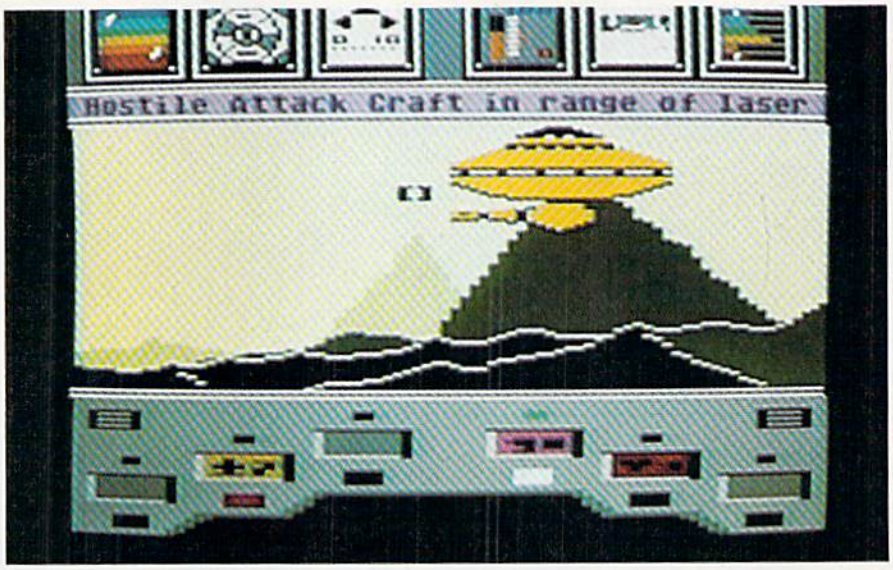
The year is 2249, and you are a technoscavenger. That's a fancy term for an intergalactic wanderer searching for the remnants of 30 lost civilizations whose elder races are known as the Ancients. The Ancients lived thousands of years ago, but for some mysterious reason, they vanished without a trace. The Ancients' technology was highly advanced, even by 2249's standards.

One day, as you're investigating a phenomenon in space, a large planet appears where the charts show nothing. Upon closer inspection, you discover that this unknown world is composed of rugged mountain ranges, rolling hills, and 20 deep rifts. A wild thought enters your mind. Could this be the fabled world of Koronis, where the Ancients supposedly tested their weapons? There's only one way to find out in this 3-D game designed by Lucasfilm.

You contact Psytek, your Science Droid Analyzer robot, and instruct him to prepare the Surface Rover for descent. Psytek acknowledges your order and places a Repo-Tech unit aboard the vehicle. Repo-Tech is a robot who performs manual tasks in environments hostile to humans.

If any of the legends about the Ancients are true, you could be in for a lot of trouble. First of all, the Ancients flooded their testing ground with a lethal radioactive mist to keep out unwelcome visitors. Thank goodness you have a Repo-Tech unit. The Ancients also created a powerful race of guardians. These creatures patrol the landscape in saucers, destroying any intruders they encounter. As an abandoned vehicle appears on the horizon, you're convinced that you've not only discovered the planet Koronis, but it appears to be untouched.

As you descend to the planet's surface, you find yourself in one of the infamous Koronis rifts. A rift is simply an isolated valley surrounded by an impenetrable wall of jagged peaks which come in various sizes and shapes. Examine them closer, and you uncover some interesting facts. Each mountain, for example, has a certain height, a particular shape, a preselected position, and certain visual characteristics.



If any of the legends about the lost civilization of Koronis are true, you're in for a lot of trouble in this game designed by Lucasfilm.

As you face each landmark, note its design. This is just as example of what can be accomplished with fractal graphics. Fractals are a sophisticated way of generating 3-D graphics, and are used in all the Lucasfilm games created so far.

You are searching for modules. Modules are found in abandoned vehicles, and have two symbols. The first symbol represents the type of system the module contains. If you discover a module bearing a circle with a dot in its center, for example, you automatically know it's some type of shielding device. This form of identification keeps things simple and easy to understand. A second symbol tells you which culture created the device. You may encounter a module containing a systems icon not mentioned in the instruction manual. To get a better idea of what you possess, research the second symbol in the Alien Insignia section of your booklet. Knowing something about the culture of that particular civilization may give you clues.

It's important to remember several things. First of all, some modules have little or no value. So determine the worth of each device, and if a module is judged undesirable, dismantle it quickly to free the interface it occupies. Some activated modules will drain power from your vehicle's drive system and appear to do nothing. But this doesn't necessarily brand that item as worthless. When you encounter a module like this, research the civilization who made it, analyze the module, determine the most it should be able to do, and make your judgment accordingly. If you feel that the module could be valuable at a later date, place it in an interface, but don't activate it.

Also remember that only six modules can be interfaced into the Surface Rover's system at a time. Early in the game, it's important to decide which basic types of modules you'll need so you can designate an interface slot for

Continued on pg. 24

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each. Use empty interfaces to store similar modules and unknown devices until they can be evaluated.

As you continue playing, simply upgrade your prime modules and experiment with others. Use your judgment. If you dismantle a module or leave it behind, it's gone forever from the game. It also pays to obtain modules that you've learned were useless during earlier playings, because they can be dismantled for credits. And as for weapons, the efficiency rating of a weapon is sometimes more important than its power rating. A very powerful laser which takes forever to recharge isn't very useful in a fight.

Your Surface Rover control room has a view window with six monitor screens. The first screen is the MK IV directional display. It was designed to help the player "home in." The second and fifth screens are for obtaining special modules and activating them on your interface board. The third screen displays drive status by pointing in the direction you're traveling. The fourth screen gives you a visual readout of your power reserve. This includes an accounting of the total energy charge available to your weapons system and a visual graph showing the amount of energy consumed by each shot. The final monitor provides updated information about your vehicle's shielding. This bar graph indicates your current shield strength. Below the viewing window are six interfaces which allow you to connect modules to your rover's systems.

The graphics of *Koronis Rift* are great. The rifts are a neutral gray, which makes brightly colored modules easy to spot on the horizon. Saucers exhibit smooth, clean animation as they glide across the screen. If you watch the saucers closely, you'll also notice the scaling effect. As they move closer, they get larger. This effect is very well executed.

Control rooms of both the Scout Craft and the Surface Rover are well done, and resemble something you'd find on Star Trek. Psytek and Repo-Tech, the two robots of the program, look sharp and perform interesting routines, but, unfortunately, they emit no sounds.

Motion in *Koronis Rift* is smooth and even. The Surface Rover has a standard speed for moving across the terrain, except when it slows as it travels over humps. Every saucer I've encountered seems to have its own distinct plan of attack. Saucers dip and dive at different speeds, and just when you think you've got them figured out, they change their flight patterns.

For the price of the average 64 program, *Koronis Rift* offers advanced fractal graphics, interesting sounds, a realistic computer-generated vehicle, Psytek and his computer equipment, and a superb challenge. You have the options to save a game, play a saved game, or terminate a mission, and have the value of your modules totalled up for a score.

I can honestly say that I've spent more time playing *Koronis Rift* than any other game in the last six months. When a game reviewer can make this claim, you know the program is something special. C

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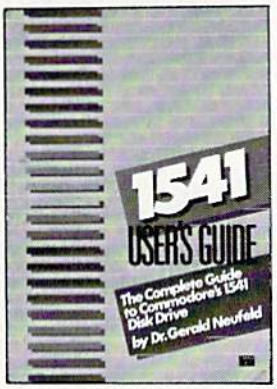

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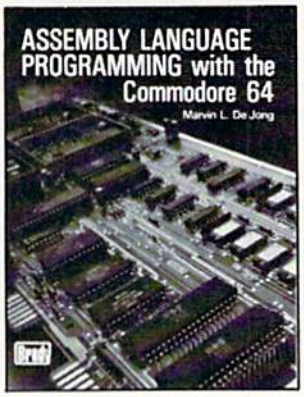

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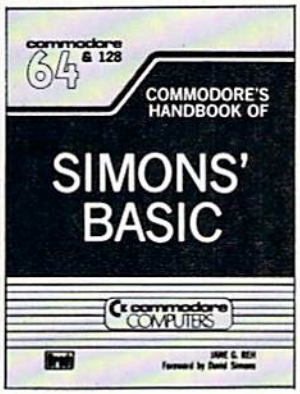

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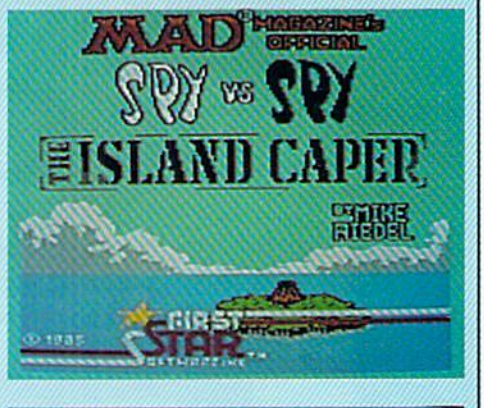
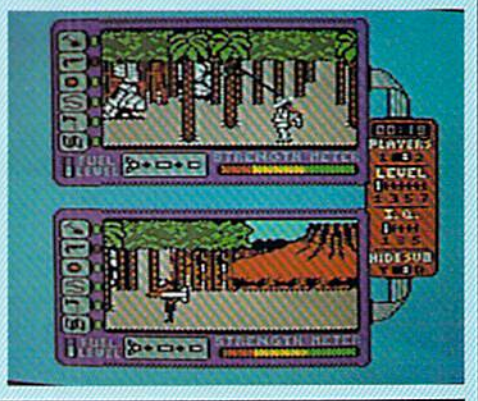
REVIEWED BY JOHN JERMAINE

Spy vs. Spy II: The Island Caper

Computer: Commodore 64
Publisher: First Star
18 East 41st Street
New York, NY 10017
Medium: Disk
Price: $29.95

Failure to complete your mission in the allotted time earns you a front row seat to a volcanic eruption.





In *Spy vs. Spy II: The Island Caper*, you're a wacko spy competing with another spy (controlled by a friend or the computer) to obtain three parts of a secret missile hidden on a remote island. Once you get the three pieces, you must not only assemble them, but get the missile off the island to the safety of your submarine.

Unfortunately, the island you're working on is about to be destroyed by a volcano. Other hazards include patches of quicksand and the threat of drowning or becoming shark bait. These are only the natural hazards; you still have to face man-made ones.

Man-made boobytraps are chosen from a menu and placed in your path by your adversary (and vice versa). Boobytraps include snares, open pits, punji pits (holes with sharpened stakes in them), coconut gasoline bombs, and a napalm cannister that can burn your foe to a cinder.

There's no way to see the location of these traps, so momentarily put yourself in your rival's place. Where would he put traps so they could do the most damaage? If you must enter a suspicious area, do so from the least obvious direction. Once you've obtained what you came for, backtrack out. If you happen to trap your foe, rush to the scene of the crime and pick up any missile parts he may have dropped.

At all times, you can see exactly what's happening to each spy. This is called Simulvision. Using another technique called Simulplay you can enter the same location as your enemy and either fight it out or continue on. There is also a visual readout of your spy's strength and what pieces of the missile you possess at the moment.

Another display shows whether one or two people are playing the game, which of the seven difficulty levels is currently being used, the I.Q. of your opponent in a single-player game, and where your escape sub is hidden. A doomsday clock, ticking backwards from six minutes, reminds you that failure to complete your mission in the allotted time earns you a front row seat to a volcanic eruption.

I was very pleased with the graphics of *The Island Caper*. The initial screen displays the two spies parachuting toward a heavily wooded island. An inactive volcano looms in the center of this paradise, and the sun is setting into the sea. Mike Riedel, the programmer of this game, has a special talent for making graphics beautiful as well as functional. Riedel also has an excellent eye for detail. Each figure has a distinct shape—detailed lines and shading. This style really entices you to become involved. The speed of the graphics are also well engineered. If the spies moved any faster, you wouldn't have enough reaction time to plan strategies and set traps.

Sound in *The Island Caper* is simple but adequate. Everything you do in the game produces a different noise. This factor, coupled with the simple background music, supports the graphics effectively.

These two comically sadistic spies (one dressed in black, the other in white) first appeared in *Mad Magazine* about 30 years ago. The comic strip continues to haunt the pages of that publication today, and over the years it's attracted a large group of followers. And *The Island Caper* lives up to its name by keeping the spies in character.

The Island Caper is challenging as well as entertaining months after you purchase it. Your computer opponent in a single-player game has a programmable I.Q. This means that you determine his intelligence. Other game options give the player the ability to change the game scenario.

I like to assume the role of a spy on a secret mission. My enemy can do anything that I can do, and there's always the possibility that the volcano will snuff us both out. Give *The Island Caper* a try. I'm sure you'll enjoy this battle of (nit) wits.

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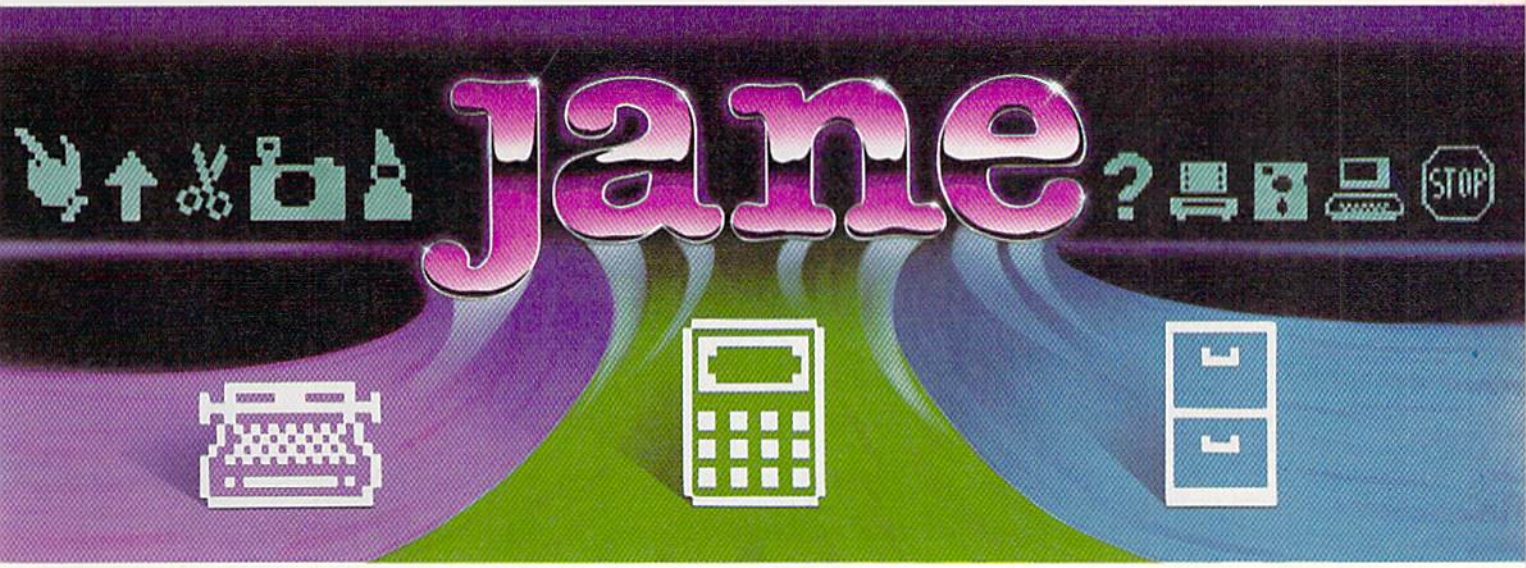

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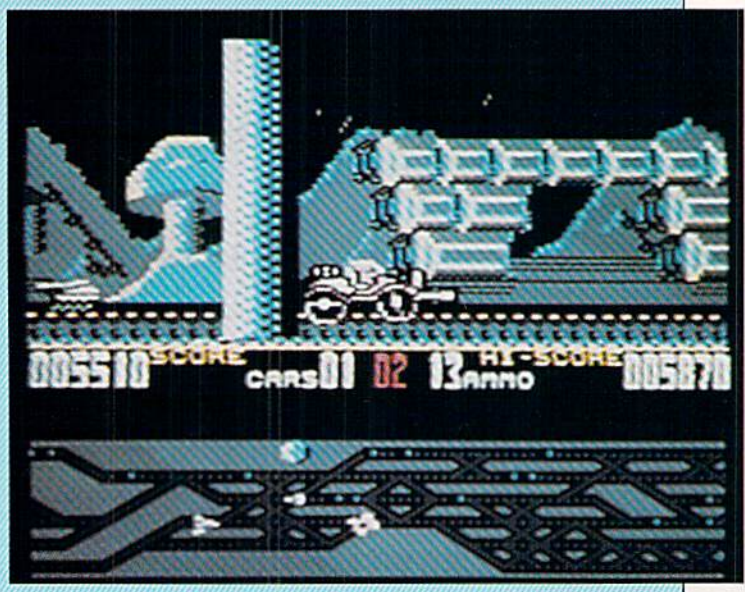
REVIEWED BY MARK COTONE

Black Thunder

Computer: Commodore 64
Publisher: Avalon Hill Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
Medium: Disk
Price: $25.00



You are in joystick control of a faceless road warrior, strapped behind the wheel of a heavily armoured mobile assault unit called the Crow-Ther (apparently christened in honor of this program's author, Anthony Crowther).

A sort of "Mad Max meets *Moon Patrol*," this high-speed reflex challenge doesn't pretend to pose anything novel for the arcade virtuoso. Instead, it takes all the proven elements that endear this style of challenge to its players—unceasing action, explosive graphics, and addictively simple design—and expertly weaves them together to create a slick, satisfying, and highly playable package.

The program's scenario is set in the year 2043 AD, a time when bands of ruthless punks rule the unpoliced commonlands. You are in joystick control of a faceless road warrior, strapped behind the wheel of a heavily armoured mobile assault unit called the Crow-Ther (apparently christened in honor of this program's author, Anthony Crowther). The object is to escape the imprisoning forces of the City Masters in a life-or-death race to the outlying space port. This is a mission of survival, a one-in-a-million shot whose odds are fixed by the relentless troop of attackers.

The action is viewed from two angles, using a split-screen display. The upper half of the playfield tracks the ground-level escapades from a vantage just off the roadside. Futuristic architecture supplies a moon-tinted blue backdrop as your vehicle cuts across the metallic landscape. Pillared structures occasionally breeze by the foreground, completing the three-dimensional illusion. The lower portion of the screen is part map and part radar, giving a high-altitude bird's-eye view of the city roadnets and your position relative to any nearby attackers.

The antagonists come by land and air. Cruising the asphalt are suicidal tanks, which opt for head-on collisions, along with low-riding guided missiles that demonstrate unprecedented tailing abilities. Show your mettle by surviving a couple of rounds with these road hazards, and a fleet of missile-dropping helicopters will join the chase, closely followed by an equally destructive breed of flying saucer.

The choppers are the most illusive of the enemies, bobbing above your auto in taunting maneuvers which become progressively quicker as the rounds advance. The saucer, on the other hand, although the largest and most intimidating challenger, would just as soon ignore your vehicle, and if given the chance, will be more than happy to quietly pass up on any combative opportunities. But any provocation—whether intentional or misguided—will be deemed an act of war, sending this ship into an enraged cobat mode, one that is sure to leave you literally crushed.

Your offensive weapons are a front-mounted rocket launcher, with its car-to-air missile counterpart. Both are released simultaneously with a push of the fire button. Any necessary reloading is carried out by locating ammo dumps. Simply run over a dump and it's yours.

As with most entries in this genre, the control aspects are straightforward and easy to learn, while the challenge remains stringent. There is little room for error on a journey that encompasses 15 levels and 32 screens. Winning is accomplished by destroying all opponents and collecting 100,000 points. But don't set your goals too high. I'd be happy to see the other side of level five.

An added technical feature to *Black Thunder* is the inclusion of the now fashionable voice synthesis, where an unseen android begins each contest with a verbal warning to get prepared, and closes the trip with a complete scoring read out. Unfortunately, these speech sounds are mere window dressing, adding little to the contest while sounding like some crass prankster relieving indigestion with a series of phonetic belches. It can all be a bit humorous, though I don't know if that was the intended effect.

Nevertheless, all of that will go unnoticed once the game pulls you

Continued on pg. 172

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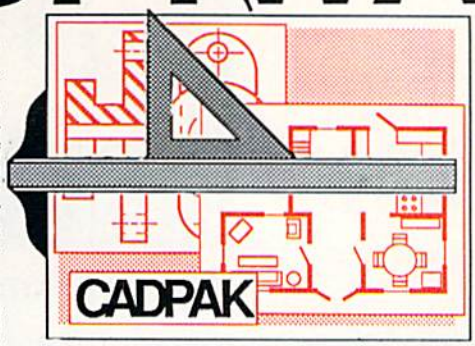

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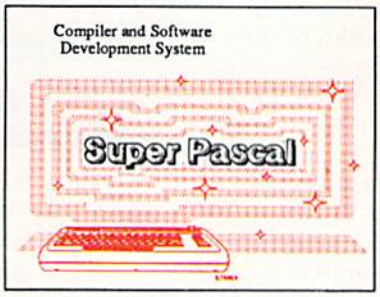

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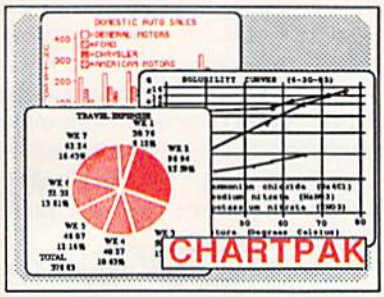

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REVIEWED BY GARY FIELDS

The Crimson Crown

Computer: Commodore 64
Publisher: Polarware/Penguin Software
P.O. Box 311
Geneva, IL 60134
Medium: Disk
Price: $34.95

Perhaps the most terrifying tales of the night are spun using the legends that surround vampires. Fearful fables describing these creatures of evil have captivated readers for centuries. Those same hair-raising superstitions are resurrected for the 20th century's electronic generation in Antonio Antiochia's *The Crimson Crown*. In this illustrated, interactive novel, players must face the terror of the vampire.

The land of Wallachia, in Transylvania, is being threatened by the ever-growing forces of the Vampyr (that's Transylvanian for vampire). Good King John is dead and his crown has been stolen. Without its secret powers, Prince Eric can never sit on his father's throne, and the forces of good have no chance of freeing Wallachia from the vampire's evil grip. You, aided by Prince Eric and his sister, Princess Sabrina, must find and destroy the vampire and recover the crown. The path you must venture is twisting, dark and dangerous. On your trek, you will meet witches, gryphons, werewolves, knights, dragons, snakes, spirits and sages. Some will help you, others will destroy you.

Unlike most early interactive novels, *The Crimson Crown* is not a text-only adventure. Antiochia not only authored the novel, but illustrated it, as well. He included over 100 pictures, which supply clues for its completion. Each is brought into the 64's memory by accessing the disk drive, so there is a short pause each time a screen is updated. I've found these delays annoying in other interactive novels, but because of the quick-replace scheme used by *The Crimson Crown*, the delays are short and not objectionable. The graphics, while not as detailed as some screens used in the better educational and arcade programs, are well done and effective. The images accurately reflect mystery, drama and an ominous atmosphere.

The Crimson Crown *is perfect for adventure players who prefer their mystery and challenge mixed with fears of the night*

The program recognizes a little over 1,000 words, and includes all those normally associated with interactive novels. Players of other disk-based novels should have no trouble conversing with the characters of Wallachia since they will understand full or multiple sentenced commands as well as cryptic directional commands like "N" (the abbreviated command for "GO NORTH').

In order to keep track of the action, you must either take notes as you play or rely upon your memory. You can, however, save three places in the novel on the game disk. It is a good idea to save your place before trying anything dangerous, so you can instantly retrace your steps.

The creatures and challenges you encounter in Transylvania are interesting. A sage will occasionally appear like a wisp on the wind. If you address him quickly and correctly, he will offer sound advice. If not, he will quickly disappear. You'll also meet some witches looking for a good time and dragons ready for a barbecue. Often it is better to have either the prince or princess talk to these creatures, since both have special talents. The prince is usually better at taking care of physically demanding chores, while Princess Sabrina has some knowledge of magic.

As you explore the vampire's domain, you'll have to answer riddles such as "A famous knight made me famous, too. I do not breathe, yet I need air true." The answer is "windmill." It helps to keep a list of the riddles' answers, since some work over and over. For instance, if you find yourself in a dangerous spot and whisper one of these words, a magical force will sometimes whisk you away to a safe spot.

Above all, map your adventure's turns and twists. There are over 50 locations to explore in the vampire's domain, and a wrong move in any could cause you to drop through a trap door and reappear miles away. Detailed mapping is required unless you have a flawless memory.

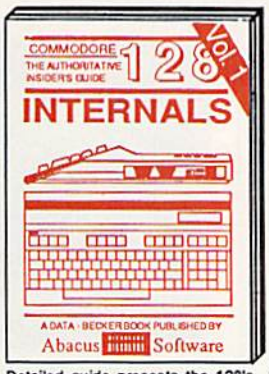
For those who get helplessly lost in the deep mysteries of Transylvania or just can't solve a riddle, Penguin Software's advice is not to panic. Instead, write for a free hint book! The only charge is a self-addressed stamped envelope.

The challenges offered in *The Crimson Crown* are similar to those of other good interactive adventures: You must solve a multitude of riddles, defeat or outwit dozens of opponents, conquer the source of evil, and retrieve a magic object to live happily ever after (or at least until a sequel is released).

But good electronic novels (like good paper novels), can have similar themes and still offer fresh adventure, spine-tingling suspense and quiet amusement. *The Crimson Crown* is such a novel. It is perfect for players who prefer their mystery and challenge mixed with fears of the night. So if you want adventure that makes the hairs on your neck rise, *The Crimson Crown* is for you.

The game disk comes with an instruction manual, map, a brief journal which sets the stage for your adventure, and a multicolor game poster. Polarware/Penguin Software warrants the game disk for 60 days. Past that date a replacement disk is available for $5.

C-128™ and C-64™ REQUIRED READING



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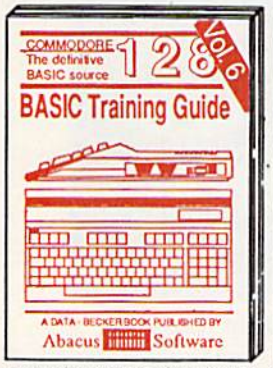

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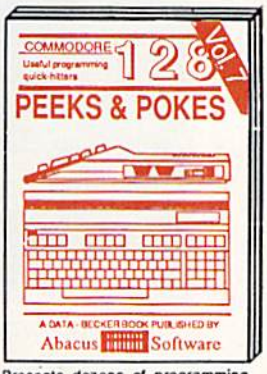

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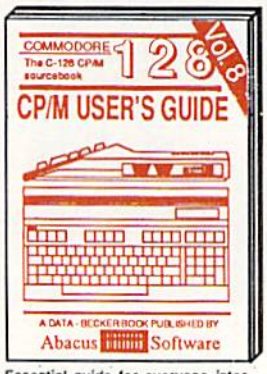

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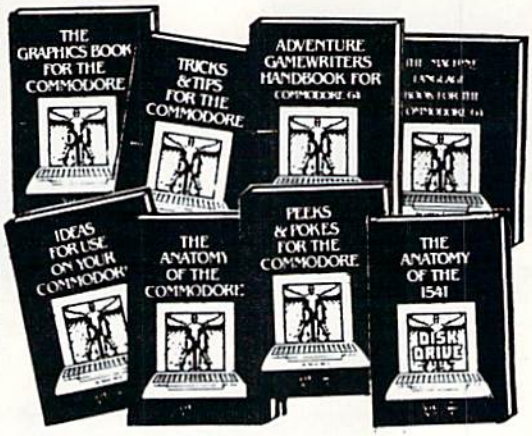

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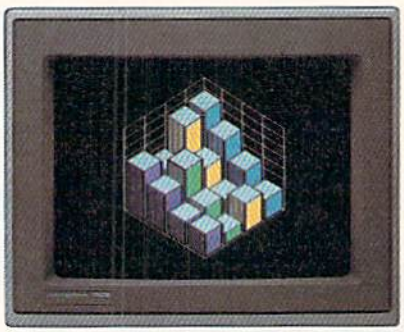

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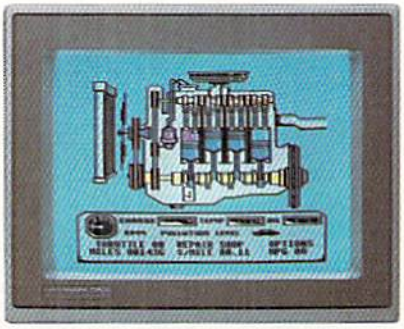

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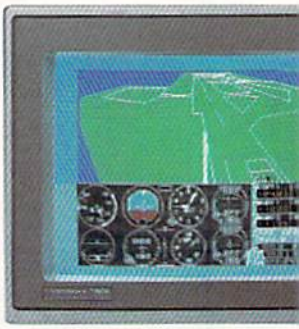

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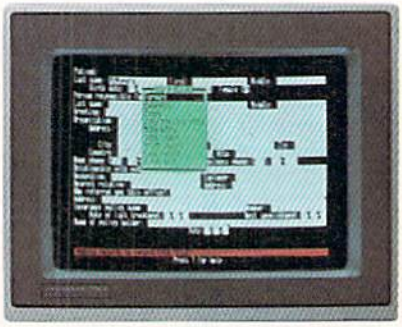

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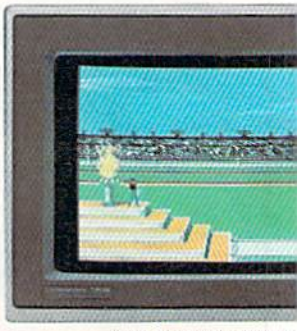

win a gold medal

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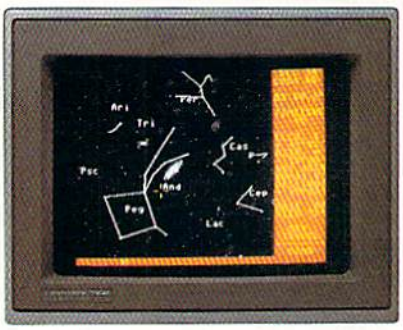

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REVIEWED BY JOHN J. KOTTLER

Silent Service

Computer: Commodore 64
Publisher: MicroProse
120 Lakefront Drive
Hunt Valley, MD 21030
Medium: Disk
Price: $34.95

"Enemy cruisers have been spotted on radar, Commander," is the response of your navigator as you peer through your periscope.

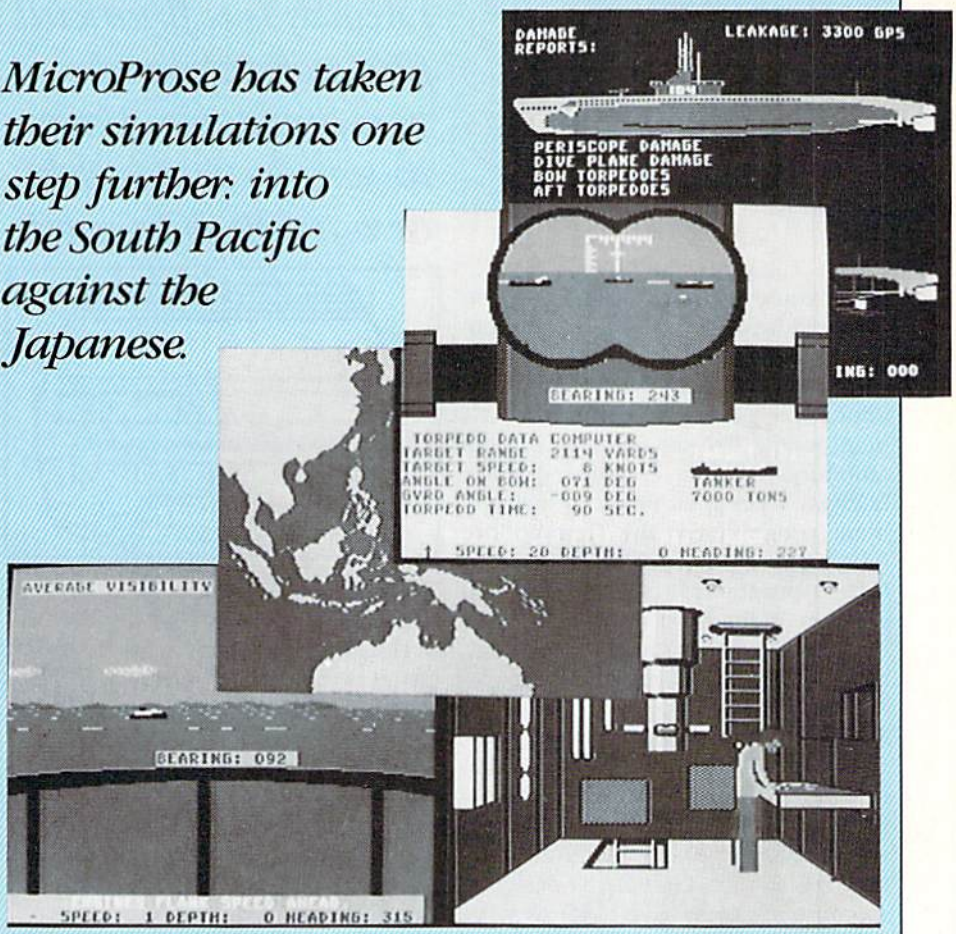
You begin to grind down on the choice cigar you managed to pilfer out of North Australia as you spot the enemy ships on the horizon. You check your gauges and find that your World War II submarine, the Guard-Fish, is still just above the surface of the water. You begin to examine closely the distance and direction of each ship as they approach.

Suddenly you notice an escort approaching. You frantically fire the deck gun several times hoping that one shot may destroy the threat. All the shots have missed, and the escort begins to fire at you. You suddenly realize that there is only one way of escape—dive! The siren screams and the submarine begins to sink beneath the surface.

Safely underwater, the sonar detects a splash of water just above the submarine. The enemy shell would have caused serious damage had the submarine remained surfaced. You decide to release oil and debris into the water, and soon your navigator notifies you that the escort ship that was directly over the sub has raced away, convinced that your sub has been destroyed.

With the taste of victory, you surface the sub once more and fire several torpedoes towards the enemy fleet. The periscope is raised, and all you can see are tremendous explosions as the enemy tankers, troop ships, and cargo ships begin to slip beneath the surface. You smile to yourself, realizing that all you have to destroy now is the escort ship. Your sub is now completely surfaced, and you fire the deck gun unmercifully at the distant escort, which soon begins to sink with the others. You are truly pleased with your crew, your sub, and yourself.

MicroProse has taken their simulations one step further: into the South Pacific against the Japanese.



Silent Service is another masterpiece from MicroProse. MicroProse, known for their great flight simulations, has taken their simulations one step further: into the South Pacific against the Japanese. In this realistic submarine simulation, you become the Commander of the USS SeaWolf, the USS Spadefish, and other memorable submarines covering the same course they did during the war. Or you can try torpedo and gunnery practice on old cargo ships outside your home base. You can select the reality level of each game, including limited visibility, dud torpedoes, and expert destroyers.

The first screen is the "Conning Tower" screen, which is similar to a menu screen. From the Conning Tower, you select your battle station. If you press the joystick forward and press the button, you appear at the bridge battle station, assuming the submarine is surfaced, of course. From here you can view the horizon using your binoculars.

At the periscope battle station, you can not only examine the distant objects, but also see how the Torpedo Data Computer calculates the target's range and speed, along with the angle on the bow of your sub to determine the torpedo gyro angle. This gyro angle is the angle needed to turn the torpedo toward the target. Of course, if you would rather calculate this angle yourself, instead of trusting the computer's calculations, this option is available as well.

To keep record of where your submarine is and where the enemy's ships are, there is a Maps-and-Charts battle station. The map displays the land surfaces, your location, the location of the enemy ships, and your torpedo directions. The Maps-and-Charts battle station is actually maps, visual sightings, radar and sonar, all com-

Continued on pg. 172

REVIEWED BY MATTHEW STERN

Lifeplan

Computer: Commodore 64
Publisher: Lifeware
2318 Second Avenue
Seattle, WA 98121
Medium: Disk
Price: $59.95

Do you ever find yourself short on cash and heavy on bills? Do you wonder if you will ever be able to save enough money for your children's education or your retirement? To help people like us, financial consultant Jürgen Tobys created *Lifeplan*, Lifeware's personal financial management program for the Commodore 64. *Lifeplan* is more than just another budget program. It not only lets you develop a financial plan to reduce debt and increase savings, but monitors your results as you go along.

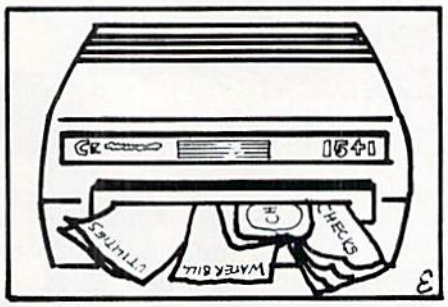
Lifeplan is *not* a checkbook balancing program. It looks at your overall financial picture. *Lifeplan* is also not just an integrated financial program. It lets you analyze your finances without having to do any extra bookkeeping. In fact, *Lifeplan* is designed so you don't even have to know what a debit or a credit is to use it.

Lifeplan is an easy program to learn. The manual is well written, clear and comprehensive. It even comes with a section for first-time computer users. The program is menu-driven, and sample files are included so you can practice working with the program.

In addition to showing you how to use the program, the manual comes with many helpful tips on how to manage your money: how to control your cash flow, set up a budget, and save. It even tells you how to avoid the pitfalls that ruin your finances, such as impulse buying or overusing your credit cards. To help you with your record keeping, the manual comes with a creditor payment schedule, record of your gasoline purchases, and inventory list. You can copy these forms for your own use.

To enter information, you must first format two data disks: one for your transactions and the other for asssets. Secure your confidential information from prying eyes by entering a password. The formatting process takes ten minutes for the transactions disk and seven minutes for the assets disk.

Lifeplan is a financial planner designed so you don't even have to know what a debit or a credit is to use it.



You enter information into *Lifeplan* from your checkbook registers, credit card slips, bills, and auto record. If you use a separate program to balance your checkbook, Lifeware suggests that you still key in your checks and deposits individually. This way, you can incorporate your checks into your overall financial picture.

Entering data should take less than an hour per week. The only preparation you need is to separate your receipts and bills into categories. *Lifeplan* suggests a simple filing system for doing this. After sorting your information, *Lifeplan*'s full-screen editing makes entering easy. When you want to change an item at the top of the screen, just move up the cursor to change it, or press the number of the desired line.

Be careful, though, as you enter information. When you finish entering your figures, *Lifeplan* will ask you if you are done entering information for the month. If you answer "Yes," the totals for the category will be closed out, and you won't be able to enter information until next month. Fortunately, *Lifeplan* gives you plenty of warning so you cannot accidentally close out the month before you enter all your data.

After you close out your totals at the end of the month, you can display your information in tables or graphs. One set of tables shows your progress. You may compare this month's net worth against last month's, or see how your budget compares with your actual expenses. These charts show patterns in spending and income. The tables can be printed on any Commodore-compatible printer, though you cannot print the graphs.

When you begin working with *Lifeplan*, you will not be able to see any totals until you close out the first month. Since your spending patterns fluctuate throughout the year, the only way you can really get an accurate picture of your finances is to enter several months' worth of information.

For example, my first month's figures showed me at a loss, since I made some major repairs on my house. In the second month, I didn't spend as much on my telephone bill, so I had more money left over. I didn't see a consistent pattern in my spending until I had entered information for four months. I noticed that I was over budget each month on my grocery and water bills. Once I identified those areas as trouble spots, I made cutbacks.

Lifeplan expects you to actively participate with it. You need to organize your financial records, keep tabs on your expenditures, and, of course, change your spending and saving habits. *Lifeplan* takes time. Not only do you need to spend time to key in the necessary information, you need several months of information to establish a comfortable budget and develop better financial policies.

The program reads and writes information frequently to the disk, which may take awhile on the 1541. This can be frustrating if you have a lot of information to enter. You can speed up the process with a fast-load program. Lifeware recommends Epyx's Fast Load cartridge, although Access' Mach 5 works as well.

If you are serious about solving your money problems, and you are willing to put in the time and effort to do it, *Lifeplan* is an easy-to-use and effective tool to help you reach your financial goals. C

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REVIEWED BY MARK COTONE

Nine Princes in Amber

Computer: Commodore 64
Publisher: Telarium
Spinnaker Software
One Kendall Square
Cambridge, MA 02139
Medium: Disk
Price: $29.99

The company you keep—as well as the company you kill—spells the difference between your coronation and your funeral.

Walk Shadow to Arden
You begin to notice strange things happening to the world outside the car... the countryside is scattered with large, slowly turning windmills...a sudden and violent thunderstorm, strangely colored clouds rolling overhead. A vast desert surrounds you...the roadway begins to sparkle.

Nine Princes in Amber is an intermediate text adventure based on a series of science fiction books by Roger Zelazny. You are Corwin, a bedridden patient who has just blinked his sleepy eyes open in a quiet and secluded private hospital room. Your legs are packed in casts, your brain is fogged with amnesia, and some burly gorilla of an attendant is preparing to board you on another flight back to dreamland. But don't get too cozy, for the drugs you are about to receive are not for your benefit. The involuntary rest they will induce is all part of an elaborate plan to keep your brain and body immobilized.

Why? You don't know. Or more correctly, you can't remember. But you will soon go on a perilous journey, one that will take you from infirmary inmate to national ruler, all in the span of a two-sided disk. Rise, brave warrior. It is time to get out of bed.

Amber is the land where this adventure takes place, a "perfect world of which all others are imperfect shadows." Ever since he can remember, Corwin has always envisioned himself seated upon the throne to this magnificent kingdom. Ambitious dream, perhaps, but one that is well within reach. For King Oberon, the current leader of Amber, is actually Corwin's father. That's right, your surrogate is a Prince, and by royal law he is a natural heir. That's the good news.

The bad news is that for the imperial parents, once was obviously not enough. For in addition to our hero,

Continued on pg. 40

Amber's Golden Rules

No need to feel so lonely in this strange town. Here are a few tips to help you survive.

Sword Fighting

- Always save your progress to disk just before a sword fight begins, and, more importantly, right after it ends. Even if you have the enemy trapped at your blade's edge, there is still a chance that you will be done in by some hidden cohort or unseen weapon. It's better to be able to resume the action without having to risk replaying a duel.
- Never feint with your sword without following through. Strategically, it serves no purpose but to put you on the losing end of your opponent's weapon.
- When counterattacking, aim to strike your opponent's body in an area opposite to the offensive thrust that he just played. If he aims high, you aim low, and vice versa. For example, if an enemy were to take a cut at your legs, you should first parry, and then take a cut at his head. Most opponents will not be able to raise or drop their guard quick enough to block your attack.

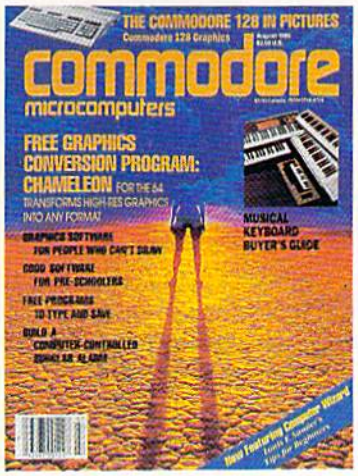
The Pattern

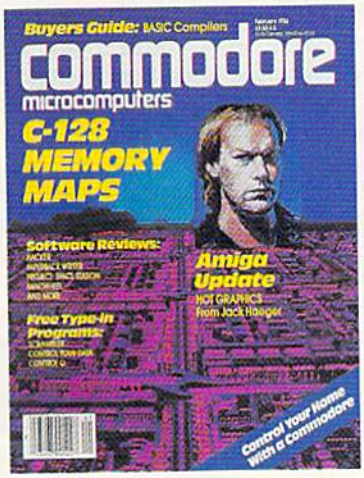
- The Pattern is your vehicle to regain some forgotten mystical powers available to each member of your royal family. You can be led to this proving ground by confessing your confused amnesiac state to a trusted ally.
- When constructing the maze paths, try to play the "T" pieces as soon as possible. This will quickly open up all four colored tracks, leaving you with more options when negotiating the labyrinth.
- Don't be afraid to use one colored path as a dump for unwanted pieces. This strategy will actually allow you to reach your destinations with more direct routes. The five stars can be easily crossed with the three remaining paths.

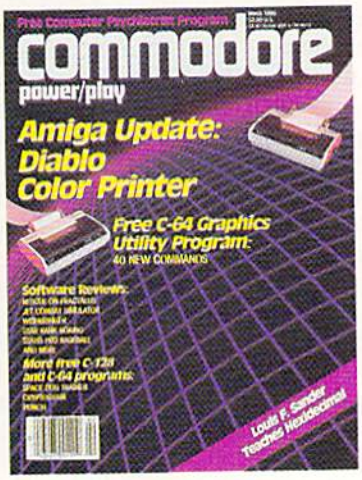
Staying Alive

- To get a sneak preview of how the alliances will shape up as the game progresses, check the tarot cards illustrated on the inside of the box. Notice any similarities that might tie some family members together?
- The demo mode provided on the game disk can be very helpful, not only for orientation purposes, but also to supply clues on how to approach early predicaments. It will be worth your while to give it the once over.

MACHINE LANGUAGE.







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the queen has also raised other children—eight sons and three daughters—most of whom share the same aspirations. One throne and a dozen candidates. (Talk about sibling rivalry.) This game sets up a mad race for the royal seat, instigating a family feud that would make J. R. Ewing salivate.

Now, the trip to the top is never a solo endeavor, and if a Prince hopes to be successful, he will have to stand on the shoulders of a trusted entourage. The dealings, deception, bands and bribes that help form this troop are the essence of game play. The company you keep—as well as the company you kill—spells the difference between your coronation and your funeral. With the burden of an erased memory, Corwin must first renew old acquaintances. Using subtle questioning and disguised interrogation, he discovers the characters' factions and allegiances.

The action evolves in the usual text-adventure style—on-screen prose. The parser is smooth and intelligent, reacting quickly and logically. Colorful illustrations accompany the prose, and although there are times when a picture will visually reaffirm the importance of an object, the drawings are not intended to supply any specific clues by themselves.

The plot structure, while fairly straightforward, allows for innumerable twists. The package advertises "40 possible final endings and over 40,000 different game variations," numbers that validate this game's latitude. Every time a character is confronted, the story line can swing wildly. An early frictioned encounter with a sister, for example, might be brought to your attention hours later by a supporting brother. Make an aggressive move against one relation, and another may make you pay a belated price. It's as if the computer-controlled family members are meeting, talking, and plotting in some secret off-screen conference room, trying to guess your next move even as you struggle to ascertain theirs. This perpetual interweaving of all of Amber's pawns gives this contest an engaging life all its own.

The outcome of your kingdom quest will ultimately be determined by your ability to form alliances. But sagacity alone will not a ruler make, so a pair of challenges of a slightly different nature further test a candidate's worth. To represent the more physical trials, an occasional sword fight has been incorporated into Amber life. When verbal banter is unable to bring about a solution or compromise, an impatient prince may use the hard edge of his blade to cut through all the argumentative nonsense. The duels stick to the all-text format, presenting these classic matches totally stripped of their visual element. With this set up, a contestant can survive only by understanding the subtle planning that goes into each offensive attack and defensive stand. If you choose to "feint, cut high" when the situation calls for a "parry, thrust low," you might find yourself kneeling in a pool of your own blood. Joystick jerkers who usually fall back on their lightning reflexes to cover up for any tactical miscues will find this prosaic approach unusually challenging and quite deadly.

To help compensate for Corwin's amnesiac handicap, "The Pattern," a maze game-within-a-game, is presented as a sort of mystical antidote. Put simply, the player must use an assortment of path pieces to build a continuous course that intersects five veiled "stars" which lay scattered about the play field. Each move recalls a small tidbit of Corwin's past, while every crossed star reveals and restores some forgotten power that is inbred in all the members of the Royal House of Amber. Only by completing this pattern will Corwin regain the knowledge to use these tools. This memory remedy works well from a player's perspective, since, unless familiar with the novels of Roger Zelazny, you enter the contest knowing little or nothing of Amber's ways. But once The Pattern is finished, many objects, commands and events that Corwin has since encountered will start piecing into an overall picture—as if your memory is actually starting to clear. It's a well executed touch.

Nine Princes in Amber is gripping fun, requiring players to possess the courageous strength of a warrior, the analytical mind of a detective, and the *savior-faire* of a Machiavellian politician. It's a wild family reunion you don't want to miss.

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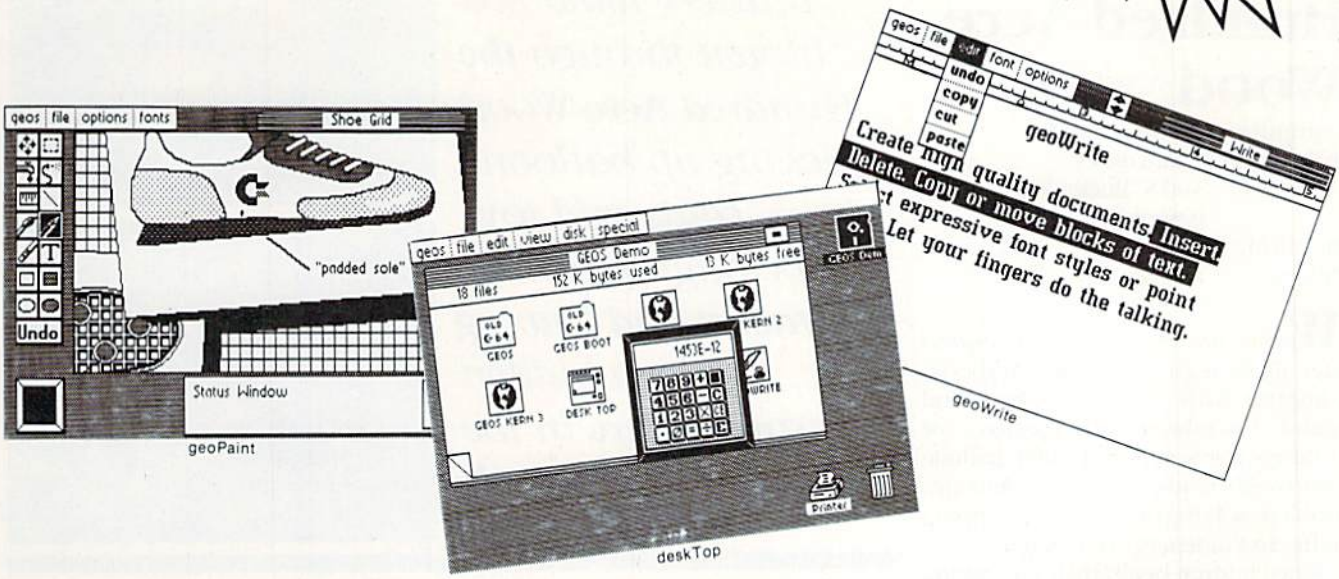

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There's also a few desk accessories, for that little extra help when and where you need it. Available from any **GEOS** application, they include an alarm clock, a notepad, a four function calculator, and photo and text albums (for collecting pictures and phrases to paste into other applications).

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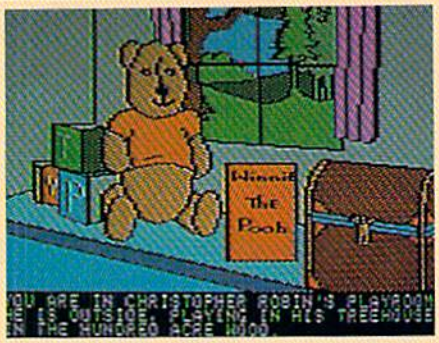
REVIEWED BY GARY FIELDS

Winnie the Pooh in the Hundred Acre Wood

Computer: Commodore 64
Publisher: Walt Disney
500 S. Buena Vista S.
Burbank, CA 91521
Medium: Disk
Price: $49.95

During the night a blustery wind has blown through the Hundred Acre Wood, picking up balloons, coats and toys belonging to each character, and leaving them hidden somewhere in the woods.



Winnie the Pooh in the Hundred Acre Wood is an electronic storybook, complete with colorful pictures and sound. The educational objectives for children age seven and older include improved reading comprehension, problem-solving and basic mapping skills, and independent reading.

Few children begin their day asking for help with reading comprehension. What they want is fun. Happily, *Winnie the Pooh in the Hundred Acre Wood* is just that—fun. But while the children are busy playing in the Hundred Acre Wood, the game quietly helps them improve their skills. And because children learn faster when they are having fun, *Winnie the Pooh* is an ideal teacher. The game features the characters from Walt Disney's versions of the *Winnie the Pooh* books: Pooh, Tigger, Piglet, and Christopher Robin.

During the night a blustery wind has blown through the Hundred Acre Wood, picking up balloons, coats and toys belonging to each character, and leaving them hidden somewhere in the woods. The child's task is to find the lost objects and return them to their owner.

The Hundred Acre Wood is divided into 30 display screens. To search from one screen to another, the child must decide whether they want to walk north, south, east or west. As the child walks, they'll also get a chance to visit and talk with the characters they meet. In addition, there are lots of interesting things to do in the woods like climbing trees, exploring a rabbit's burrow, singing, and visiting each character's home. But the child must always keep an eye out for Tigger, because he is the bouncing tiger who will cause them to drop any objects they've found.

The beginning screen is a scene from Christopher Robin's playroom. The display is multi-colored bit-mapped graphics, so the stuffed bear and other toys here look like those from the page of a picturebook. Below the picture are options the child can try, such as knocking on a door, entering a home, talking to a character or taking a nap. Plus they can always walk in any of the four directions. To cycle through the options, all the child needs to do is press the spacebar. Pressing the RETURN key selects the option.

The function keys allow the child to read words again, save a game to disk, turn the sound on or off, and display the found objects as well as calculate how many objects are still lost in the woods.

The challenges of the game are to walk through the woods without getting lost, find the missing objects, identify the owner of each and return them—and and to finish doing all this without running into Tigger or the blustery wind, because both will cause found objects to be lost again.

A walk in Pooh's Hundred Acre Wood is similar to walking through a real forest. Each turn is a different view and a differnt adventure. The game is full of side excursions which don't directly affect the play of the game, but that are delightful. For instance, just west of Christopher Robin's playroom is a bridge and stream. There the child can climb a tree or scoot down the stream's bank and look under the bridge. There's a chance of finding a lost object there, but most children will just enjoy the freedom of roaming and exploring.

The graphics in *Winnie the Pooh in the Hundred Acre Wood* are the quality you would expect from Walt Disney. The songs are just as delightful. My own children enjoy going to the special place in the woods just to listen to or sing along with the songs.

Children age seven and above will like this offering, and parents and teachers will be happy to see them playing it. I have only one objection to the game: speed. Each screen display is brought into memory by accessing the disk drive. This means that the turning of pages or going from one point in the woods to another is slow. So in *Winnie the Pooh*'s woods, you walk, not run. But this lack of speed is compensated for with very detailed and colorful displays.

The game comes with a backup disk, computer/comic book, 20-page manual and 90-day warranty. C

REVIEWED BY KELLEY M. ESSOE

Alice in Wonderland

Computer: Commodore 64
Publisher: Windham Classics
Spinnaker Software
One Kendall Square
Cambridge, MA 02139
Medium: Disk
Price: $26.95

Adventure writers beware! I have unwittingly unleashed upon your world two more valiant and fearless explorers. I didn't mean to. Really. I think it was unavoidably pre-ordained in their genetic make-up. In other words, it runs in the family.

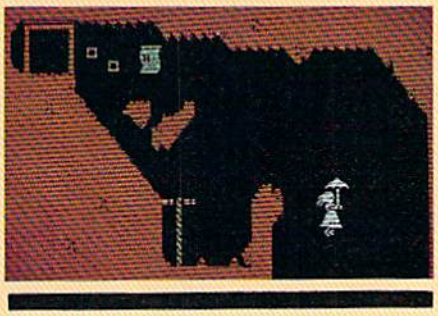
You see, their father, a seasoned veteran of the *Zork* wars, is now currently trying to deliver his home planet from a certain ill-fated destiny. Meanwhile, just last month, these two impressionable young boys witnessed the shocking sight of their own mother leaping about the house, gleefully raving about having finally managed to get a Babel fish into her ear.

Still, up until a package arrived last Saturday, I had nary a concerned thought that the incurable scourge of E.A.S. (electronic adventure syndrome) could rear its thrill-seeking head in pre-adolescent children.

I was wrong. For within the enchantingly illustrated box from Windham Classics was the computerized version of Lewis Carroll's classic masterpiece, *Alice in Wonderland.* And within the magnetic magic of that innocent looking floppy disk was the catalyst that awoke the sleeping adventurers within my children.

What do you get when you cross an arcade game with a text adventure? Well, in my pre-*Alice-in-Wonderland* opinion, what you get is apathetic. At best, I've been underwhelmed. At worst, bored, frustrated, unfulfilled and still hungry—like finding myself at a party where the fare is raw carrot sticks, bran crackers, bad-smelling cheese and small talk when I expected continental cuisine and stimulating conversation. But Windham Classics has succeeded where others have failed. They have managed to cross-pollinate apples and oranges and

Over 250 full-screen graphic scenes, rich in color and detail, allow you to actually see where you are, where you're going, and where you've been.



come up with a hybrid that is not only digestible but altogether fitting as a main course.

There are a number of major differences that set *Alice in Wonderland* apart from most adventure games. First of all, this adventure is truly a holistic "you-are-there" experience. Visually entrancing, over 250 full-screen graphic scenes, rich in color and detail, allow you to actually see where you are, where you're going, and where you've been. Plus, the splendid music and sound effects also bring your sense of hearing into play.

Another big difference is that you control all of your movements, as Alice, with a joystick. You can make Alice walk, run, jump, climb, crawl, stand up, glide with her parasol, fall without it, enter or exit doorways, shimmy through tunnels, and creep down rabbit holes. And you are never reduced to typing in idiot "nerb" (noun/verb) sentences such as "Take Object," "Look Room" or "Sound Stupid." Nor are you subjected to the exquisite tortures of phrasing and rephrasing your "nerbs" in search of the one combination that the game's parser can understand.

Other than basically just moving around, everything else you might want to do or say as Alice is available as a selection on one of the game's callable menus. For example, Alice can "coax," "scold," "calm," "argue" and "tease" any of the 60 or so characters she happens upon within the adventure.

She can "ask" them for information, "offer" them any of the items she has picked up along her way (although many characters accuse her of bribery when she does this), and even "sing" any number of songs to please and soothe the more agitated and high-strung among them.

Alice can "examine" objects, "take" those which are takeable, "drop" the ones she doesn't think she needs, and run an "inventory" to remind herself of everything she is or is not carrying. Plus, she can "use" a wide variety of very unusual tools she finds, which enable her, for example, to cross wide gaps or float upwards—both absolutely essential to her explorations and ultimate escape from Wonderland. Of course, "eat" is another thing Alice can do. For, as we all know, Alice does have a risky penchant for drinking strange elixirs and nibbling on unattended cakes and questionable mushrooms—all of which wreak havoc on her growth hormones.

The menus also let you start a new game, save a current game on disk, continue a previously saved game, or view a sample self-running game for demonstration purposes. There's even an option which allows you to reposition yourself within your current game into a more familiar environment—invaluable in case you become hopelessly lost (which is quite likely).

You begin your adventure at a picnic in the park. Free to move about in any direction, you are wise to fully explore this "real world" before chasing after any oddly dressed rabbits. There are certain things from up here that you're going to need to take with you on your journey. And once underground, there's only one way back to

Continued on pg. 168

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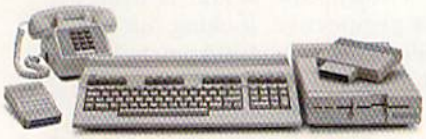

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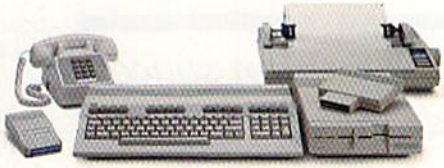

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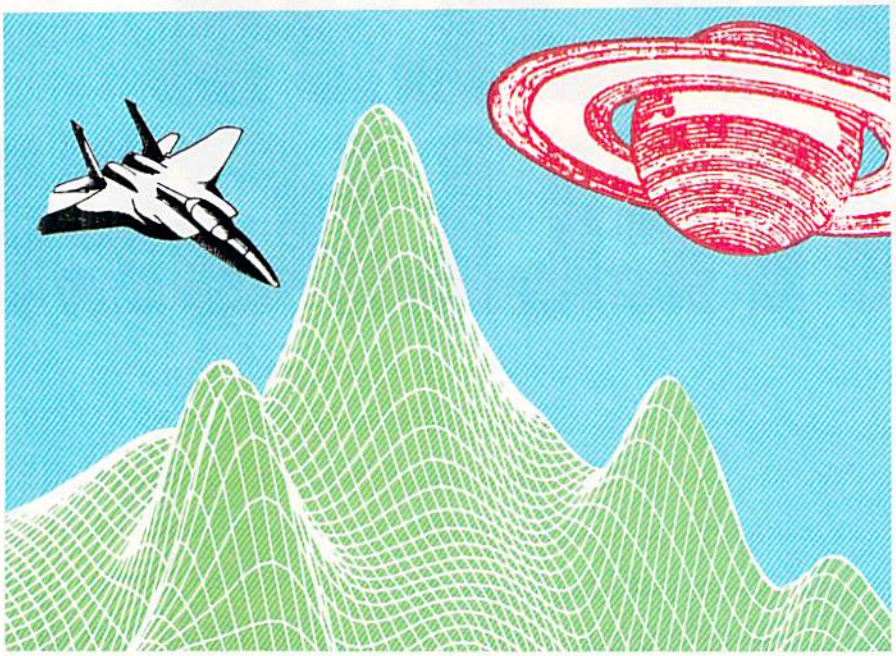
COMMODORE 128 PERSONAL COMPUTER

A Higher Intelligence

REVIEWED BY MARK COTONE

Elite

Computer: Commodore 64
Publisher: Firebird
P.O. Box 49
Ramsey, NJ 07446
Medium: Disk
Price: $29.95



Perched inside your *Elite* star cruiser, you'll find not only asteroids, but cosmic crafts aplenty, itching for combat. But beyond the flashing lasers and lurching missiles lies a creatively conceived, demanding world of intergalactic commerce, a competitive stage that has been set to test business, financial, and piloting prowess.

Each *Elite* player enters the game as a common space trader. Your possessions are few: a Cobra Mk III ship—a spunky little medium-range fighter/trader—and 100 units of universal currency. That's it. Your mission is to merely endure—to organize your trades so you can replenish your ship's supplies while maintaining a positive cash flow.

The secret to space-merchant prosperity is easy enough. Simply fly to a planet that has an abundance of something, buy as much of it as you can for a cheap price, pack it all into your ship's cargo hold, and then sell it for profit on another planet. Theoretically, a success formula couldn't be easier. But when you try to put it into motion in a market that spans eight galaxies with over 2,000 distinct planets—each with its own political structure, fluctuating price board, marauding pirates, and alien invaders—then you had better learn to expect the unexpected.

Space traders may traverse any of three paths. For the law-abiding, dealing in legal merchandise is probably the safest. Foodstuffs, textiles, minerals and luxuries will all fetch a good price on the right planet. Money might be a bit slow in coming, but your conscience and record will remain clean.

Those with a little more guts (or a little less brains, depending on how you look at it) might be attracted to more covert dealings. One viable course would be to answer the galaxies' increased calls for narcotics, slaves, and firearms. It is quick cash, provided you don't mind the inherent dangers. Your clientele here is certified galactic scum, a group that would rather kill off than pay up.

As a common space trader, your possessions are few: A Cobra Mk III ship and 100 units of universal currency.

The final option is to take the law into your own hands, standing on whichever side suits you best. Bounty hunting and pirating are both lucrative considerations. But with the higher salaries comes the higher risks. In these unpredictable life styles, only one thing is always certain: You won't die of old age.

Survival is a privilege reserved for the fittest. Keen economic sense alone will not insure personal permanence. Only the addition of a killer instinct in battle and a deft hand at navigation will keep a pilot among the lucky living.

Your Cobra ship is controlled by a combination of both joystick and keyboard. Visually, the action is from a cockpit perspective, looking out into the speckled blackness from behind an elaborate control panel. This starship dashboard is an intricate piece of design, keeping you in constant touch with your vessel's systems: cabin temperature, altitude, velocity, relative positioning, weapons' status, defensive shield strength, and energy supply. The three-dimensional scanner allows pilots to pinpoint any other ship's related position with a mere glance. You won't really appreciate it, though, until you witness firsthand how successfully you can follow an entire swarm of attackers during a Cobra ambush.

The actual steering of your ship can be a tricky task, especially for those who have grown accustomed to the slow banking motions of most of earth's air machines. You are advised to fasten your safety belts before putting the Cobra through its first zero-gravity battle roll. The high speed and precise maneuverability of this ship will initially cause some unintentional turns and drops, but it is ultimately a combative delight.

If a Cobra pilot does fail in his mission, it will not be because he was uninformed. Firebird has compiled one of the most extensive instructional packages ever to accompany a game program. I can't remember this much documentation being supplied with my car.

"The Dark Wheel," a Rob Holdstock novella, sets the scene by incorporating the intergalactic space trading environment into an entertaining fictional adventure. The story can't be considered required reading, but it does do well to bring the contest to life by dramatizing and romanticizing the life of a nomadic trader.

Once your interest is piqued, it's onto the "Space Traders' Flight Training Manual," a 64-page booklet that details every aspect of your ship and mission. Technical without being boring, this tutelage will introduce aspiring pilots to the full spectrum of data that will soon become second nature. Everything from docking procedures to the body language of alien races is covered. It should be read, reread, and referred to often.

To further aid the novice is a large "Ship Identification Chart," a guide that summarizes all the necessary controls and includes a template to fit over a portion of the Commodore keyboard to label the important function keys.

Each of the 2,040 planets represented has its own name, history, trading tendencies, political profile, and commodities market. The number of possible scenarios is almost mind-boggling. This package is more than a fictional simulation, because an entire universe has been created, as boundless in design as it is in approach. Players are encouraged to build on their own strengths, outfitting and changing their craft before blasting off, and all excursions can be saved to disk.

I highly recommend that you investigate the life of a space trader. As they say, "It's not just a job...it's an adventure." C

Trade Secrets

There is a staggering amount of information contained in the "Space Traders' Flight Training Manual," including tips and techniques on every aspect of game play. Absorb as many of the lessons as you can, put them into motion with some on-the-job training, and you should be well on your way to a profitable trading career. The additional tips listed below won't guarantee success, but they might help.

- When you are involved in a losing battle against a host of enemy ships, you can retreat out of danger by hyperspacing to a different location. Unfortunately, these high-thrust engines can only be used to move between planets, and if you don't have enough fuel stored to complete at least the shortest connecting flight, you're out of luck. Whenever possible, plan your trade trips in such a way that you have enough fuel in reserve to complete a second-planet hop, just in case.
- Running from battle is not always a sign of cowardice. It can often be the shrewd strategic act of a competent pilot. Your Cobra Mk III tradeship is one of the fastest in the universe, and a wise warrior will take advantage of this speed. If you find yourself low on energy and outmatched, turn and run. The Cobra ship can replenish its energy supplies by simply travelling through space. By fleeing the battle scene, you are not admitting defeat. Let the enemy follow you at a distance, just long enough for you to increase your energy banks and shield strength. Then turn back and fight with renewed strength.
- When using the scanner to track and attack enemy ships, I have had great success using the vertical bar directly above the "I" in "ELITE" as a sort of gunsight. Until you have gained enough capital to outfit your ship with additional weapons, the only pulse lasers you have are housed on the front of your Cobra. So, as soon as an enemy vessel appears on the scanner, maneuver your ship so that your foe is positioned directly ahead of you, even if it means turning completely around. As the dogfight proceeds, whenever you lose sight of the enemy, look back to the scanner and reposition your ship.
- Every time you land on a new planet, take note of its market prices, as well as the economic, governmental, and technical composition. No two planets are alike, and price boards will fluctuate to a certain degree, but you will soon find patterns between similarly structured worlds, providing information that can surely aid your marketing game plan. C

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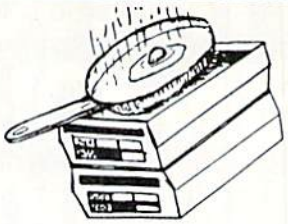

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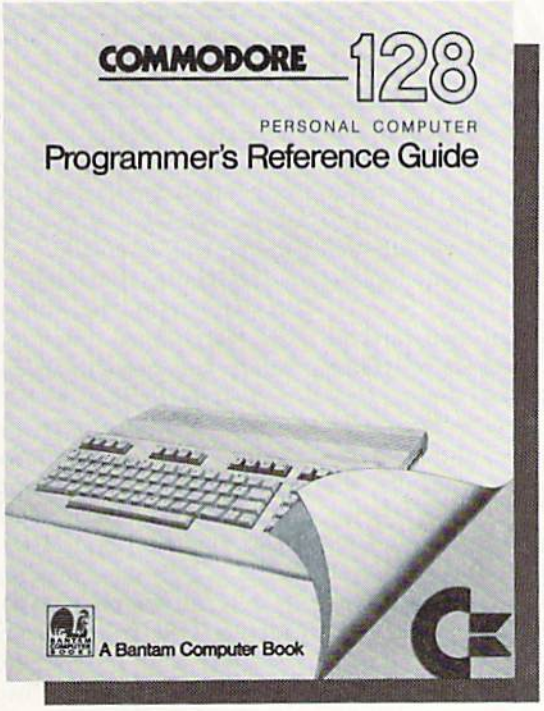

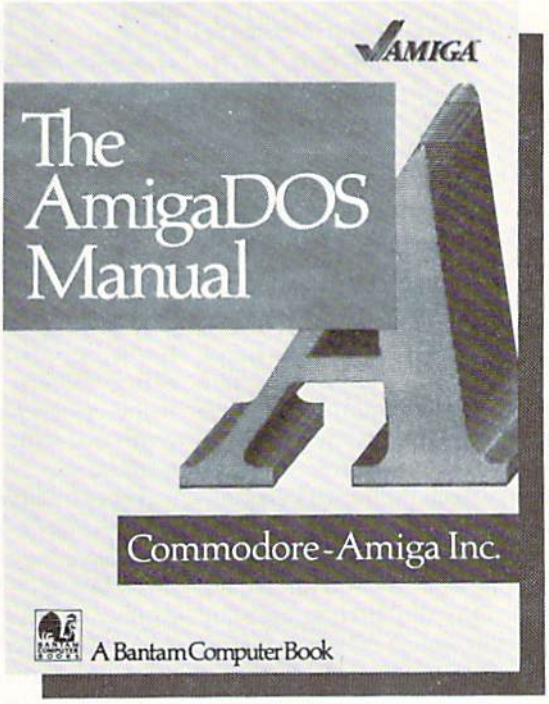

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BY MATHEW LEEDS

New Products from the Valley

An inside look at the dynamic world of entertainment software.

This is the first of a regular series of columns, so I think it's only fair to warn you that a good subtitle for this would be "Subject to change without notice." My assignment is to cover the field of entertainment software for the full range of Commodore computers, talk to publishers and programmers, and report on products while they are still being developed. Sort of a preview of coming attractions.

Now I want you to bear in mind that I'm writing this in January, and you may not read it until May. This means that the products I write about will sometimes be three to four months away from their final versions, and can (will) often have features added, enhanced, or removed by the time they become available on the retail shelves. In the normal course of events, I will select three or four products each month and look at them from various perspectives: the design and intent of the program, background on the programmer(s) involved in its production, features and functions, sometimes a screenshot or two, and its probable release date.

Most magazines have a policy of not doing reviews of products until they are finished. This means that the reviewer may get the program only a few weeks before it is released to the public. By the time the review is published, the program has been available for months, and you've already purchased it. Hopefully this column will give you some information about products before they come out, and will allow you to decide if they fit your needs when they finally arrive. But please bear in mind that these are mainly very early looks at programs still in development.

Since this is my first column, I've got a backlog of information on new products to get you caught up on. I'm going to go through my list from A to Z this month, and next month will start my usual format of only looking at a few programs at a time.

Since entertainment software includes music and graphics programs, I will be covering just about everything except business programs. Hope you enjoy the show. Please write in with your comments and suggestions.

Access Software will be releasing *Leader Board*, a 3D golf simulator. It will have several 18-hole courses, three levels of play, and will allow up to four players. Their *Inside Story* is an anatomy learning system with 50 full-color screens showing the inner workings of human anatomy. It will feature a multiple-choice quiz to test your knowledge. Both are for the Commodore 64.

Access is also acting as the distributor for MULTIBOTS, a set of electronic-robotic experiment and construction sets. This is a system of modules that add on to an interface unit. Add-on modules will include speech digitization, digital storage oscilloscope, robotics workshop, and thermodynamics lab. This set of kits will be available for the full line of Commodore computers.

Accolade, a spinoff from Activision, has been producing some of the best full-graphics, character-oriented action games for the 64. They have just released *PSI-5 Trading Co.*, a science fiction multi-character adventure that combines elements of text adventure, arcade action, and strategy. You should also be looking for an as-yet-unnamed game for the Amiga to be released in the second half of the year by Accolade.

Activision is making a strong move in software for the Amiga. Coming in the March/April timeframe will be an Amiga version of their *Little Computer People Project*, as well as *Garry Kitchen's GameMaker*, and *The Music Studio*. *The Music Studio* is a professional-quality music composition tool that features stereo sound, 16 channels, keyboard and MIDI compatibility, and uses standard music notation. It will sell for under $50. Coming in the 2nd/3rd quarter of the year is *N-Vision*, a paint program for the Amiga.

I've had a chance to use *Impact* for the Amiga, produced by **Aegis**. This is a presentation graphics program for the creation of charts and graphs. It also has a great slide-show feature. It should be available by the time you read this.

Avant-Garde will be releasing several new products for the Commodore 64: *Jackie Stewart's Winning Formula*, a competitive racing skill builder; *The Entrepreneur's Game*, a tutorial and simulation on venture capital; *Get What You Want*, an interactive tutorial on negotiating; and *Family Album*, a geneology tracking program.

GEOS from **Berkeley Softworks** will be on the shelves by now. See the feature elsewhere in this issue for more details on this revolutionary new operating system that turns your Commodore 64 into a mini Amiga.

Broderbund has several products

for the 64 coming soon. *Print Shop Companion* will finally be released. This supplemental disk for the popular *Print Shop* will include 12 new fonts, a font editor, 50 new borders, a border editor, calendar maker, and an enhanced graphics editor. Also coming is the *Graphics Library Disk 4*, and *Where in the World is Carmen SanDiego*, a world exploration game that has you tracking a thief to different countries using the World Almanac (included) to decipher clues. In the works for the Commodore 64 are *Variable Feasts*, a meal planning tool based on the Time-Life *Foods of the World* cookbooks; and *Theater Europe*, a World War III simulation that pits the Warsaw Pact nations against NATO forces in West Germany. If you can keep the Eastern Bloc forces out of West Germany for 30 days you win, but watch out, don't let the conflict escalate to the use of nuclear weapons. There are no winning scenarios with nuclear weapons.

Broderbund also has several Amiga products under development. There are no firm release dates as of yet on any of these, but look for *Mindwheel*, *Essex* (an intergalactic search and rescue), *Brimstone* (Sir Gawain's escape from the underworld of Ulro), *The Print Shop* with color printing and an on-screen preview function, and *Mindwalker*, a stereo-sound, 3D-graphics adventure starting with a stroll through the "mental" mind, fighting off bad thoughts while blazing a trail to the "physical" mind, and on from there. I saw a preview of this game, and it had some of the best graphics and sound I have seen on the Amiga to date. Although it was still under development when I saw it, I highly recommend this as a must-have game.

I couldn't resist a mention of **Cardco's** new hard disk drives for the Commodore 64 and 128. Soon to be available in 5-, 10-and 20-megabyte versions, these drives are supposed to be totally transparent to the end-user, and are addressed just as standard 1541/1571 drives are. Cardco plans to include a utility for installing protected software on the hard disk.

Electronic Arts is marketing a host of new products, many of them developed by other companies. Starting with the Commodore 64, we have

Hopefully this column will give you some information about products before they come out, and will allow you to decide if they fit your needs when they finally arrive.

Boulder Dash +, a combination of *Boulder Dash 1* and *Boulder Dash 2* with some additional intermission screens; *Wizard +*, a combination of the existing *Wizard* programs with an enhanced level editor and new graphics by Paul Reiche; Timothy Leary's *Mind Mirror*, a personality development and role-playing program; *Lords of Conquest*, a strategy game based on *Borderlands*; *Amnesia* by Thomas M. Disch, an all-text adventure that starts with you waking up in Manhattan with no memory of who you are, or why you are wanted for murder. The entire subway system and over 4,000 landmarks are included in this two-disk, double-sided adventure. Also for the 64 are two new role-playing adventures created by **Origin Systems** and marketed by Electronic Arts: *Moebius*, an Oriental world of magic, mysticism, and combat with some of the most fluid combat scenes I've seen on the 64; and *Autoduel*, based on *CarWars*, a futuristic freeway battle, where the right of way goes to the biggest guns.

For the 128, Electronic Arts will release an enhanced version of *Adventure Construction Set* by Stuart Smith. Look also for a version of *Marble Madness* for the 128 and 64.

Electronic Arts also has several products for the Amiga about to be released. Versions of *Marble Madness*, *Adventure Construction Set*, *Pinball Construction Set*, *Archon II*, *Deluxe Music Construction Set*, and *Deluxe Printing Construction Set* will all be coming in the 2nd/3rd quarters of this year. I'll be looking in depth (no pun intended) next month at *Return to Atlantis* for the Amiga. Under the "you heard it here first" category, Electronic Arts will be producing a baseball game for the Amiga, featuring statistics of famous baseball players. There will also be a football game to follow.

Enlightenment, Inc has released *Jeremy Silman's Complete Guide to Chess Openings*, an extensive tutorial giving a complete system of chess openings, including "Play the White Pieces" and "Play the Black Pieces," "King's Indian Defense (4.e4 lines)," and "Najdorf Sicilian Defense." Each tutorial contains more than 60 hours of instructional material as well as the "Coffeehouse Chess Monster" opponent program.

Gamestar will be releasing *GBA Basketball* for the 64/128. This two-on-two version will feature over 40K of animation and a league option that will extend the playing enjoyment for months. I'll take an in-depth look at this game next month.

Mimetics has been a force in music software for quite a while. They have decided to make a strong commitment to produce Amiga music products, and will be announcing a set of programs running in the *Soundscape* series. These will all feature full MIDI support. Editors for RX11's, DX-TX 6 systems, MIDI record/playback sequencers, pitch followers, and a sound sampler that will retail for under $100 are some of the products that will be available in the 2nd/3rd quarter. I'll provide an in-depth look at the sound sampler next month.

Mindscape is ready to ship *Keyboard Cadet*, a typing tutorial; *Deja Vu*, a 1940's style graphics-and-text mystery; and *Brataccas*, an adventure game with movie-like animation, over 50 separate characters, and mouse-controlled action. All of these are for the Amiga.

Last but by no means least in our line-up of future releases is *Gunship* from **Microprose** for the Amiga. This is a helicopter simulation of the AH-64 Apache attack gunship.

Well, that's the round-up of new products you can expect to see in the next few months. This is by no means all of the programs coming, but hits on the highlights of what you should be looking for.

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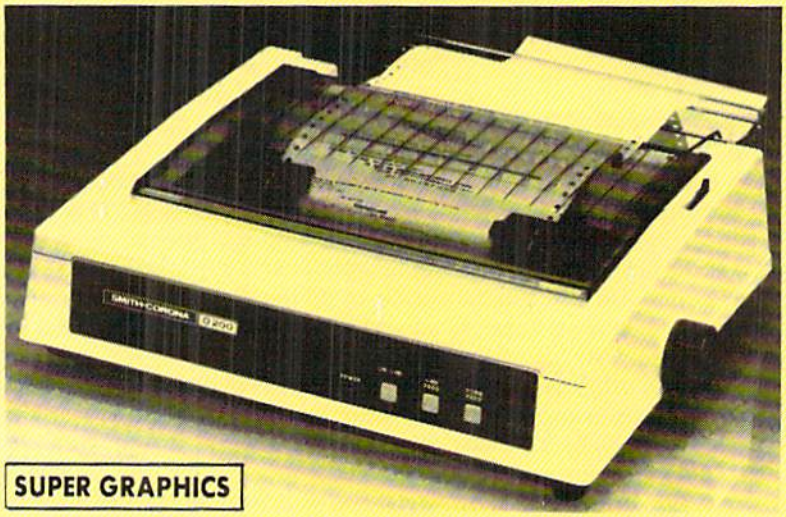

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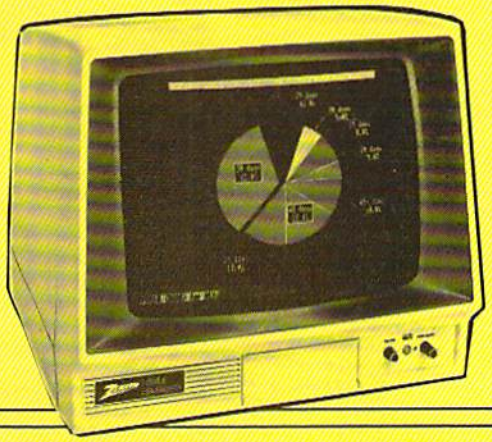

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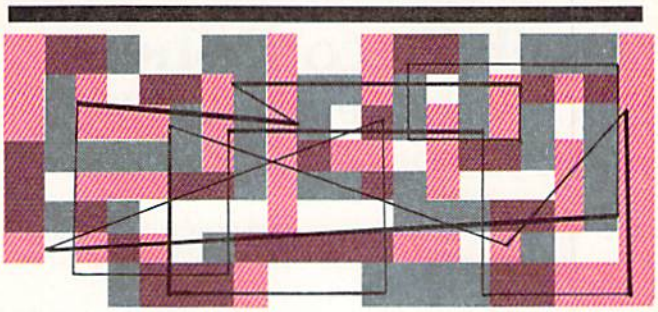
BY JERRY A. STURDIVANT

Abstract

for the Commodore 128



A quick program that creates interesting abstract drawings, using random numbers and the 128's DRAW and BOX commands.

Being in electronics, I understand some of the benefits of leaving electrical equipment on. And a computer that is turned off is doing nothing to earn its keep.

I like to leave mine on as a continual art display. Each time I finish with my computer, I load this program, run it for about ten seconds or so, then hit the space bar, thereby leaving an abstract "painting."

Depending on your mood, you can pick three different types of display. I call them LINES, BOXES, and BOTH.

Because you use the new BASIC words DRAW and BOX, the program is very simple. Line 30 is used for creating random numbers from within the program. Lines 40 to 100 are for making your selection. Line 170 and 180 pick a number for a random location on the graphics screen. Then we enter the DO loop.

X1 and Y1 pick another random screen location and line 220 picks a color. If you selected LINES, the line 240 will activate the BASIC word DRAW and draw a colored line between the two random screen locations. If you selected BOX, then a box is drawn between the two locations.

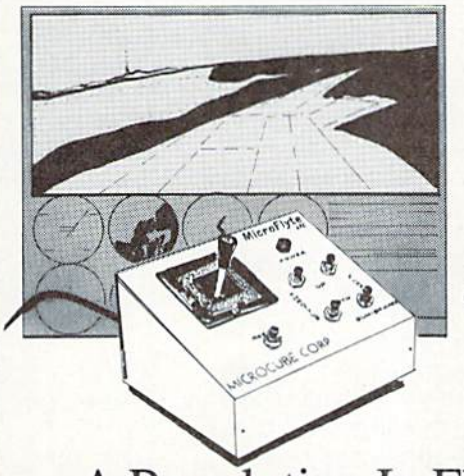
X1 and Y1 now transfer their numbers to X and Y. Then we loop back to pick up two new locations for X1 and Y1. This loop will continue until we exit. Then we can either continue drawing or start over. C

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Abstract

```
10 GRAPHIC 1,1:GRAPHIC 0
20 DEF FN R(X)=INT(X*RND(0)+1)
30 PRINT"[CLEAR,DOWN2] 1. LINES"
40 PRINT" 2. BOXES"
50 PRINT" 3. BOTH"
60 PRINT"[DOWN,SPACE4]SPACEBAR
   TRIGGERS OFF AND ON."
70 PRINT"[DOWN,SPACE4]'R' RUNS NEW
   PROGRAM."
80 DO
90 GET KEY G$:G=VAL(G$)
100 IF G=1 THEN A=1
110 IF G=2 THEN B=1
120 IF G=3 THEN A=1:B=1
130 LOOP UNTIL G<4 AND G>0
140 COLOR 0,13:COLOR 4,13
    :REM BACKGROUND
150 GRAPHIC 1,1
160 X=FN R(320)
170 Y=FN R(200)
180 DO
190 X1=FN R(320)
200 Y1=FN R(200)
210 C=FN R(16):IF C=13 THEN 210
220 COLOR 1,C
230 IF A THEN DRAW,X,Y TO X1,Y1
240 IF B THEN BOX,X,Y,X1,Y1
250 X=X1:Y=Y1
260 GET A$:IF A$<>"" THEN EXIT
270 LOOP
280 GET KEY A$
290 IF A$="R" THEN RUN :ELSE 180
```

END



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Family Record Sheet

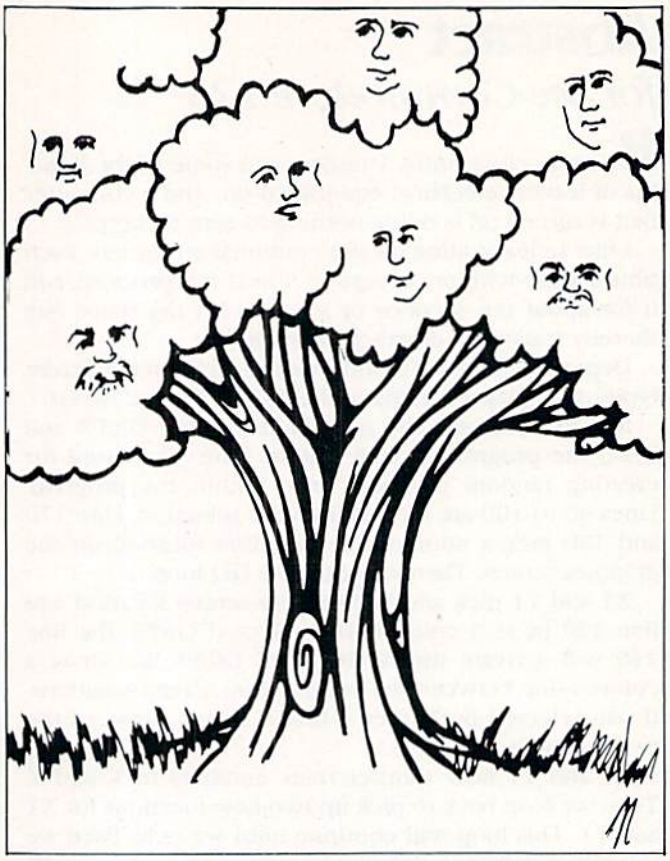
for Commodore 64 and 128 with 1526 or MPS-802 Printer

For those of you who are tracing your family history, how many times have you needed more room to write on those research forms you use?

I have, dozens of times. So I designed the Family Record Sheet to overcome that problem. The program prints out a two-page form that gives you plenty of room to write. It provides space for listing up to ten children, plus ample room for memos.

The form fits very nicely into a typewriter, too.

"Family Record Sheet" was designed for use with the Commodore 1526 or MPS-802 printer. If you are using a different printer, you may need to change the secondary address and chr$ to make the program work on your printer (consult your printer manual). C



If you are tracing your family history, use this handy form to keep track of your research.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Family Record Sheet

```
1 PRINT"[CLEAR,RVS,WHITE,RVOFF]"
  :POKE 53280,7:POKE 53281,12'DRLF
2 PRINT"[DOWN2,RIGHT4]FAMILY HISTORY
  DATA SHEET"'BASI
3 PRINT"[DOWN2,RIGHT5]PLEASE TURN ON
  PRINTER"'BAFI
4 PRINT"[DOWN2]PRESS(P)AND HIT RETURN
  TO START PROGRAM"'BAON
5 PRINT"-[RIGHT2,DOWN2]
  (USE NO COMMAS OR COLONS)"'BASK
6 PRINT" ":INPUT Z$'CDUF
7 IF Z$<> "P" GOTO 5'EDXI
8 IF Z$= "P" GOTO 10'DEUI
10 A$=CHR$(14)'CGWY
20 B$=CHR$(129)'CHDA
30 OPEN 4,4,0'BFRA
40 PRINT#4,CHR$(147)'CHVC
51 PRINT#4,A$SPC(6)"*FAMILY HISTORY
   DATA SHEET*"'CGFL
52 PRINT#4,CHR$(13)'CGPF
53 PRINT"[CLEAR]"'BATF
60 PRINT"[RIGHT4,DOWN2]NAME:"
   :INPUT NA$'CEBG
62 PRINT#4,B$SPC(3)"NAME:**"NA$'CJAI
63 PRINT#4,CHR$(13)'CGPH
64 PRINT"[RIGHT4,DOWN2]DATE OF BIRTH:"
   :INPUT DA$'CEWM
66 PRINT#4,B$SPC(3)"DATE OF BIRTH
   :**"DA$'CJRP
100 PRINT"[RIGHT4,DOWN2]PLACE OF BIRTH
    :":INPUT PL$'CERB
111 PRINT#4,B$SPC(3)"PLACE OF BIRTH
    :**"PL$'CJLE
113 PRINT"[RIGHT4,DOWN2]COUNTY:"
    :INPUT CO$'CEXD
115 PRINT#4,B$SPC(3)"COUNTY
    :**"CO$'CJRG
131 PRINT"[RIGHT4,DOWN2]DATE OF DEATH
    :":INPUT DE$'CEHF
133 PRINT#4,B$SPC(3)"DATE OF DEATH
    :**"DE$'CJCI
135 PRINT"[RIGHT4,DOWN2]PLACE OF DEATH
    :":INPUT AC$'CEYJ
137 PRINT#4,B$SPC(3)"PLACE OF DEATH
    :**"AC$'CJSM
138 PRINT"[RIGHT4,DOWN2]COUNTY:"
    :INPUT OU$'CEQK
139 PRINT#4,B$SPC(3)"COUNTY
    :**"OU$'CJKM
140 PRINT"[RIGHT4,DOWN2]FATHER'S NAME
    :":INPUT FA$'CEJF
142 PRINT#4,B$SPC(3)"FATHER'S NAME
    :**"FA$'CJDI
150 PRINT"[RIGHT4,DOWN2]MOTHER'S NAME
    :":INPUT MO$'CEBG
152 PRINT#4,B$SPC(3)"MOTHER'S NAME
    :**"MO$'CJUJ
160 PRINT"[CLEAR]"'BATC
170 PRINT#4,CHR$(13)'CGPE
```

JIFFIES/FAMILY RECORD SHEET

```
180 PRINT"[RIGHT4,DOWN2]SPOUSE'S NAME
    :":INPUT SP$'CEYJ
190 PRINT#4,B$SPC(3)"SPOUSE'S NAME
    :**"SP$'CJSL
195 PRINT#4,CHR$(13)'CGPL
200 PRINT"[RIGHT4,DOWN2]DATE OF BIRTH
    :":INPUT AT$'CENC
220 PRINT#4,B$SPC(3)"DATE OF BIRTH
    :**"AT$'CJHF
230 PRINT"[RIGHT4,DOWN2]PLACE OF BIRTH
    :":INPUT AC$'CESF
232 PRINT#4,B$SPC(3)"PLACE OF BIRTH
    :**"AC$'CJMI
251 PRINT"[RIGHT4,DOWN2]COUNTY:"
    :INPUT NT$'CEOG
253 PRINT#4,B$SPC(3)"COUNTY
    :**"NT$'CJIJ
255 PRINT"[RIGHT4,DOWN2]DATE OF DEATH
    :":INPUT DTE$'CFQM
257 PRINT#4,B$SPC(3)"DATE OF DEATH
    :**"TE$'CJSP
259 PRINT"[RIGHT4,DOWN2]PLACE OF DEATH
    :":INPUT CE$'CEDQ
261 PRINT#4,B$SPC(3)"PLACE OF DEATH
    :**"CE$'CJWK
262 PRINT"[RIGHT4,DOWN2]COUNTY:"
    :INPUT TY$'CEAI
264 PRINT#4,B$SPC(3)"COUNTY
    :**"TY$'CJTL
270 PRINT"[RIGHT4,DOWN2]FATHER'S NAME
    :":INPUT ER$'CEAJ
272 PRINT#4,B$SPC(3)"FATHER'S NAME
    :**"ER$'CJTM
274 PRINT"[RIGHT4,DOWN2]MOTHER'S NAME
    :":INPUT RE$'CEVN
275 PRINT#4,B$SPC(3)"MOTHER'S NAME
    :**"RE$'CJPP
290 PRINT"[CLEAR]"'BATG
310 PRINT"[RIGHT2,DOWN2]CHILD/CHILDREN
    :(WILL LIST 6)"'BAUG
311 PRINT"[RIGHT2,DOWN2]
    WHEN DONE LISTING HIT RUN/STOP
    RESTORE"'BAEK
320 PRINT#4,A$SPC(15)"CHILDREN
    :[SHFT S2]"'CHWF
330 PRINT#4,CHR$(13)'CGPC
340 FOR X=0 TO 5'DDWD
350 PRINT"[RIGHT4,DOWN2]NAME:"
    :INPUT DL$'CECG
352 PRINT#4,B$SPC(3)"NAME
    :[SHFT S2]"DL$'CJCK
360 PRINT"[RIGHT4,DOWN2]DATE OF BIRTH
    :":INPUT BI$'CEDJ
380 PRINT#4,B$SPC(3)"DATE OF BIRTH
    :[SHFT S2]"BI$'CJEN
381 PRINT#4,CHR$(13)'CGPI
390 NEXT'BAEG
400 CLOSE 4,4,0:END'CGXA
```

END

Copy Worldwide Short-wave Radio Signals on Your Computer

Remember the fun of tuning in all those foreign broadcast stations on the short-wave radio? Remember those mysterious sounding coded tone signals that baffled you? Well, most of those beeps & squeals are really digital data transmissions using radioteletype or Morse code. The signals are coming in from weather stations, news services, ships & ham radio operators all over the world. Our short-wave listener cartridge, the "SWL", will bring that data from your radio right to the video screen. You'll see the actual text as it's being sent from those far away transmitters.

The "SWL" contains the program in ROM as well as radio interface circuit to copy Morse code and all speeds/shifts of radioteletype. It comes with a cable to connect to your radio's speaker/earphone jack, demo cassette, and an excellent manual that contains a wealth of information on how to get the most out of short-wave digital DXing, even if you're brand new at it.

For about the price of another "Pac-Zapper" game, you can tie your Commodore 64, 128 or VIC-20 into the exciting world of digital communications with the Microlog SWL. $64. Postpaid, U.S.

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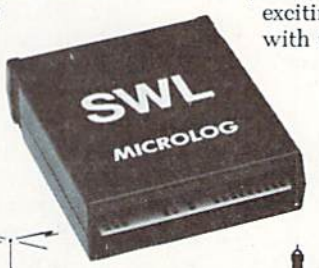

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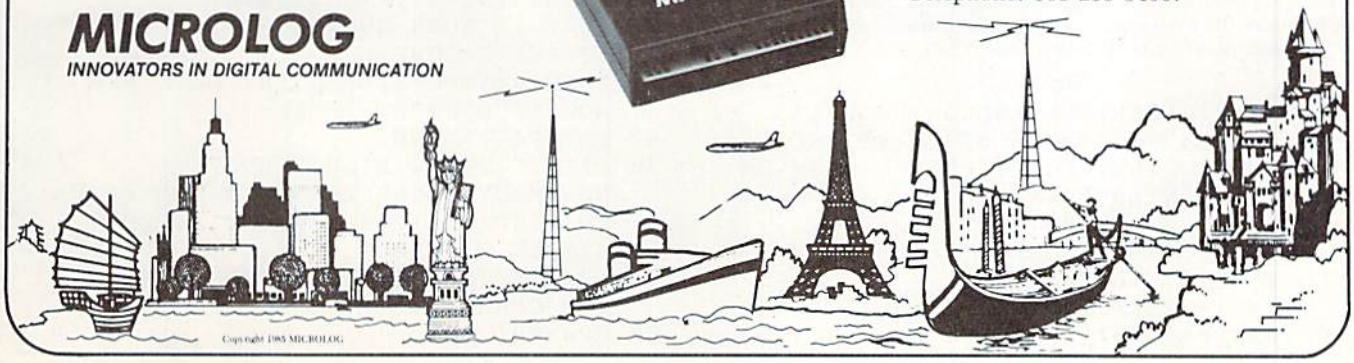


BY D. W. SAMPSON

Pay Check

for the Commodore 64 and Commodore 128 with 1526 or MPS-802 Printer

Since pay stubs are small and easily lost, here is an alternative way to keep track of your earnings. "Pay Check," for use with Commodore's 1526 and MPS-802 printers, lets you enter all your payroll information and print it out, so you can keep it all together in a file or three-ring binder.

If you use a printer other than the 1526 or MPS-802, you may have to change the secondary address in line 8, as well as the CHR$ (consult your printer's manual).

The program can also be adapted for use in preparing payroll for a small business. To do so, make the following changes:

Line 11: Change the spacing and insert the name of your business.
Line 20: Change to read "payroll".
Add the following lines:

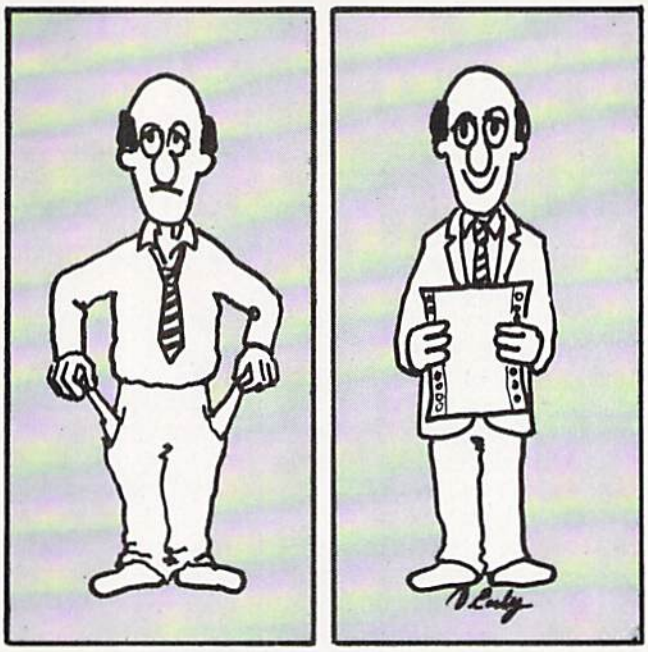
```
21  PRINT#4,
22  PRINT"(CRSR2DOWN2RIGHTRVSON)-
    EMPLOYEE'S NAME:(RVSOFF)":INPUTTY$
23  PRINT#4,(SPC 5);TY$;
24  PRINT#4,
```

Line 60: Change statement to same as in line 61.
Line 70: Change statement to same as in line 71.
Line 110: Change statement to read same as in line 120.
Line 200: Change statement to read same as in line 210.
Line 260: Change word "your" to read "employee's".
Line 412: Change word "your" to "employee's".
Line 430: Change word "your" to "employee's".
Line 440: Change word "your" to "employee's".
Line 1050: Change to read "commissions earned".
Line 2000: Change word "you" to "employee".
Line 2010: Change word "your" to "employee's".
Line 2040: Change word "you" to "employee".
Line 2080: Change word "your" to "employee's".
Lines 330-400 may be changed to meet your needs. C

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Paycheck

```
1 PRINT"[CLEAR,RVS,YELLOW,RVOFF]"
  :POKE 53280,3:POKE 53281,11'DRFG
5 PRINT"[DOWN2,RIGHT7]PLEASE TURN ON
  YOUR PRINTER"'BAWM
6 FOR T=1 TO 15000:NEXT'EIOI
7 PRINT"[CLEAR]"'BATG
8 OPEN 4,4,0'BFRH
9 PRINT#4,CHR$(147)'CHVJ
10 PRINT#4,CHR$(13)'CGPY
```



Keep track of your earnings and deductions with this handy program—and stop worrying about lost pay stubs.

```
11 PRINT#4,SPC(35)"PAY CHECK"'CFIC
20 PRINT"[DOWN2,RIGHT4,RVS]PAY CHECK
   [RVOFF]"'BARC
30 PRINT"[DOWN3,RIGHT5,RVS]
   PERIOD BEGINNING:[RVOFF]"
   :INPUT PE$'CEFH
31 PRINT#4,SPC(3)"PERIOD BEGINNING
   :"PE$'CHMH
32 PRINT#4,'BCWB
40 PRINT"[DOWN3,RIGHT6,RVS]
   PERIOD ENDING:":INPUT EN$'CEYG
41 PRINT#4,SPC(3)"PERIOD ENDING
   :"EN$'CHSH
50 PRINT#4'BBDB
51 FOR T=1 TO 1500:NEXT'EHVF
52 PRINT"[CLEAR]":GOTO 1001'CFCF
60 PRINT"[DOWN2,RIGHT2,RVS]
   WHAT IS YOUR HOURLY RATE:[RVOFF]"
   :INPUT H'CCHL
61 PRINT#4,SPC(3)"REG.PAY RATE PER
   HOUR:$"H'CFPL
62 PRINT#4,'BCWE
70 PRINT"[DOWN2,RIGHT2,RVS]
   HOW MANY HOURS HAVE YOU WORKED
   THIS[SPACE4]PAY PERIOD:[RVOFF]"
   :INPUT M'CCLS
71 PRINT#4,SPC(3)"REG.HOURS WORKED
   :"M'CFAL
80 RP=M*H'CEXG
```

JIFFIES/PAYCHECK

```
90 PRINT"[DOWN2,RIGHT2,RVS]
   REG.PAY EARNED:[RVOFF]$"RP'BCJL
91 PRINT#4,'BCWG
100 PRINT#4,SPC(3)"WAGES EARNED
    REG.PAY:$"RP'CGFD
110 PRINT"[DOWN2,RIGHT2,RVS]
    HOW MANY HOURS OVERTIME FOR THIS
    PAY[SPACE2]PERIOD:[RVOFF]"
    :INPUT O'CCQK
120 PRINT#4,SPC(3)"OVERTIME HRS.
    :"O'CFDD
130 PRINT"[DOWN2,RIGHT2,RVS]
    AT WHAT RATE:[RVOFF]":INPUT Z'CCTE
140 OV=O*Z'CEVB
150 PRINT#4,SPC(3)"OVERTIME EARNINGS
    :$"OV'CGPH
160 PRINT#4,'BCWB
170 PRINT"[DOWN2,RIGHT2,RVS]
    ENTER BONUSES IF ANY(IF NOT ENTER
    0):[RVOFF]":INPUT B'CCUO
180 PRINT#4,SPC(3)"BONUS:$"B'CFOH
190 GW=RP+OV+B'DHTI
200 PRINT"[DOWN2,RIGHT2,RVS]
    YOUR GROSS WAGES EARNED ARE
    :[RVOFF]$"GW'BCKG
210 PRINT#4,SPC(3)"GROSS WAGES
    :$"GW'CGND
220 PRINT#4,'BCWX
230 FOR T=1 TO 10000:NEXT'EIJD
240 PRINT"[CLEAR,DOWN2,RIGHT2,RVS]
    GROSS WAGES:[RVOFF]$"GW'BCPG
241 GOTO 260'BDHC
260 PRINT"[DOWN2,RIGHT2,RVS]
    PLEASE ENTER YOUR DEDUCTIONS
    :[RVOFF]"'BAXL
261 PRINT#4,'BCWD
262 PRINT#4,SPC(3)"DEDUCTIONS:"'CEXJ
263 PRINT#4,'BCWF
270 PRINT"[DOWN2,RIGHT2,RVS]
    1.FEDERAL W/H:[RVOFF]"
    :INPUT F'CCMJ
280 PRINT#4,SPC(3)"1.FEDERAL W/H
    :$"F'CFKJ
290 PRINT"[DOWN2,RIGHT2,RVS]2.FICA
    [RVOFF]":INPUT I'CCBJ
300 PRINT#4,SPC(3)"2.FICA:$"I'CFCB
310 PRINT"[DOWN2,RIGHT2,RVS]
    3.STATE W/H:[RVOFF]":INPUT S'CCRD
320 PRINT#4,SPC(3)"3.STATE W/H
    :$"S'CFJE
330 PRINT"[DOWN2,RIGHT2,RVS]
    4.HEALTH INS.:[RVOFF]"
    :INPUT L'CCJG
340 PRINT#4,SPC(3)"4.HEALTH INS.
    :$"L'CFCH
350 PRINT"[DOWN2,RIGHT2,RVS]
    5.CREDIT UNION:[RVOFF]"
    :INPUT U'CCNI
360 PRINT#4,SPC(3)"5.CREDIT UNION
    :$"U'CFFJ
370 PRINT"[DOWN2,RIGHT2,RVS]
    6.CONTRIBUTIONS:[RVOFF]"
    :INPUT C'CCKL
380 PRINT#4,SPC(3)"6.CONTRIBUTIONS
    :$"C'CFDM
390 PRINT"[DOWN2,RIGHT2,RVS]7.OTHER
    :[RVOFF]":INPUT V'CCPK
400 PRINT#4,SPC(3)"7.OTHER:$"V'CFHC
410 PRINT#4,'BCWY
411 PRINT"[CLEAR]"'BATB
412 PRINT"[DOWN2,RIGHT2,RVS]
    ARE YOUR EARNINGS HOURLY OR
    COMMISSION:[RVOFF]C OR H:"
    :INPUT ZE$'CEWQ
413 IF ZE$="C"GOTO 418'DGFF
414 IF ZE$<>"C"GOTO 420'EGVH
418 JC=FA-(F+I+C+L+U+S+V)
    :GOTO 441'JRDR
420 NW=GW-(F+I+C+L+U+S+V)
    :GOTO 430'JRXK
430 PRINT"[DOWN2,RIGHT2,RVS]
    YOUR NET WAGES ARE:[RVOFF]
    $"NW'BCVI
440 PRINT#4,SPC(3)"YOUR NET WAGES ARE
    :$"NW :GOTO 450'DKDL
441 PRINT"[DOWN2,RIGHT2,RVS]
    YOUR NET WAGES ARE:[RVOFF]
    $"JC'BCWK
442 PRINT#4,SPC(3)"YOUR NET WAGES ARE
    :$"JC'CGSL
450 CLOSE 4,4,0'BFSE
460 END'BACE
1001 PRINT"[DOWN2,RIGHT2,RVS]
     DO YOU WORK ON COMMISSION
     :[RVOFF]YES OR NO":INPUT CO$'CEWG
1020 IF CO$<>"YES"GOTO 60'EFKY
1030 IF CO$="YES"GOTO 1050'DHDA
1050 PRINT#4,SPC(34)"MY
     COMMISSIONS"'CFJE
2000 PRINT"[DOWN2,RIGHT2,RVS]
     WHAT WAS YOUR GROSS SALE TOTAL
     :[RVOFF]$":INPUT D'CCPF
2005 PRINT#4,SPC(3)"GROSS SALES
     :$"D'CFFE
2010 PRINT"[DOWN2,RIGHT2,RVS]
     WHAT IS YOUR COMMISSION RATE
     :[RVOFF]%":INPUT P%'CDTG
2020 PRINT#4,SPC(3)"COMMISSION RATE
     :%"P%'CGRD
2030 CE=P%*D/100'DIUA
2040 PRINT"[DOWN2,RIGHT2,RVS]
     YOU EARNED:[RVOFF]$"CE'BCLD
2050 PRINT#4,SPC(3)"COMMISSIONS EARNED
     :$"CE'CGWH
2052 PRINT"[DOWN2,RIGHT2,RVS]
     BONUS EARNED:(IF NOT ENTER 0)
     [RVOFF]$":INPUT NS'CDQL
2060 PRINT#4,SPC(3)"BONUS:"NS'CGWE
2061 FA=CE+NS'CGME
2080 PRINT"[DOWN2,RIGHT2,RVS]
     YOUR GROSS EARNINGS ARE
     :[RVOFF]$"FA'BCBL
2090 PRINT#4,SPC(3)"GROSS EARNINGS
     :$"FA'CGRJ
3000 FOR T=1 TO 5000:NEXT'EHUX
3010 PRINT"[CLEAR]":GOTO 241'CEJX
```

END

BY W. O. NELSON

Speed Boat Race
for the Commodore 64

Speed Boat Race is an exciting action game that can be played by one to four people using the keyboard. You race a speedboat down a river full of little islands. The object is to maneuver between the flags marking the course. To speed your progress, there are jump ramps which will propel your boat through the air. But if you crash into a flag marker or an island, there is a slight delay while you make repairs and get underway again.

Your goal is to get the lowest score possible by running the course in the shortest amount of time, going between all the markers and not hitting any objects. If you miss going between a set of flags, you are penalized five points.

First type in the game program at the end of this article and save it. To play the game, load and run it in the usual way. You will then see an instruction screen asking for the number of players, number of rounds, and skill level. The skill level selected determines how many island obstacles will be randomly printed on the screen. Try the beginner level first to get familiar with the game. When you have entered your choices, you will see a starting position. Press any key to start the action and use the comma and period keys to move the boat left or right.

All objects on the screen are keyboard graphic symbols, except the boat, which is a sprite. The screen is constantly scrolled upward as new lines containing islands, flags, ramps or blanks are printed at the bottom. This is done in a loop that goes from lines 320 to 470. When an object is hit, line 450 detects it and sends the program down to line 500 to find out what was encountered and what action to take.

The sprite-collision detector tells you that something has been hit, but won't differentiate among different objects. To do this, a blank space is printed in front of the boat (line 360) and when line 450 detects a foreign object, then lines 500 through 580 determine whether it is a flag gate, finish line, a flag itself, a ramp, or an island. Appropriate action is then taken, sound effects enabled, scorekeeping done if required, and the program returns to the action loop. If the finish line is hit, however, the game is stopped and final scores printed.

How do the collision detectors know when the boat goes between flags? If you look at line 400, you'll see a line of Commodore @ symbols (POKE 100) between the flags. The line is printed in the screen color, so it doesn't show up, but it still can be peeked by lines 450 and 500.

Developing the sound routines was somewhat of a challenge, especially when the boat goes over a jump ramp. The descending whistle sound is made with a loop that counts down from 200 to 100 (line 880). I didn't want the action to stop while this was happening, so I placed a counter, R1, inside the loop. Every time R1 counts up to eight, it jumps to line 895, which prints a blank line and keeps the screen scrolling upward.

To provide more reliable action, an invisible character (£, #28) is poked in under the boat in line 340. In 345, if no key is pressed, the boat stays in the screen's center, and the waves (73 and 85) are poked in beside it. In line 350, if the comma key is pressed then D = −1 moves the invisible character, the space in front of it, and the waves to the left. Lines 356 through 358 move the boat sprite to the left in increments of eight pixels at a time. Similarly, lines 355 through 358 move things to the right when the unshifted period key is pressed. C

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Speed Boat Race

```
35 FOR J=0 TO 63:READ I:POKE 12288+J,I
   :NEXT:REM READ IN SPRITE DATA'IISR
40 POKE 2040,192:V=53248
   :POKE V+39,2'EVIH
65 POKE 53280,5:POKE 53281,14'CQTL
70 PRINT"[CLEAR,YELLOW]"TAB(10)"[RVS]
    SPEED BOAT RACE"'CDQK
75 PRINT"[DOWN,BLACK]SCORE IS ELAPSED
   TIME +5 FOR EACH[SPACE3]
   GATE MISSED. LOWEST SCORE"'BAVY
80 PRINT TAB(32)"[UP]WINS."'CDHH
90 PRINT"[DOWN,GRAY3]PRESS < TO GO
   LEFT, > TO GO RIGHT."'BATO
95 PRINT"[DOWN]TRY TO GO THROUGH ALL
   GATES[SHFT SPACE,L. RED,CMDR M,
   CMDR V,CMDR @5,CMDR C,CMDR G]"'BAOA
100 PRINT"[GRAY3]AND MAKE ALL JUMPS
    [YELLOW,RVS,SHFT POUND,SPACE3,
    CMDR *,RVOFF,GRAY3]
    THAT YOU CAN."'BAUI
105 PRINT"[DOWN,BLACK]HITTING AN
    ISLAND WILL CAUSE DELAY!"'BAUK
```

```
110 INPUT"[DOWN,YELLOW]
    NO. OF PLAYERS (1-4)";NP
    :IF NP<1 OR NP>4 THEN 70'GMFI
115 INPUT"[DOWN]NO. OF ROUNDS (1-5)";
    NR:IF NR<1 OR NR>5 THEN 70'GMPM
120 R=1:P=1:PRINT"[DOWN,RVS,WHITE]
     PLAYER #";P:M$="[DOWN,YELLOW]
    "'ELHF
130 PRINT M$"SELECT SKILL LEVEL
    DESIRED:"'BCOG
135 PRINT"[WHITE]1=BEGINNER"
    :PRINT"2=INTERMEDIATE"'CBRL
140 PRINT"3=ADVANCED":PRINT"4=OLYMPIC"
    :PRINT"5=PROFESSIONAL"'DCEK
150 A$="":GET A$'CFLC
160 IF A$="1"THEN S$="[SPACE2]
    BEGINNER":GOTO 210'FIOI
170 IF A$="2"THEN S$="INTERMEDIATE"
    :GOTO 210'FIEK
175 IF A$="3"THEN S$="[SPACE2]
    ADVANCED":GOTO 210'FIVO
180 IF A$="4"THEN S$="[SPACE2]OLYMPIC"
    :GOTO 210'FIVK
185 IF A$="5"THEN S$="PROFESSIONAL"
    :GOTO 210'FIIQ
190 C1=C1+1:IF C1=20 THEN C1=0'GNPK
195 IF C1=10 THEN M$="[DOWN,L. BLUE]
    "'EGKN
200 IF C1=19 THEN M$="[DOWN,YELLOW]
    "'EGXA
205 PRINT"[UP8]":GOTO 130'CECH
210 SK=VAL(A$):RN=(SK+1)/10'FQVE
215 IF SK<1 OR SK>5 OR
    SK<>INT(SK)THEN PRINT"[UP10]"
    :GOTO 130'LQAS
220 SK=35-5*SK'DHAB
230 PRINT"[CLEAR]":S=54272'CHLC
240 FOR I=1 TO 12 STEP 2'EFRD
245 L=INT(RND(1)*38)+.5
    :PRINT TAB(L);"[L. GREEN,CMDR +,
    CMDR -,DOWN,RIGHT2,CMDR +2,UP]"
    :NEXT'IPSR
250 B=1484:C=54272:POKE B,28
    :POKE B+C,14:POKE B+37,32
    :POKE B+38,32:POKE B+40,32'LTJR
260 POKE 1475,106:POKE 1476,126
    :POKE 1475+C,10:POKE 1476+C,10
    :REM FLAGS'HQCP
265 POKE 1490,124:POKE 1491,116
    :POKE 1490+C,10:POKE 1491+C,
    10'GKPR
270 PRINT"[HOME,DOWN4,RIGHT4,RVS,
    YELLOW]";S$;"[SPACE2,RVOFF,DOWN19]
    "'BEYI
275 X1=175:POKE V+1,125:POKE V,X1
    :POKE V+21,1'GXLR
300 GET A$:IF A$=""THEN 300'EICB
310 TI$="000000"'BDCA
315 GOSUB 830:REM TURN ON SOUND'CPUI
320 REM START OF ACTION'BNLD
340 B=B+D:POKE B,F:POKE B+C,14'FNHH
345 IF PEEK(197)<>64 THEN 350'FKAL
347 D=0:F=28:POKE B-41,73
    :POKE B+C-41,3:POKE B-39,85
    :POKE B+C-39,3'MJJX
350 IF PEEK(197)<>47 THEN 355'FKGH
352 D=-1:F=28:POKE B-41,73
    :POKE B+C-41,3:POKE B-39,85
    :POKE B+C-39,3'NJGT
355 IF PEEK(197)<>44 THEN 357'FKFM
356 D=+1:F=28:POKE B-41,73
    :POKE B+C-41,3:POKE B-39,85
    :POKE B+C-39,3'NJFX
357 X1=X1+(D*8):IF X1>255 THEN POKE
    V+16,1:POKE V,X1-255:GOTO 360'LGDX
358 POKE V+16,0:POKE V,X1'DKDO
360 POKE B,32'BEFE
365 IF SK THEN FOR T=1 TO SK:NEXT'GHIN
370 G=G+1:IF G<28 THEN 410'FKCJ
380 G=0:E=E+1:IF E=10 THEN PRINT"
    [WHITE]=========================
    =============="'HKCV
390 IF E=10 THEN PRINT"[WHITE]
    ================================
    ======":GOTO 470'FHWT
400 X=INT(RND(1)*25)+2:PRINT TAB(X)"
    [L. RED,CMDR M,CMDR V,L. BLUE,
    CMDR @7,L. RED,CMDR C,CMDR H]"
    :GOTO 470:REM PRINT GATES'JCCT
410 IF G=10 THEN X=INT(RND(1)*30)+4
    :PRINT TAB(X)"[YELLOW,RVS,
    SHFT POUND,SPACE3,CMDR *]"
    :REM JUMP RAMP'LYPO
420 IF RND(1)>RN THEN 440'EIME
430 L=INT(RND(1)*30)+1:PRINT TAB(L)"
    [L. GREEN,CMDR POUND,DOWN,LEFT2,
    CMDR +2,UP]":GOTO 450'IQAN
440 PRINT:REM  PRINT BLANK LINE'CPBH
450 IF PEEK(B)<>32 THEN 500
    :REM TEST FOR COLLISION'GADN
470 GOTO 320'BDEG
490 REM WHAT DID BOAT COLLIDE WITH?
    :'BYGO
500 IF PEEK(B)=100 THEN H=H+1
    :FOR T=1 TO 30:NEXT:GOTO 470
    :REM GOES THRU A GATE'MIYO
510 IF PEEK(B)=61 THEN H=9-H
    :TM=INT(TI/60):POKE V+21,0
    :GOTO 640:REM FINISH LINE'NNRR
520 IF PEEK(B)=124 OR PEEK(B)=126
    THEN POKE B-40,91:GOTO 600
    :REM HITS A FLAG'LHHP
530 IF PEEK(B)<>160 AND PEEK(B)<>223
    AND PEEK(B)<>233 THEN 580
    :REM HIT A JUMP RAMP'OJUT
540 G=G+10:GOSUB 805:GOSUB 870
    :GOSUB 830:IF SK>0 THEN
    SK=SK-2'KATP
560 GOTO 470'BDKG
580 IF PEEK(B)=92 OR PEEK(B)=102 THEN
    POKE B-40,91:GOTO 600
    :REM HITS AN ISLAND'LJQW
590 GOTO 470'BDKJ
600 GOSUB 805:GOSUB 850
    :FOR J=2 TO 0 STEP-1
    :FOR I=5-J TO 5+J:POKE 53267,I
```

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```
    :NEXT I,J'OFSP
610 OS=OS+1:FOR T=0 TO 127
    :POKE B-40+C,INT(T/40)+2:NEXT'MYLO
630 GOSUB 805:GOSUB 830:GOTO 470'DLIG
640 GOSUB 810:REM SHUT OFF SOUND'CQAJ
650 U=0:PRINT"[CLEAR,RVS,WHITE]
     OBJECTS HIT=";OS:PRINT"[RVS]
     GATES MISSED=";H'DJAR
655 PRINT"[RVS] TIME="TM
    :SC=TM+5*H'EJKQ
660 PRINT"[RVS] SCORE="SC'BCGJ
670 Z(P)=Z(P)+SC:PRINT"[DOWN2,SPACE7,
    RVS] ROUND ";R:PRINT" "
    :FOR I=1 TO NP'HTST
680 PRINT"[SPACE2]PLAYER #";I;Z(I)
    :NEXT'CITN
690 SC=0:G=0:E=0:OS=0:H=0
    :IF U=10 THEN U=0:GOTO 130'KBQV
700 P=P+1:IF P<NP+1 THEN 130'GLSH
710 R=R+1:IF R<NR+1 THEN P=1
    :GOTO 130'IOQK
720 PRINT"[DOWN2,SPACE7,RVS]
     GAME OVER "'BAGH
725 POKE 198,0'BFXJ
730 INPUT"[DOWN2,RIGHT,YELLOW]
    DO YOU WISH TO PLAY AGAIN (Y/N)";
    B$'BDIO
740 IF B$="Y"THEN Z(1)=0:GOTO 70'FKOK
750 PRINT"[CLEAR,DOWN5,RIGHT10,RVS]
     GOODBYE! "'BANL
760 FOR T=1 TO 5000:NEXT
    :PRINT"[CLEAR,BLACK]":POKE 53280,0
    :POKE 53281,0'HYBR
800 REM ****SOUND ROUTINES****'BVYH
805 REM CLEAR SOUND REGISTERS'BTEN
810 FOR J=1 TO 24:POKE S+J,0:NEXT
    :RETURN'HLAJ
830 REM SOUND OF WIND'BLWI
835 POKE S+24,5:POKE S+5,128
    :POKE S+6,128:POKE S+1,40'IABU
840 POKE S+4,128:POKE S+4,129
    :RETURN'FOHM
850 REM SOUND OF CRASH'BMEL
855 POKE S+24,15:POKE S+5,28
    :POKE S+1,20:POKE S+4,128
    :POKE S+4,129:RETURN'LINB
870 REM JUMP ROUTINE'BLPM
875 POKE S+24,15:POKE S+5,12*16+0
    :POKE S+6,12*16+10'KAMA
880 FOR J=200 TO 100 STEP-1:POKE S+1,J
    :POKE S+4,17'JTLT
885 R1=R1+1:IF R1=8 THEN GOSUB
    895'GMIV
890 NEXT:POKE S+24,0:RETURN'EHRO
895 PRINT:R1=0:RETURN'DFAT
900 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0'BQBK
905 DATA 0,127,0,0,255,128,0,193,128,
    0,193,128,0,193,128'BWGR
910 DATA 0,193,128,0,193,128,0,193,
    128,0,193,128,0,255,128'BYQN
915 DATA 0,127,0,0,62,0,0,28,0,0,8,0,
    0'BEFO
```

END

AMIGA

The Buyer's Guide

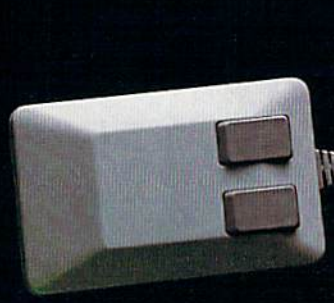
A Redgate Publication June, 1986

Descriptions Of More Than 250 Amiga Products

A Report On Coming Amiga Products

Amiga Printer Facts

Product Reviews:
Activision; Animator; Flow; DeluxePaint; Analyze!; Marauder; And Many More



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—*Amigaworld*

4. Arcticfox™

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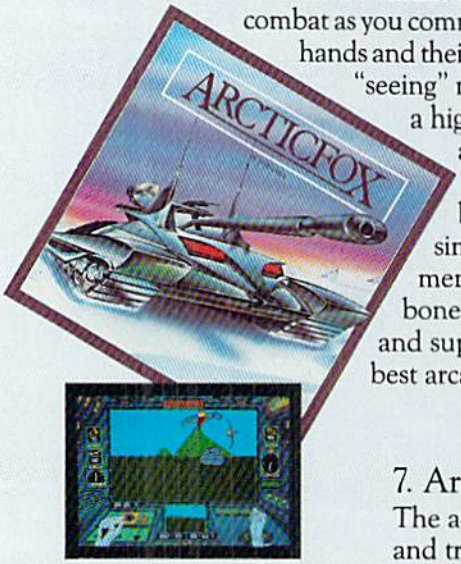

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—*Electronic Games*

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2. Skyfox™

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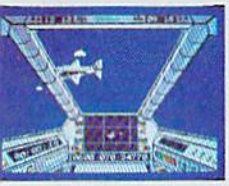

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—*Family Computing*

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—*Computer Entertainer*

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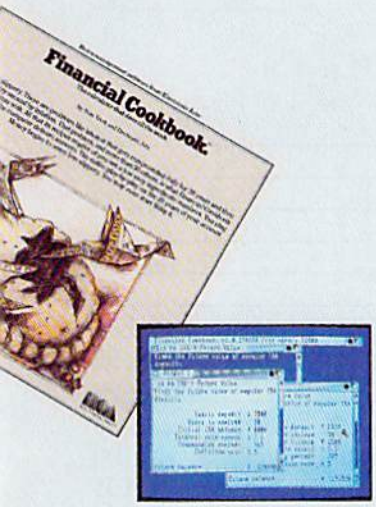

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Play the role of Columbus or Cortez in this lush simulation and adventure game. Learn history and geography as you explore the New World—and face the problems of the Conquistadors. Earn glory and gold, or wind up beached by mutineers. If you survive, the computer will generate unlimited new continents for you to explore.

"Best Role-Playing Adventure"
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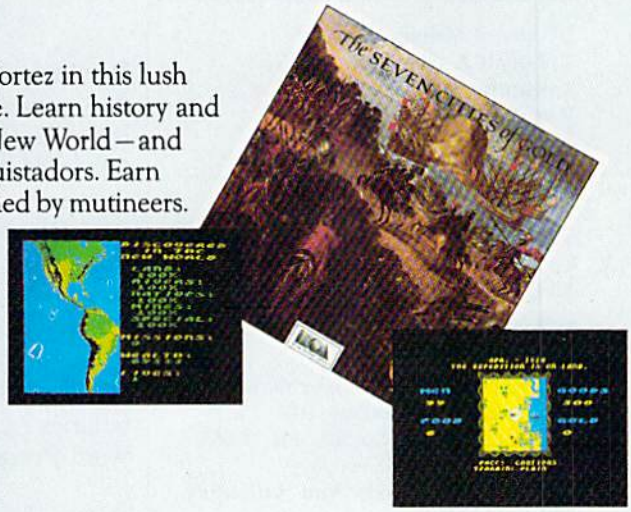

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The Amiga Buyer's Guide

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A Printer For All Reasons

Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the **best** printer on the market today at a bargain price.

The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seikosha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

"NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking ***quality*** printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for $500 and more *without* the interface or cable needed to hook up to your computer.

Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H_2O or X^2. This fantastic machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and . . . VOILA! The letter now fits on one page.

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Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½") ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only $11.00. Order *#2001.)*

The Best Part

When shopping for a printer with this quality and these features, you could expect to pay around $500 or more. *Not now!* We sell this fantastic printer for **only $259.95! You need absolutely nothing else to start printing — just add paper.**

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We give you a 2-week satisfaction guarantee. If you are not completely satisfied for any reason we will promptly refund your purchase. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours of receipt.

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Coming Soon:

Hundreds Of New Amiga Products

You've set up your new Amiga and you're looking for just the right software packages and peripherals to let you take advantage of its capabilities. Third-party support for the Amiga is in full swing with over 1,000 developers at work, and there is already a wide variety of products to choose from.

At press time in late March, there were 90 software titles available and 50 more due to be released by the end of April. These totals include software to be distributed by both third-party houses and under the Commodore-Amiga brand. Due to the unpredictable nature of the software market, undoubtedly several more are now available. One note of caution—some developers may have rushed software into production, so whenever possible you should try out programs before purchasing them.

Productivity Software

Developers such as Micro Systems, Electronic Arts, Lattice, TDI Software, Aegis and Manx have developed or are currently developing productivity software titles for the Amiga. Applications such as spreadsheets, telecommunications, word processing, investment analysis, outline processing, desktop publishing and data bases are examples of productivity software. There were just under 20 titles available in February and 16 more slated for release by April. "Right now we are working with half a dozen companies who are developing strong data bases, because that's an area of concern for a lot of people," says John Campbell, manager of software development at Commodore's Computer Systems Division in West Chester, Pa. Productivity software is the second largest software category for the Amiga, and more programs are sure to be forthcoming.

Small-Business Software

If you're a small-business owner with an Amiga, you probably want to know what kind of accounting packages are available. Chang Labs' *Rags-to-Riches* accounting series includes General Ledger, Accounts Payable and Accounts Receivables modules. Byte by Byte's integrated accounting package is available now, and BEST's integrated accounting package was slated for release in March. Also due for release in

THE
AMIGA
TECHNICAL REFERENCE SERIES

The Creator's Edge

THE AMIGA TECHNICAL REFERENCE SERIES from Addison-Wesley gives software developers and programmers the key to unlocking the power and versatility of the Amiga Personal Computer.

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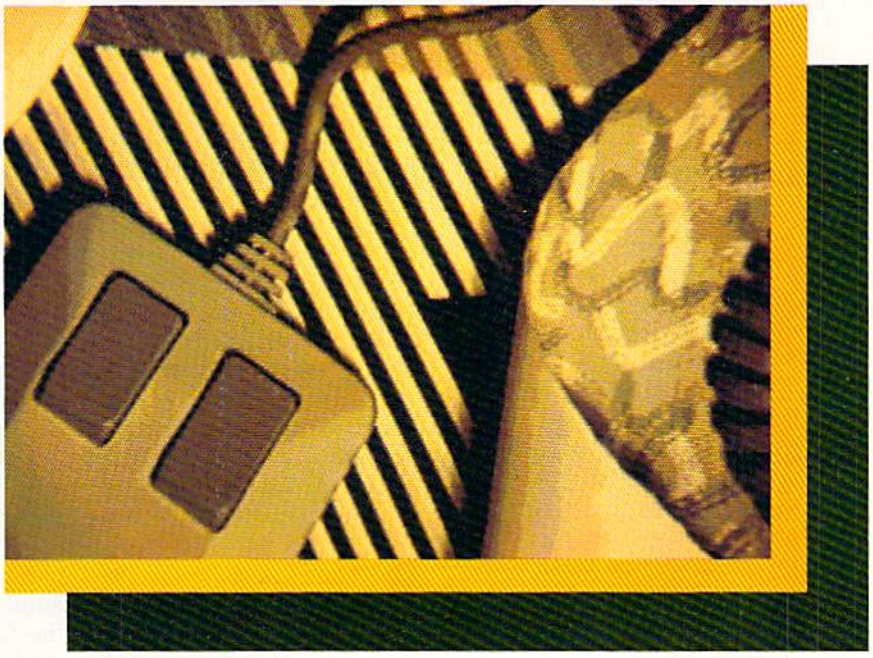

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AMIGA HARDWARE REFERENCE MANUAL
Provides detailed descriptions of the graphics and sound hardware of the Amiga and explains how the machine talks to the outside world through peripheral devices.

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Provides a complete description of Intuition, the Amiga user interface. Numerous examples and illustrations show how to create applications programs that conform to Intuition's guidelines.

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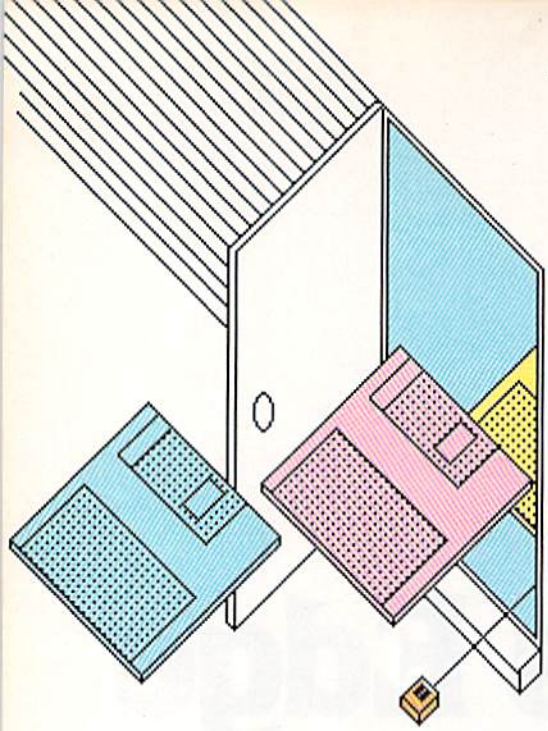


March were TDI Software's seven accounting modules: A/P, A/R, G/L, Inventory, Order Processing, Payroll and Purchasing; as well as Manx's *Horizon I* and *OPUS* accounting packages.

Educational Software

Parents and teachers who've purchased an Amiga will want to know what educational titles are available. Though education is the smallest software category, it's only a matter of time before developers begin to write educational software that takes advantage of the Amiga's state-of-the-art graphics. Kids spend hours playing video games in arcades. Just think of the ramifications, if they spent as much time with educational programs that *look* like arcade games on their Amigas. Nine titles from such developers as Scarborough, Mindscape, First Byte and True Basic were slated for delivery by April.

Recreational Software

The largest category, programs designed mainly for entertainment, is currently available from companies such as Infocom, Mindscape, Activision, Electronic Arts and Blue Chip. More than 30 games were available at press time and nine more were due to be released by April. They range from illustrated text adventures, such as Activision's *Mindshadow* and *Borrowed Time,* to animated board games such as Electronic Arts' *Archon.* Many of these games are designed to use the Amiga's sound capabilities as well as graphics.

Arts Software

It probably doesn't come as a surprise that several developers have created sophisticated graphics, music and video packages for the Amiga. The computer's custom graphics chip, custom animation chip, 4,096 colors, seven layers of sprites, four-channel stereo sound system and built-in speech synthesizer make it a natural for music and graphics programs.

"Obviously, we're probably strongest in areas where the Amiga itself is strongest, including graphics, CAD/CAM and specialized products like music where the ability to multitask is an advantage," says Campbell.

Artists such as Andy Warhol are using the Amiga to produce art. At the Amiga launch, Deborah Harry, singer for the group Blondie, posed before a video camera. A single black-and-white frame was frozen and transferred to a paint program where Warhol filled in colors, added lines, drew with the mouse and finished in 10 minutes what would have taken weeks in a studio.

There were six graphics packages either available or scheduled for release by April. These include scaled-down CAD (computer-aided design) packages as well as sophisticated drawing and painting software.

Sound software being developed for the Amiga includes professional MIDI (Musical Instrument Digital Interface) music sequencers, music synthesizer programs, composition programs and a program from Electronic Arts, called *Instant Music,* scheduled for release in April. This program plays three instruments while you use the mouse as your instrument.

Just in case you'd like to use the Amiga to create your own music videos, there are several programs available for this purpose. One such program, *Deluxe Video Construction Set* from Electronic Arts, accepts video input and stores it digitally. You can then enhance the video images with the company's other graphics and music programs.

Development Software

Just under 30 Amiga development programs are available. The following languages are being distributed by Commodore—some in preliminary form—Amiga Assembler, Amiga Pascal, Amiga Lisp and Amiga "C." UCSD (University of California, San Diego) Pascal is available from several third-party houses. Development tools, including screen editors, printer drivers, compilers and workbench tools, are available from third-party developers such as Lattice, Digital Creations and TDI Software.

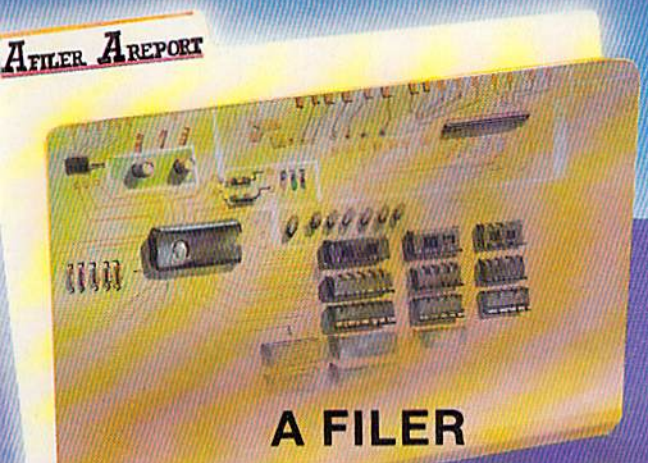
Hardware

The list of Amiga hardware developers at press time was 32 companies strong and included such companies as Computer System Associates, Eastman Kodak Company, Eclipse Systems Corp., Epson American, Inc., The Micro Forge, MicroP Technologies (Xerox), Okidata and 3M. Hardware under development includes printers, hard disk systems, memory expansion boards, multifunction modules and much more.

As you can see, there's quite a lot of third-party support out there for the Amiga, and the list is changing daily. Developers are excited by the Amiga's technology and capabilities and enthusiastic about writing new software for it, so you'll have plenty of packages from which to choose, whether your Amiga's sitting in your office, at home or both.

—Lori Tracy

The author is associate editor of The Amiga Buyer's Guide.



A FILER

"A Filer" is only one of a series of intergrated packages that allow you to store and retrieve information in an easy and timely manner. It's flexible design allows you to create a filing system that will best fit your particular needs. You can find and print information like mailing labels, client records, inventory lists or purchase orders. Instantly! It's powerful yet easy to use features make it an asset in any application.

FEATURES:

- Create your own disk files
- Sort the information off any catagory
- Print out mailing labels
- Add a record, insert a record, change a record or delete a record
- Print out a sorted list or a partially selected list
- Amount of records can be set for your memory capacity!
- 12 fields per record maximum

$49.95

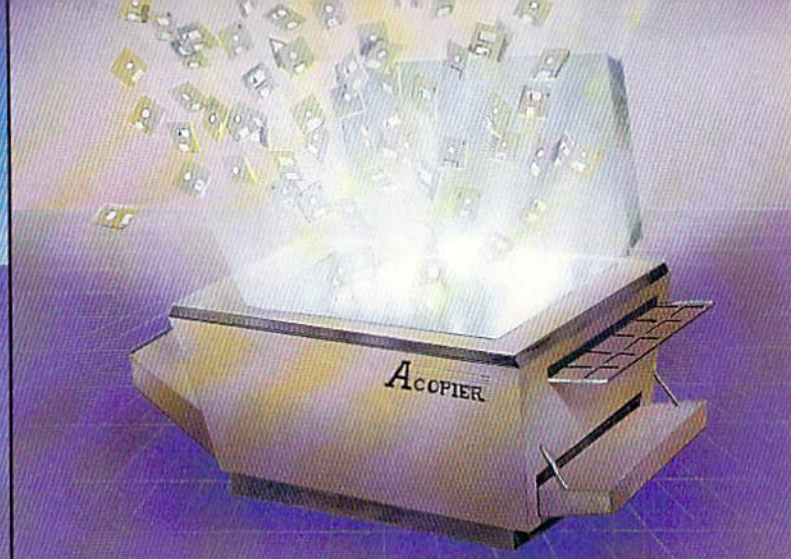
A REPORT

One of the series of intergrated packages that allows you to create custom reports and mailing labels from your "A-Filer" data files. It's versitile formatting capabilities and ease of use can give your reports that professional look.

FEATURES:

- Sort reports based upon any field in the file
- Create custom report headings
- Do page numbering of reports
- Create column-type or multiple line reports
- Calculate totals on numeric fields in your file
- Format the output so custom forms can be used
- Prints report to the screen or the printer
- Print-out full or partial records

$49.95



FOR ARCHIVAL USE ONLY.

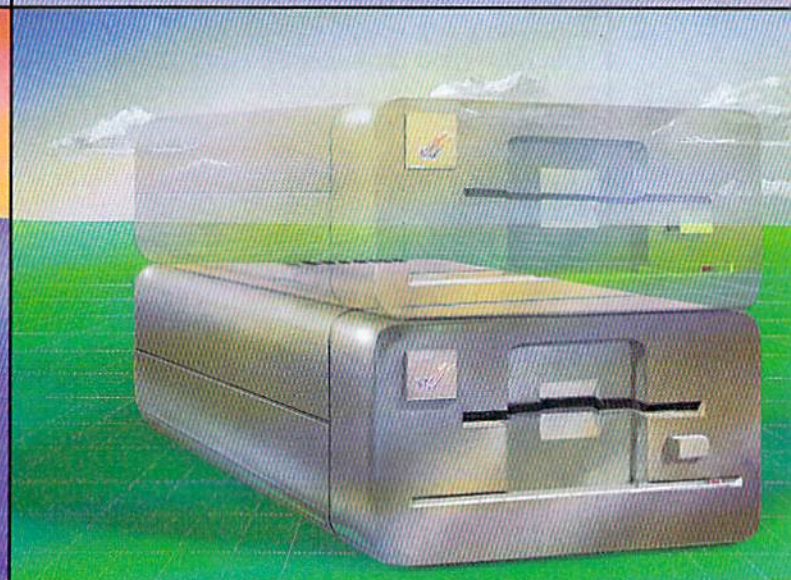
$39.95

A TERM

A comprehensive terminal program for the Amiga. This package is guaranteed not to lose a bit, even at 38400 Baud. Options include:

- "SPEAK ON" allows the in coming data to be spoken thru the speaker of the AMEGA.
- "PRINT ON" allows data to be printed as it's coming over the line
- You may also change the parameters while on line
- Protocols include (x-modem text, x-modem binary VT-100)
- Also many other features not found in other more expensive terminal packages.

$49.95



Tired of Swapping?

A DISK

This is a "2-drive" emulator for your Amiga computer that lets you load and run programs without continually "swapping" your workbench disk in and out. It is intended for those using an Amiga with a single drive who are tired of constantly changing from your program disk to a workbench disk in order to run a program.

Your "A Disk" is a system disk that reconfigures your system to fool it into thinking that you have two drives on your system; one drive for your workbench and one drive for your program disk.

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Say What?

Amiga Vocabulary For The Uninitiated

A new computer combined with new technology can be confusing even to those who have used computers for years. The Commodore Amiga is certainly new, advanced and full of unfamiliar terminology. For example, a workbench to me is a place where I bruise my thumbs and cut my fingers. To the Amiga, it's a place where all the electronic tools reside. Let's take a few paragraphs and get more familiar with this exciting machine called Amiga.

The Main Unit: This is the central processing unit, the box that holds most of the electronics and one disk drive. It also serves as a base for the monitor.

Keyboard: You know what this is. The Amiga's keyboard is of good quality and smooth in operation. It also has a built-in numeric keypad and 10 function keys.

Mouse: This is the device that you slide around on the desktop to move the pointer on the screen. Amiga's mouse has two buttons. The left button is used to activate most on-screen action, and the right button is used primarily for menu selections.

Monitor: The television-like screen at which you stare while using the computer.

Internal Disk Drive: This is built into the Main Unit. It uses double-sided, 800Kbyte-capacity disks.

External Disk Drive: This is an optional drive—identical in operation to the internal drive—that sits alongside the Main Unit and plugs into the back of it.

Kickstart Disk: This is the Amiga boot disk—the one the computer needs before it can do anything else. After turning on the Amiga, you must insert the Kickstart Disk into the internal drive and wait for a picture of a hand holding a Workbench Disk to appear on the screen.

Workbench Disk: This is the disk that brings up the icon- and window-oriented screen. It shows you which disks are in which drives, tells the contents of the disks and provides the basic

Innovative computers—such as the Amiga—create a specialized vocabulary to explain new and unfamiliar operational features.

Amiga tools for getting into application programs and setting the parameters of operation.

The Workbench program is installed on many software program disks, which eliminates the need to insert the separate Workbench Disk each time the system is booted.

Click, double click and drag: These are terms used when describing the operation of the mouse and its buttons. They are used extensively in most Amiga applications.

A click is accomplished by pressing the mouse button and releasing it, like you would ring a doorbell.

A double click is accomplished by pressing the button two times in quick succession, like you're impatient while ringing the doorbell. It usually produces more action than a click.

There are some programs that use a triple click, as well. It's like getting really upset that nobody has come to the door yet and punching the doorbell button three times in quick succession.

Another final primary mouse function is called dragging. You use the mouse to position the pointer over an item you want to move on the screen, push the mouse button down and hold it and then "drag" the item—using the mouse—to another location on the screen. When the item is where you want it, you simply release the mouse button and the item stays put or the action you've selected is initiated.

This is used to activate the pull-down menus, to resize screen windows, to move icons around on the screen and for other activities.

Window: A rectangular area on the screen that shows disk contents or the working contents of an application program.

Icon: A pictorial representation on the screen that stands for a disk, an application program, a file drawer, whatever. It's like an international road sign that is supposed to convey its meaning without words.

Pull-down Menu: There are usually several of these associated with application programs. They are not visible until you position the pointer over the menu title at the top of the window and press the right-hand mouse button. Then you drag the pointer down to the activity you want to initiate and release the button to activate it.

Pointer: The icon on the screen—usually an arrow—that follows the mouse movement on the desktop. This is how you choose activities on the Workbench screen and within application programs.

Gadgets: There are different kinds of gadgets, some used to change the size of windows, others used to position windows in front of or behind other windows, others used like push-buttons to cancel or continue operations, etc. You click on or drag a gadget to get it to do what it's intended to do.

Scroll Bar: These appear along the right side and along the bottom of many windows. You use the pointer and the mouse in these areas to move the information in the window either vertically or horizontally.

Disk Gauges: Like the gas gauge in a vehicle, these appear vertically along the left side of a disk window and indicate approximately how much storage space is left on the disk.

Well, that's about it for the most uncommon Amiga terms. If we missed any, or you're confused as you read through *The Amiga Buyer's Guide,* please feel free to call or write. We'll be happy to answer as we're able.

—Tom Kempf

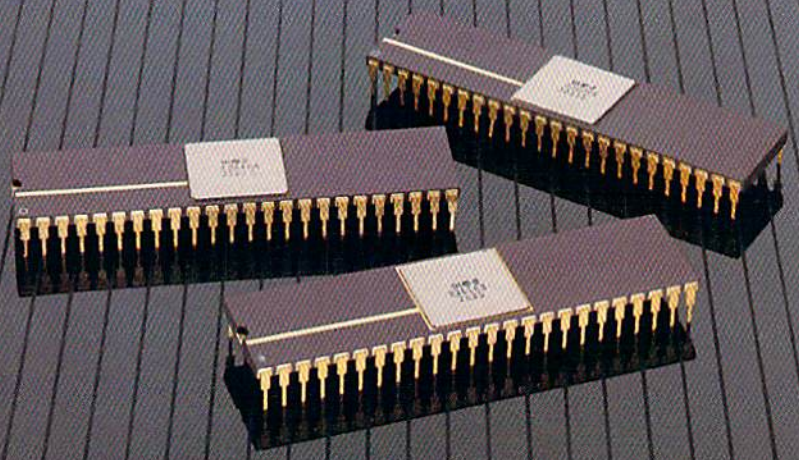
The author is managing editor of The Amiga Buyer's Guide.

Amiga Is Choosy About Printers

Before you invest in a new printer for your Amiga, or hook up the one you already have, there are a few things you should consider. First, the Amiga has built-in printer drivers that handle all of the interfacing with the printer, so some printers work with it and some don't. A wide range of common printers are fully supported directly by the printer drivers, and printers that are clones of these may also be supported, though all of their functions may not be implemented. Also, it's necessary to buy a custom Amiga printer cable, either Centronics Parallel or RS-232.

Currently, there are 12 printers that the Amiga has built-in drivers for: Alphacom Alphapro 101 (daisy wheel), Brother HR-15XL (daisy wheel), CBM MPS 1000 (dot matrix), Diablo 630 (daisy wheel), Diablo Advantage D25 (daisy wheel), Diablo C150 (color inkjet), Epson FX-80/RX-80 (dot matrix), Epson JX-80 (color), HP Laserjet (laser), HP Laserjet Plus (laser), Okimate 20 (color) and Qume Letterpro 20 (daisy wheel).

The advantage in having printer drivers is that software packages can support all printers for which there are drivers written, even if the software package isn't specifically written to run that particular printer. Software written for an IBM or Commodore computer must be written to specifically take advantage of every feature of a printer or it won't work



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All these capabilities are easy to tap because Amiga's open architecture provides you with access to the 68000 main bus in addition to the serial, parallel and floppy disk connectors. Complete technical manuals enable you to take full advantage of the custom chips and the software support routines in the writable control store on the Kickstart™ disk that comes with every Amiga computer.

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Color Printer Compatibility List

Printer	Driver	Comments
Diablo C150	Diablo C150	
Epson JX-80	Epson JX-80	
Apple Imagewriter II	Imagewriter	Requires custom driver[3]
Juki 5510	Epson JX-80	Requires a color upgrade
Okimate 20	Okimate 20	Requires Amiga Plug-n-Print

Dot Matrix Printer Compatibility List

Printer	Driver	Comments
Alphacom Alphapro 101	Alphapro 101	
Apple Imagewriter	Imagewriter	Requires custom driver[3]
Brother 1509	Epson	
Citizen MSP series	Epson	
CIE CI-3500	Epson	Requires IBM-compatible module
Epson FX series	Epson	
Epson LX series	Epson	
Epson MX series	Epson	
Epson RX series	Epson	
Epson LQ-800	Epson	
Epson LQ-1500	Epson	Supports text only
IBM Graphics	MPS-1000	
Juki 5510	Epson JX-80	
Okidata 192	MPS-1000	Set in IBM-compatible mode
Okidata 193	MPS-1000	Set in IBM-compatible mode
Panasonic 1080	Epson	
Panasonic 1091	Epson	
Panasonic 1092	Epson	
Panasonic 1592	Epson	
Star SG-10	Epson	All features not implemented
Star SD-10	Epson	All features not implemented

Daisy Wheel Printer Compatibility List

Printer	Driver	Comments
Brother HR-15XL	Brother HR-15XL	
Citizen Premiere 35	Diablo 630	
Comrex CR-II	Brother HR-15XL	
Comrex CR-III	Brother HR-15XL	
Commodore 6400	Diablo 630	Requires Centronics option
Diablo Advantage D25	Diablo Adv. D25	
Diablo 630	Diablo 630	
Dynax	Brother HR-15XL	
Epson DX-20	Diablo 630	
Juki 6000	Diablo 630	
Juki 6100	Diablo 630	
Juki 6300	Diablo 630	
Qume Letterpro 20	Qume Letter-pro 20	
Qume Sprint 11	Diablo 630	
Panasonic KXP 3131	Diablo 630	
Panasonic KXP 3151	Diablo 630	
Tec F10	Diablo 630	

Laser-Jet Printer Compatibility List

Printer	Driver	Comments
Canon Laser	Epson	Set in FX-80 mode
CIE Lips 10	Epson	Set in Epson mode
HP Laser Jet	HP Laser Jet	
HP Laser Jet Plus	HP Laser Jet Plus	

1.) All of the printers listed above require the appropriate printer cable.
2.) Most C-Itoh, NEC and Apple printers are not compatible with any drivers.
3.) Redmond Cable has released an Apple Imagewriter Driver that it is selling with the cable. There is a version for the Imagewiter and the Imagewriter II. Redmond Cable can be contacted at 206-868-2168

with that printer.

With the Amiga, however, the software doesn't have to work with multiple printers—just with a printer driver. This makes software development easier, since the software only needs to tell the printer driver what to print and the driver figures out how to do it on the printer that's connected.

If you already have a printer that doesn't have a built-in printer driver, chances are you can select a printer, from the preferences tool on the Workbench disk, that is similar enough to your printer to allow you to use it. For example, if you have a Panasonic 1091 printer, you would select the Epson FX-80/RX-80 driver.

You will most likely be able to take advantage of all of your printer's capabilities, but there may be some features that aren't implemented. For example, if you have a Star SG10 printer and are using the Epson driver, you won't be able to use the near-letter-quality mode.

Refer to our Printer Compatibility Lists to see which driver to use if you have a printer that the Amiga doesn't fully support with a built-in driver. If your printer isn't on the list, you might try calling your printer's supplier to see if they can write a custom driver for the Amiga or, if you're an experienced programmer, you could try your hand at writing your own custom printer driver.

Hooking up your printer with any cable that works is not a good idea—you may damage your printer. The plug gender on the Amiga for Centronics is male; an IBM computer, for example, uses female. If you buy an IBM Centronics Parallel cable, it will not plug in. You can buy a gender changer to make it work. Certain pins on the port carry voltages, however, and there is the possibility of damaging your printer when using a gender-changed cable. It's safest to buy the correct custom cable to begin with.

—Lori Tracy

The author is associate editor of The Amiga Buyer's Guide.

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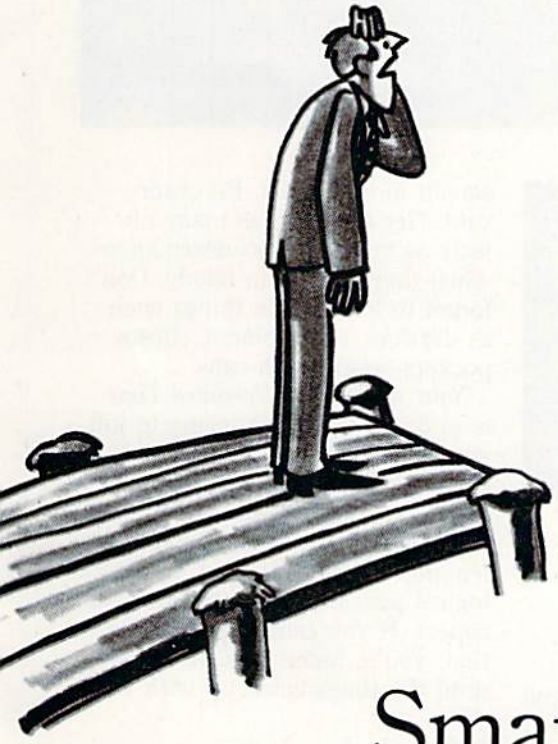

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Activision Games

Hacker

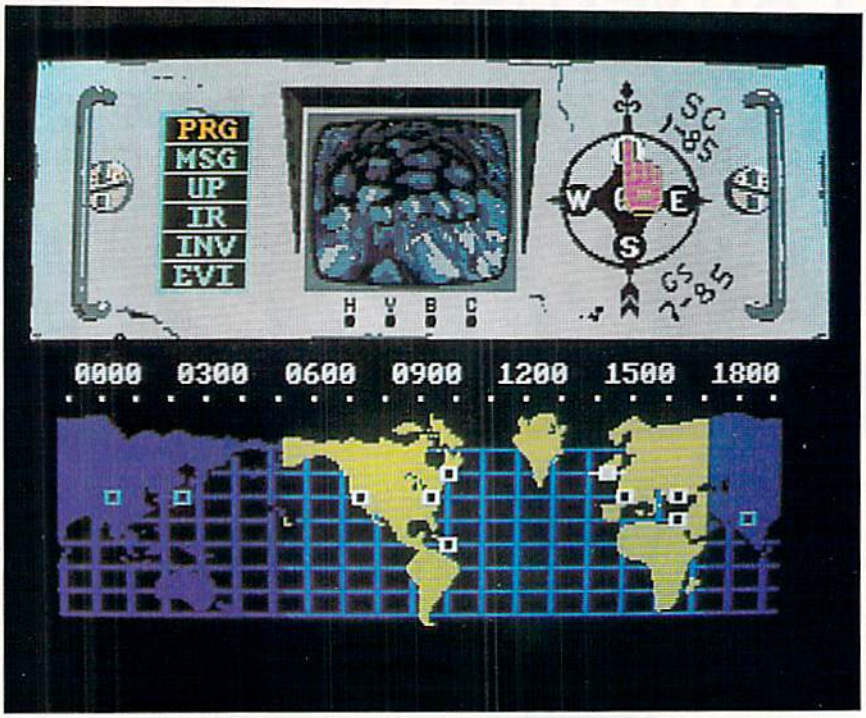
Did you ever wish you had the guts and ability to access top secret computer networks and files? Activision's *Hacker* lets you do just that without breaking the law.

After you manage to log on, you realize that you have stumbled into the computer network for Magma, Ltd. First, you have to figure out how to run a laser test on a subterranean remote unit (SRU).

Once you have completed the laser test without errors, you receive your mission. You are told that "headquarters intelligence reports that spies have stolen pieces of a shredded document that contained proprietary information concerning 'The Magma Project.' Your mission: use the SRU to negotiate with these spies for the return of all pieces of the document before this evidence reaches federal agents."

You travel to Paris, London, San Francisco and other cities in your quest for pieces of the elusive document. You negotiate with spies in each of these cities, buy evidence or merchandise that can be traded for evidence and endure several security checks. If you can't supply the necessary information for the security checks, your access is terminated and the game is over.

If you get confused or completely stumped, the vendor has some "Hacker Hints" for you. They are available from Activision for $1. Try to play the game without them, though, and find out just how good you'd be at hacking.



Activision's *Hacker*

Activision's *Borrowed Time*

Borrowed Time

Any fan of detective novels will get a kick out of Activision's *Borrowed Time,* an illustrated text adventure that puts you in the detective's shoes. As private eye Sam Harlow, you can bank on getting shot at, badly burned, anesthetized, beaten up, strung up, sentenced to life behind bars, smashed over the head with a gun butt, shoved from a ledge, ripped to pieces by crazed canines, blindsided by a crowbar and generally held in contempt by many people.

Through a series of logical puzzles, you let the computer be your eyes, ears, voice, hands and legs. You tell it what to do by using the keyboard, joystick or mouse to give it commands.

As you move around, watch for objects that might eventually be useful. These could be mentioned in the text or may only appear on screen in the visual. Be observant. Get and take as many objects as you can. You never know when they'll come in handy. Don't forget to look inside things such as drawers, file cabinets, chests, pockets—even trash cans.

Your mission in *Borrowed Time* is to discover who is trying to kill you, collect the appropriate evidence and bring it to the police, while avoiding constant attempts on your life. It's absorbing, challenging and fun. Solving the first logical puzzle is the most difficult aspect. If you can manage to do that, you're home free. At least until the thugs catch up with you.

Mindshadow

Your adventure starts when you find yourself alone on a tropical island. You don't know how you got there or even who you are. Your goal in playing Activision's *Mindshadow* is to escape from the island and discover your identity.

This is not an easy task. Your world is fraught with danger and you have only your wits and a strange bird, The Condor, to

Activision's *Mindshadow*

help you.

It's best to go through the "Living Tutorial" before your first attempt at *Mindshadow.* This takes you through a sample game, giving you several problems and ways to solve them.

You move around the island using the arrow keys or mouse to indicate direction. The problem with *Mindshadow* is that the geography of the island limits you to certain directions. It's frustrating to be constantly told: "You can't go that direction." You find yourself going in circles; falling into the same quicksand and being eaten by the same sharks over and over again. Though we're sure it's possible through perseverence and practice to find a solution to the puzzle, we sure couldn't find it.

If we spent enough time playing it, we would probably manage to think of some clever approaches to the dilemmas it poses. Until then, we could invest in the "*Mindshadow* Hints" available from Activision for $1.

—*Lori Tracy*

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Analyze!
Spreadsheet

512K Amiga.

Analyze is the first spreadsheet we've seen for the Amiga, and the wait for such a program was anxious. Aside form the obvious need of a spreadsheet for increased productivity, there was also the thought that it would be an ideal way to see the terrific processing speed of the Amiga system at work.

Analyze will not disappoint those who want speed or ease of use. It is not an Amiga version of *Lotus 1-2-3,* however, nor does it pretend to be. It is, instead, a very good number cruncher that the experienced user can work in minutes and the novice in only a few hours.

Although *Analyze* will run in 256K of RAM, the designers recommend having 512K. When the disk icon is opened, a requester will ask how much memory you wish to allocate and 128K is the suggested minimum.

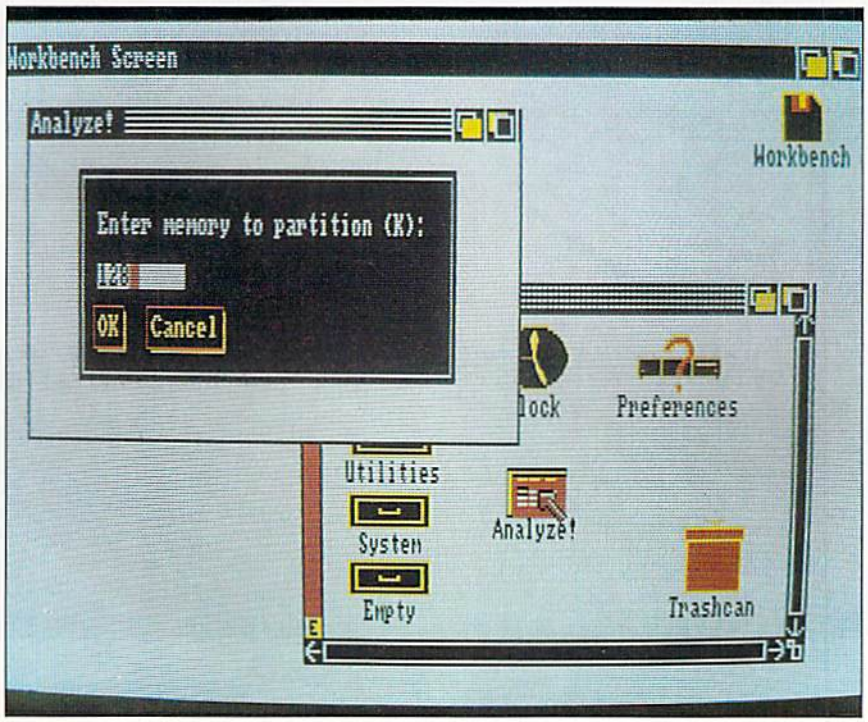
This partitioning of memory makes it easier to run another program concurrently, since *Analyze* will, in effect, have built a fence around itself to keep it from sprawling all over your RAM.

Building a spreadsheet is easy. Unless your labels begin with numbers, there is no need to specify that you are creating a label. Simply begin typing alphabetic characters. You may justify your labels as you enter them, or do it later from the pull-down menu called Range. Numeric entries, unless specified otherwise, are always right-justified as they are entered.

Both global and local reformatting may be done at any time, and Range commands are in a format that is very familiar: A4..H4 is the structure for telling *Analyze* to preform some function on every cell within that range. Replication is a feature of all spreadsheets, of course, but ease of use is of highest importance and there is nothing arcane about any of the commands here.

Besides moving around with the mouse in order to utilize the pull-down menus or to highlight a particular range, *Analyze* also allows the use of function keys for some of the most often used commands. F2 toggles you in and out of the Edit mode; F3 displays a list of

Brown Wagh's *Analyze!*



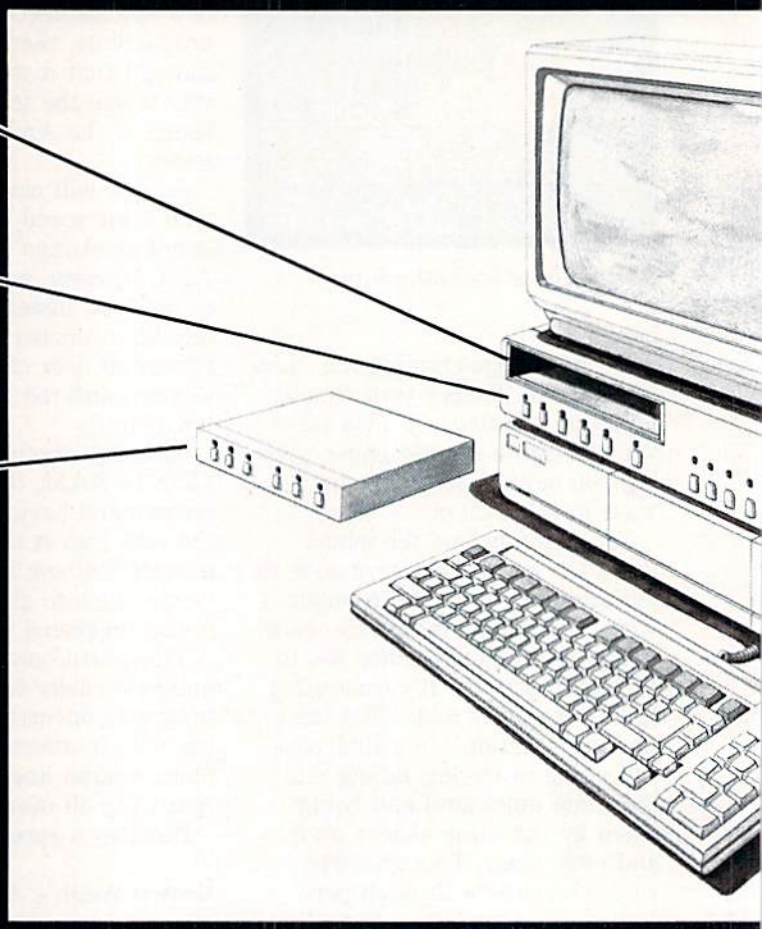
ALL

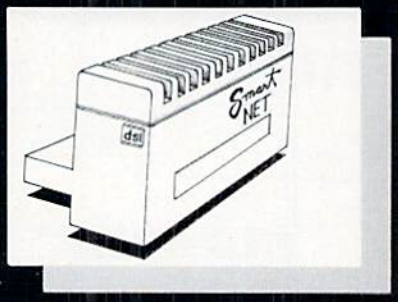
The Buss Station comes with a recessed slot which allows the user to store his most used/popular program diskettes only a fingertip away! The recessed slot can be removed to provide room for the optional DSI "Associate".

A surge, spike, RFI, and EMI interference suppressed, five outlet power control center which allows the Amiga computer, and four peripheral devices to be plugged into one fully protected power source. The front panel of the power controller section of the Buss Station, houses six switches (one is a master switch), each with an LED which lights when the corresponding switch is in the "on" position. Eliminates messy extension cord cabling, and allows the user to switch on/off his computer and all other peripherals from one panel.

The Associate is a multiport data switch which provides two fully switchable serial and parallel output ports for the Amiga. The front panel of the Associate section of the Buss Station houses six switches, each with an LED which lights when the corresponding switch is in the "on" position. The Amiga allows the use of only one serial and parallel device, however, the Associate increases the utility of the Amiga by allowing the use of up to two serial and parallel devices which are selected and controlled by the flick of a switch.

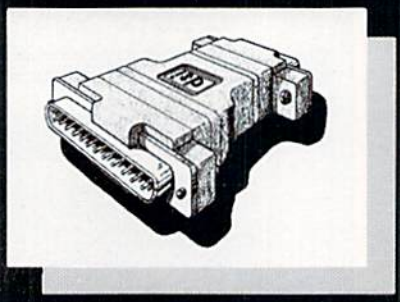
The Buss Station can be ordered with the Associate already installed at our factory or, the Associate can be ordered at a later date and installed at the dealership where the Buss Station was purchased or by the end user at his home.





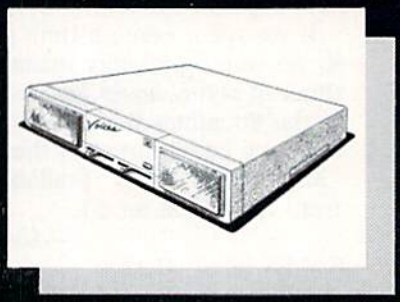
SMARTS

You can give your Amiga Smarts in two different ways. The first method requires a DSI Buss Station, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The second method requires a Smart Net, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The DSI Smart Net is an EMI/RFI shielded metal enclosure which interfaces to the Amiga, provides ports for, and encases the Smart 1 and Smart 2 RAM Expansion Cards. The DSI Smart 1 Ram Expansion Starter Card provides incremental RAM expansion and has the microprocessor necessary to expand the Amiga to an additional 2 megabytes of RAM. Smart 1 also has an expansion port which allows the user to connect up to three additional Smart 2 Ram Expansion Slave Cards. Each Smart 2 Ram Expansion Slave Card provides up to 2 megabytes of incremental RAM expansion for the Amiga. A combination of one fully loaded Smart 1 Starter Card, and three fully loaded Smart 2 Slave Cards will increase the Amiga's memory to its maximum potential of 8 megabytes. The Smart cards can be ordered with 0k, partially loaded, or fully loaded with 2 megabytes of RAM.



VISIONS

Due to the way the RGB TTL video output circuit of the Amiga was designed, it can properly interface to only a very small percentage of the many RGB TTL monitors on the market today. Visions is a video circuit designed to convert the non-standard RBG TTL video output of the Amiga to a standard IBM PC RGB TTL video output thereby allowing the user to choose from the widest possible variety of monitors available. RGB TTL monitors that can be interfaced to the IBM PC can be interfaced to the Amiga when Visions is used.

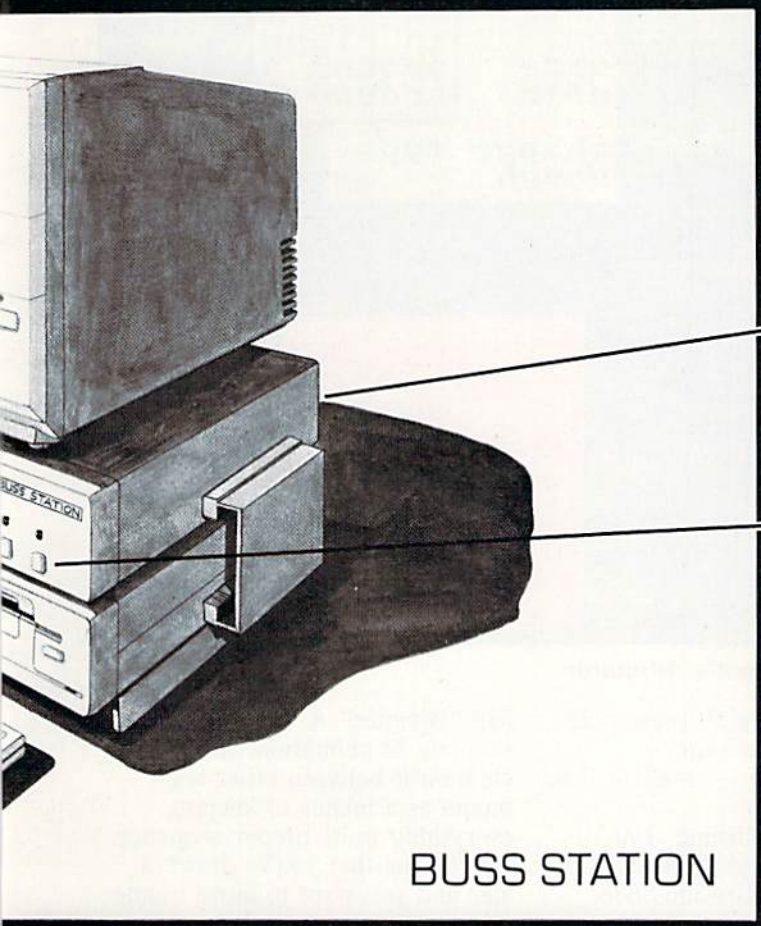


VOICES

Voices is a stereo amplifier with two full range speakers designed to fully utilize the stereo output ability of the Amiga where the use of a home stereo unit is not available or desired. The amplifier and speakers are encased in a low profile/high tech EMI and RFI shielded metal enclosure. Voices provides right and left channel stereo output jacks, which allow the user to connect the Amiga to a home stereo unit if desired and, a headphone jack for situations where quiet or privacy is desired. Voices can be used to provide stereo quality sound for audio and non-audio monitors.

For complete dealer and distributor information concerning the exciting new ine of DSI products please contact your local representative or DSI at the following address:

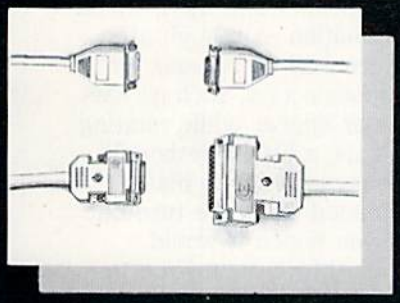
ABOARD



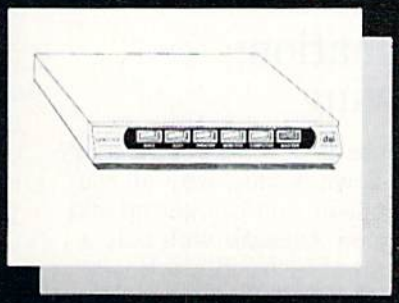
A special RAM expansion port which allows the user to plug in the DSI "Smarts" and incrementally increase the memory of the Amiga to its maximum potential of 8 megabytes.

Eight 86 pin card edge connectors, identical to the one on the Amiga, giving it expandability comparable to the IBM PC. The front panel of the slot expansion section of the Buss Station, houses eight switches, each with an LED which lights when the corresponding switch is in the "on" position.

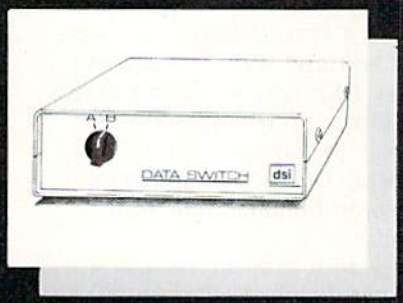
BUSS STATION



INTEREX SYSTEM
INTERFACE CABLES
The only totally comprehensive program of interface cables for connecting the Amiga to virtually all of the most popular analog RGB or digital RGB TTL color monitors, as well as composite monochrome and color monitors, serial printers and modems, parallel printers, keyboards, disk drives and other peripheral devices.



DIRECTOR
The Director is a surge, spike, RFI, and EMI interference supressed 5 outlet power control center for computers and peripherals.



DATA SWITCH
Six Data Switch models allow port expansion and sharing of computer and peripherals.

dsi

717 South Emporia
Wichita, KS 67211-2307
316-264-6118
Telex: 650-193-4977

Range names; F5 allows you to go directly to a specific cell and, if you are working in the manual recalc mode, F9 performs a recalculation.

And those recalculations are something to see. With a test spreadsheet of 48 active cells, I found I could miss the entire recalculation process by blinking at the wrong time. That's fast and that's what the Amiga and *Analyze* are all about.

One problem with many spreadsheets is that, as you scroll down or across the page, you lose your headings or your row labels or both—thus leaving you to wonder if you are working in the correct cell. *Analyze* handles this problem by allowing you to "freeze" either the column or row headings or both.

When you first boot *Analyze*, you may be a bit surprised. There is the familiar Workbench scene, but the colors seem all wrong. Not really. The designers used a black-on-white spreadsheet, with negative numbers shown in red, because that's what real spreadsheets and ledgers look like.

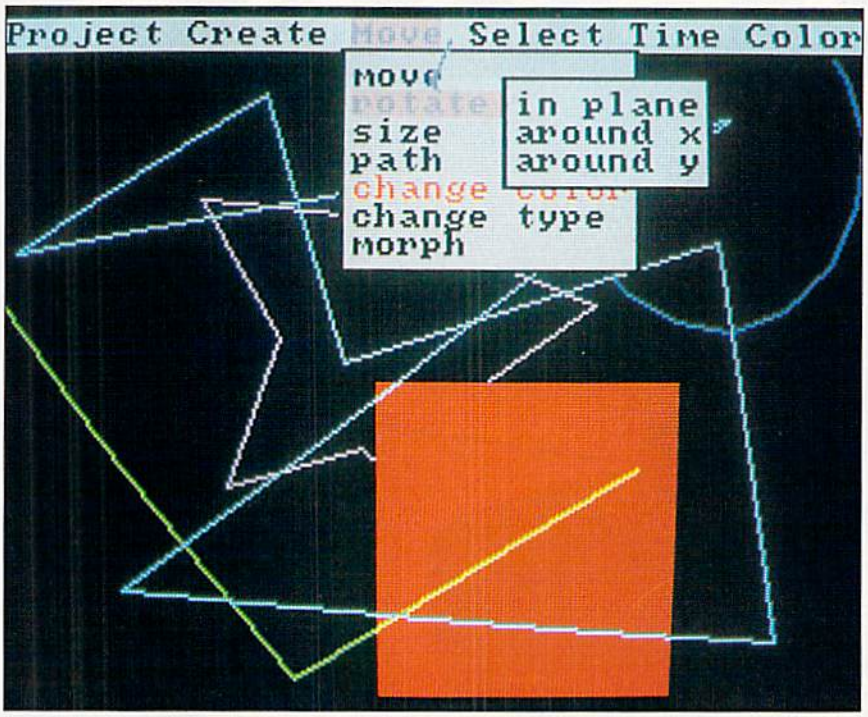
Like the program itself, the documentation is clear and concise, directed at the first-time user who may have only a vague idea of what a spreadsheet is or does. Clear text and walk-through examples help remove the mysteries of number crunching, and there are easy explanations of all commands as well as numerous examples on building your own formulas.

Because it is installed over Workbench 1.1, *Analyze* must be booted from Kickstart 1.1. When you make your working copy, you need only copy the Analyze info files. This saves room on your disk for storing a spreadsheet, and eliminates disk swapping for those who have only the internal drive.

In sum, *Analyze* is a full-featured spreadsheet that is fast, easy-to-use and is priced fairly. You may look for a long time and not find another that offers all these plus features in one package.

—*Ervin Bobo*

$99.95 retail
Brown Wagh Publishing; 100 Verona Ct.; Los Gatos, Calif. 95030; 800-451-0900 or 408-395-3838



Aegis Development's *Animator*

Animator
Animation; drawing

Because it works from a battery of pull-down menus, with all routines built in, you can get up and running on *Animator* with only a minimum of instructions. Beginning with the Project menu, you can select a new routine or elect to work with and old one. Then go to the Create menu, which allows you to select from a variety of predefined shapes or to choose a tool for freehand drawing.

The next menu is Move, but you can't go there yet, assuming you've already drawn a shape on the screen. No, you must now go way over to the right of the screen to the Time menu and select "tweener." A "tween" is a segment of animation, and you click on it between other segments as a means of keeping everything in its proper sequence.

Let's say that you've drawn a star and you want to move it sideways to the right. Without using tween, the star would simply form itself to the right and there would be no animation. Although at times there may be reasons for simultaneous action, such as having the star appear while rotating on its x-axis, a little forethought is necessary in order to make your animated sequence turn out the way you hoped it would.

From the Move menu, you may select to Rotate—in-plane, around the x-axis or the y-axis or, if you don't use tween, around all three simultaneously.

Exploring other options, we find we can clone a shape, change colors, resize objects, create a path for a moving object to follow, outline or fill a shape, change a shape, destroy an object and more. And because we are working with animated rather that static objects, these are all con-

tinuous actions.

Your star might start out in the center as a filled shape, then move sideways and change color; follow a path up the screen and change size; become a polygon; be destroyed; be reborn as a square rotating on its y-axis; recede into the background; change color; or rush to the foreground. The routine you can create is limited only by the memory in your machine, and we'd expect most people, especially those using *Animator* for business presentations, to quickly opt for the memory expansions that are measured in megabytes.

As you select each option from the menu, the one-line message bar changes to show what that option will do for you. In addition, as you become more adept and more accustomed to the routines indicated by different cursor shapes, you may go to the quick-select option, which presents you with an on-screen palette representing every command of which *Animator* is capable of carrying out.

When your routine is done, return to the Time menu and select Replay All. Now your creation will run in the proper sequence. If you really like what you've done, you can select Replay Loop, which allows your routine to continually repeat itself while you drag all your friends and neighbors into the house to show them.

Stars and polygons are not the only shapes you can work with, of course. You have freehand drawing capability and you can use predefined shapes as building blocks to make people, spaceships, moving bar charts—almost anything you can imagine.

The routines you create can be saved to disk, and a storyboard option allows you to set up an order in which related routines will be recalled from disk in order to make longer routines possible. This is a terrific tool to be used with a VCR and the composite output of the Amiga for building longer routines on videotape, which can be replayed in schools or offices that may not yet have an Amiga computer.

In summing up, we would have to say that *Aegis Animator* is all we hoped it would be and more. It is easy to use and it can be deeply explored after only a swift scanning of a few pages.

—*Ervin Bobo*

$139.95 retail
Aegis Development, Inc.; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Archon

Entertainment; fantasy game

For the Amiga, *Archon* has been rewritten to correct the main drawbacks of the original fantasy game: graphics are much improved so you can really identify your pieces. Each icon looks like what it is supposed to be, rather than all the other icons.

Use Kickstart 1.1 to boot your computer, then insert the *Archon* disk. After a moment, you're treated to an excellent title screen and a musical score that somehow manages to be both rousing and ominous.

The setting resembles a conventional chessboard, except that there are 81 black-and-white squares, five of which have a red flashing border. Before you have time to wonder about this, armies enter from stage right and stage left. As each piece appears and takes its place on the board, its identity and ability to move are both listed at the bottom of the screen.

Electronic Arts' *Archon*

Taking their places on the side of Light are a wizard, unicorns, archers, golems, valkyries, knights, djinn and a phoenix. The forces of Dark, led by a sorceress, consist of basilisks, manticores, trolls, shapeshifters, dragons, banshees and goblins.

You choose the force you wish to control, Light or Dark; the amount of control (Human, Cyborg or Computer); and one of three skill levels.

Characters change according to the squares on which they stand: a Light character gains strength from a white square. If attacked there, it stands a much better chance of prevailing. It is, however, unwise to move to a favorable square and attempt to make your stand. Such a strategy is foolhardy, because a Luminosity Cycle moves around and through the playing field changing some of the squares, upsetting balances of power and sowing confusion in the ranks.

Try to get on one of the five squares marked in red. These are Power Points: occupy one and your character will heal more quickly, gain in strength and even be immune to spells. In fact, the object of the game is to occupy all the Power Points.

There are alternatives to fighting. The game is, after all, magic, and your key character is either a wizard or a sorceress. Do not forget the conjuring of spells. They can get you out of a tight spot or keep you from getting into one.

Due to the magic of the Amiga, *Archon* displays its own magic quite well. For the first time, the game can be fully enjoyed as its authors intended.

The program's documentation is not only good, its entertaining, having been written by someone with tongue firmly in cheek. Besides concise descriptions of the various facets of the game, there

is a rather good section devoted to strategy and a couple of pages of "commonly asked questions." When you're not playing the game, read the book. It's fun.

—*Ervin Bobo*

$39.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

DeluxePaint

Color graphics; drawing; design

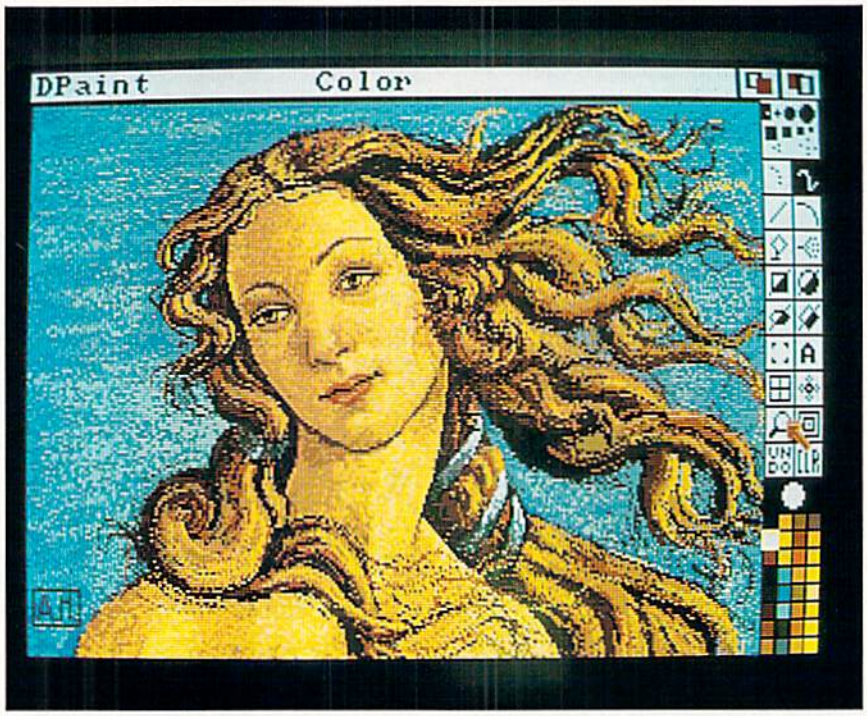
Whether you're artistic or not, *Deluxepaint* lets you create masterful works of art. The first step in using this program is forgetting all of your drawing and painting inhibitions, if you have any.

The program's power, flexibility and ease of use make it a useful tool both for dabblers and experienced graphic artists. Artists not familiar with graphic arts will find this program about as close to more traditional mediums as a computer gets. And if the machine's animation and graphics capabilities helped sway your decision to purchase an Amiga, even though you don't consider yourself artistic, you can still create pictures that will amaze your friends.

Learning how to use *Deluxepaint* is a matter of sitting down at the computer and experimenting as you read the manual.

Once you've loaded the program, you're presented with a set of icons for brushes, drawing/painting tools, hollow and filled shapes as well as a palette of colors, called the paint set, and a color indicator.

To change brushes in *Deluxepaint,* point at the one you want and click with the left mouse button. Clicking with the right button chooses a brush that can be resized. To resize a brush, drag with either button to stretch or shrink it, then release to set the size. It will remain that size until you select a different brush.



Electronic Arts' *DeluxePaint*

Any picture or part of a picture created with *Deluxepaint* can be copied or picked up and used as a brush. The program remembers that brush until you create a new one, or it can be saved to disk for later use.

Pointing at the title strip and pressing the right mouse button accesses the program's menus: picture, brush, mode, font and prefs. Some menu items—size, for instance, in the brush menu—produce submenus. Brush menu commands affect the size, shape and orientation of the brush. Mode menu commands determine how the brush paints.

Deluxepaint allows you to mix your own paints to create a custom palette.

If you decide you don't like a particular color you've created, you can click the palette's Undo command, and to cancel all the work you've done since you got the palette out, click Cancel.

The palette also contains the controls for color-cycle animation effects and for setting the limits of the Shade and Blend brush modes. *Deluxepaint* contains several pictures and collections of brushes already on the disk. Loading these pictures and following the steps in the manual is a good way to get a feeling for how the program works, that is, until you're ready to create your own pictures and manipulate them.

One way to manipulate your pictures is to use the seven brush modes found in the Mode menu: object, color, replace, smear, shade, blend and cycle. Using these, you can change the painting effect of the current brush. Switching between modes with the same brush shape often provides a quick route to special graphic effects. For instance, you can use Object and Color to create a quick drop shadow to give a shape the illusion of depth and substance.

Painting with a brush with its own built-in drop shadow is a great way to create text and objects that seem to have depth. Painting with Smear, Blend and Shade from the Mode menu lets you smear the paint around on

the screen as if you were smudging it with your finger. Blend and Shade operate within a range that you establish using the palette.

Cycle in the Mode menu and Cycle under Color Control in the Picture menu work together to produce animated effects. Picture parts painted with the Cycle mode seem to move when Cycle is turned on in the Picture menu. You can draw a line that seems to move by picking any of the three freehand tools, picking a foreground color and then choosing Cycle mode. To see the animation as you paint, you turn on Cycle Colors and continue painting.

You can also work text into your paintings with the 11 fonts from the Fonts menu.

This is just a cursory review of the dozens of features built into *Deluxepaint*. These features and others are explained fully in the manual, which is quite easy to follow. It contains a troubleshooting guide, a complete index and, since many mouse commands can be executed via the keyboard, a keyboard command summary.

The program's ease of use, power and flexible drawing and painting functions make it an excellent vehicle for experienced and novice artists as well as experienced and novice computer graphics users.

—Lori Tracy

$99.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

Desktop Amp And Disk Mate

Stereo amplifier and disk drive expansion box

Desktop Amp is a small stereophonic amplifier that provides an inexpensive way to enhance the stereo sound capabilities of the Amiga. The preproduction unit we reviewed has a footprint of only three inches by four inches and it's two inches high. Regardless of the production unit's packaging, it will be small.

It has an output of 200mW per channel. Two volume control knobs—one for each channel—are on the unit's sloping front panel. For private listening, there is a stereo headphone jack for Walkman-type headphones.

The unit comes internally wired with the proper plug for the Amiga's CPU/TV/MOD jack and two six-foot lengths of two-conductor speaker wire. We connected the Desktop Amp to a pair of Realistic (Radio Shack) Minimus 2.5 speakers and played some music. The stereo effect and the volume were fantastic. In fact, a comfortable listening level was about 25 percent of the available volume level. This means that the unit will certainly drive larger speakers. We were impressed.

Disk Mate is an add-on peripheral box that will allow you to use two or three external drives with the Amiga. It is supplied with a standard 115V plug and power cord, a 23-pin male mini-D plug for the CPU and two 23-pin female mini-D plugs for the disk drives. Internally, it has the proper logic decoding and a twin-voltage power supply.

By plugging the Disk Mate into the CPU, you can plug two disk drives into the Disk Mate box for a total of two external drives. If you plug a disk drive into the CPU first and the Disk Mate into the disk drive's output plug, you can plug two disk drives into the Disk Mate for a total of three external drives. The Disk Mate serves as the base, and all the drives fit on top of it.

The Amiga readily recognizes all these drives, and the maximum combination provides tremendous flexibility and more than 3.2MB of floppy disk capacity. It's a neat idea.

—Tom Kempf

$29 retail; Desk Amp (direct from manufacturer)
$150 retail (approximate); Disk Mate
Digital Systems Engineering; 7018 Carriage Dr.; Citrus Heights, Calif. 95621; 916-725-3025

Flow

Outline and idea processor

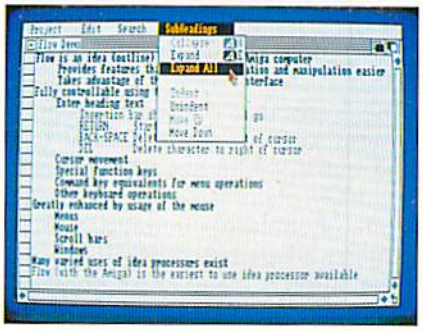
Flow is one of those products about which we say, "How did we ever get along without it?" Remember those high school days when you had to construct detailed outlines of research projects?

The computer age has changed all that, just as it has changed the way people write. Those who are still in school, and anyone who needs to organize thoughts or ideas, will find that the outlining or organizing process has suddenly become efficient and practical.

Let's imagine a perfect system for making outlines for research projects, articles, speeches, whatever. Our materials would be very simple, made up of strips of paper, perhaps two inches wide and about eight inches long, cut with a paper cutter from letter-sized sheets of paper. Once cut, you would write one main point on each slip of paper. They would then be divided into logical sections and placed in order on a desktop or on the floor.

With this system, new ideas can easily be inserted by moving slips around and making room. If something doesn't fit, you can just throw that slip away. If the whole

New Horizons Software's *Flow*



project needs reorganizing, it's a simple matter to shift slips of paper up, down, sideways, to the beginning, to the end, wherever they fit properly.

The main disadvantage of this system is that it's cumbersome, time-consuming and requires a lot of space.

Well, the perfect system is now available in electronic form.

Flow operates from the Amiga Workbench, allowing you to take full advantage of the computer's multitasking capabilities. For example, while using a word processor to write an article, the *Flow* outline can be available for reference. Either the article or the outline can be modified as necessary during the writing process.

But let's begin at the beginning. While constructing an outline, the mouse is used in a truly intuitive fashion. By this we mean that manipulating ideas within the outline structure is just as easy—actually easier—than our slips-of-paper method.

Inserting a new line is also easy. You use the mouse to place the insertion point on the previous line, press Return and the new line is inserted. Indenting or justifying lines is simply a menu selection with the mouse.

Deleting or copying lines, words or phrases is also done simply with the mouse. One click places the insertion point, a second click selects the word nearest the insertion point and a third click selects the entire line. Then you can take the appropriate action: to delete, simply press the backspace key; to copy, pull down the Edit menu and select Copy; to duplicate copied material anywhere in the outline, pull down the Edit menu and select Paste.

Let's say that the outline fills several screens, and you want to find out if you're keeping things organized. You can collapse any range of subheads under any level of main heads by pulling down the SubHead menu and selecting Collapse. This allows you to condense the outline into major points and, perhaps, view them on a single screen.

Expanding any one or all of the main heads to show subheads is just as easy.

Other functions include copy-editing functions using the mouse to correct spelling, insert words, delete words and more. You can search electronically for words, letters or phrases and sort the outline alphabetically in either direction—A to Z, or Z to A.

In addition, there are menu commands that can be executed from the keyboard so you don't have to reach over for the mouse while working.

Other shortcuts include Copy, Cut, Paste, Collapse, Save, Undo and Find.

If I were to wish for anything, it would be that *Flow* incorporate a full-featured word processor. Then an entire project could be completed within the application, the headings deleted and the result printed out in final form.

Overall, *Flow* works smoothly and will encourage even nonoutliners to use this method to cut down on preparation time. For writers and speakers, *Flow* can be invaluable. For teachers and students, it's got to be essential. In fact, anyone who uses a computer needs it, because there is always a need to organize ideas.

—Tom Kempf

Available April, 1986; $99.95 retail
New Horizons Software; PO Box 43167; Austin, Texas 78745; 512-280-0319

Marauder
Disk backup utility

Marauder is a utility program designed to make accurate backup copies of both copy-protected and unprotected software. It's certain that many disk backup programs are sold to people who make unauthorized copies of software, but they are used far more often for

Discovery Software's *Marauder*

an individual's "insurance" copies. If something happens to an expensive program disk, it's nice to have a spare that works just like the original. Unfortunately, if it's a copy-protected program it's impossible to make a fully functioning backup copy without a product such as *Marauder.*

The manufacturer makes a strong statement about illegal software copying in an enclosed brochure called *Thou Shalt Not Dupe* and condemns the practice of "softlifting." We join with the company in condemning illegal copying practices.

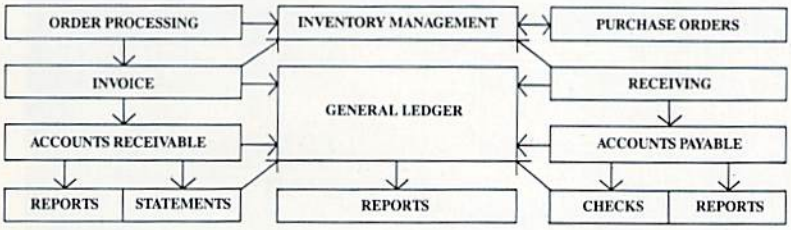
Anyway, the program is simple to use. The instructions are straightforward and the control screen is colorful. The copying process begins with booting the Amiga with Kickstart and then inserting the *Marauder* disk. Once *Marauder* is up and running, the program disk can be removed.

The source disk (original program to be copied) is then placed in the internal drive and the destination (blank) disk in the external drive. The next step is to choose the copying codes. As of this writing, *Marauder* lists 14 programs in a special Parameters pull-down menu. These include titles such as *Deluxepaint, Archon, Financial Cookbook, Maxidesk* and *Racter.* If the program you are copying is among the 14 listed, select it and the parameters are automatically selected.

If your program is not listed, select Standard from the Parameters menu. Once the para-

B.E.S.T. has hatched the new Amiga Business Management software to manage inventory, receivables, payables, order processing, general ledger... all in one.

Or put another way:



This is *the* integrated business management system designed *on* the Amiga *for* the Amiga. Now *one* software system can help you manage your entire business. It becomes an invaluable tool in managing cash flow, your inventory—and provides the reports you want *when* and *how* you need them.

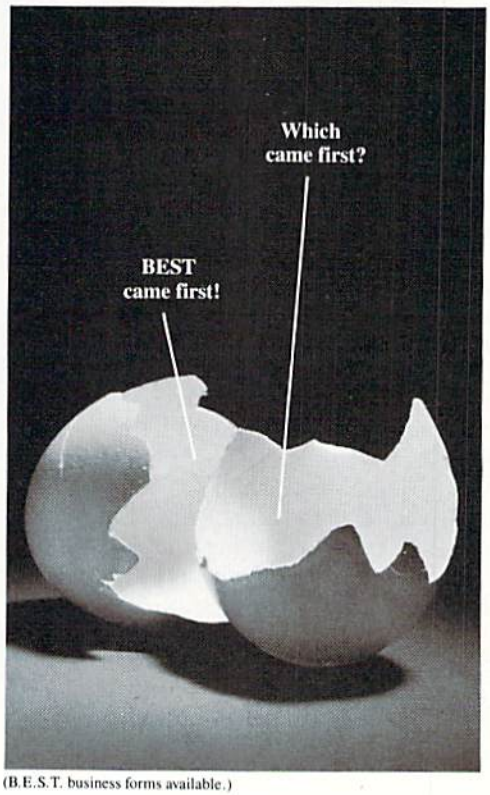
Say you print an invoice. The computer automatically updates inventory, receivables, general ledger. Look at the flow chart. This is more than an accounting program; it is a system that makes information available for you to make management decisions.

Our business is to make your business easier to manage.

CALL 1-800-368-BEST for immediate information and response.

Business Electronics Software & Technology, Inc
PO Box 852 McMinnville, Oregon 97128
503/472-9512

B.E.S.T.



(B.E.S.T. business forms available.)

meters have been selected, you simply click on the Start button and the rest is automatic. We tested it—and it works well.

—Tom Kempf

Discovery Software; 262 S. 15th St., Ste. 300; Philadelphia, Pa. 19102; 215-546-1533

PARHome I

Personal financial analysis

PARHome I is a top-notch program for anyone confused about how to determine interest rates, payments, return on investment, budgeting and many other areas of personal financial management.

PARHome I is a collection of automated calculation programs common to most home- and personal-finance situations. All you have to do is fill in the blanks with the requested information—such as dollars, percentages, terms and similar information—and the program will calculate the result and give you an analysis.

You then have the option of printing and/or saving the information or trying other options. In many ways, it operates like a spreadsheet, allowing you to experiment with various choices and alternatives until you come up with what works best for you.

The following program functions provide the means for record keeping and budgeting:

Financial Evaluation: This section deals with various types of loans—how to determine what you can afford, amortization analysis, home/asset appreciation and loan-length determination.

Investment Analysis: These functions include various annuity calculations plus planning aids for IRAs and CDs, for a college investment and for life insurance.

Home Lease Versus Buy: This allows a comparison of the costs involved in leasing with those involved in purchasing a home.

Personal Finance Statement: Most of us have trouble figuring out how to put together one of these. The program provides a general guide that is helpful—but limited.

Spendaholics Examination: This is a test to find out if your spending habits are good or bad. We took it—and wished we hadn't. While it doesn't spell out how to manage finances better, it points out weaknesses and provides food for thought.

Budget Management: Here is a highly useful program for those who aren't sure how to sit down and figure out a budget. It provides space for three income sources and 17 expense items and calculates how much money is left—or how much you overspent—at the end of each budgeting period. This is a fine program for those with fairly simple budgets.

Accounting: This module is intended to automate up to 12 checking and/or savings accounts. You are provided with 17 expense categories in which to record payments—the same as those in the Budget module. This allows you to compare actual expenditures with budgeted amounts at any time.

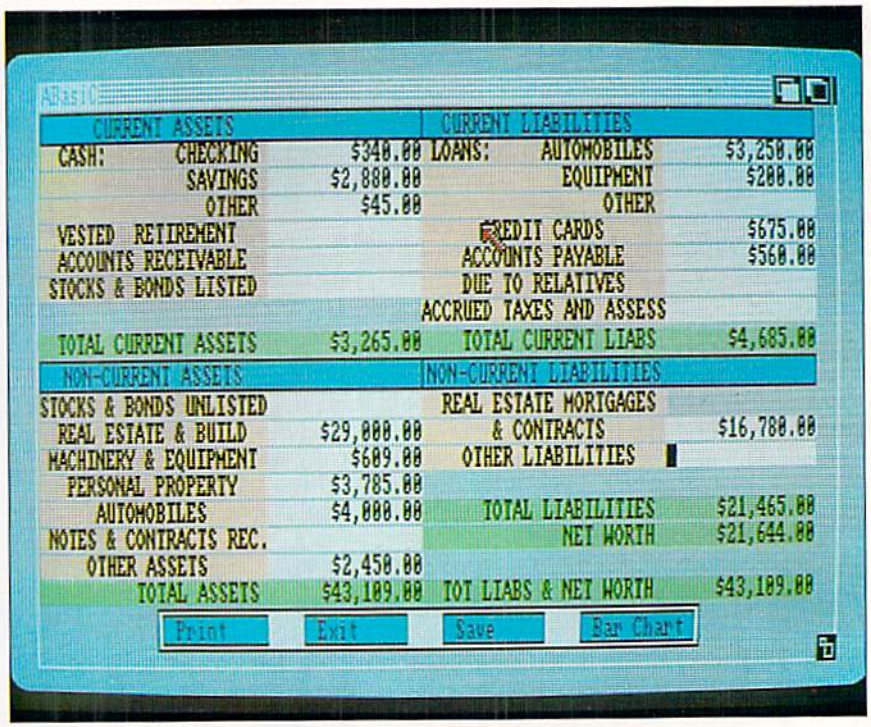
The module provides for recording withdrawals other than checks, deposits, interest earned, service charges and void checks. As you write checks or otherwise work with the account, you simply enter the amounts, check numbers, payees and other information in the on-screen blanks provided.

At the end of each monthly statement period, the program has a special screen that helps reconcile the accounts. It's possible to print a record of transactions at any time during the month. This is especially helpful when reconciling, of course.

Keep in mind that in this initial version of *PARHomeI* there is no way to rename or add to expense categories.

PARHome I is written in ABasiC, and as an added bonus the program disk includes the ABasiC programming language. A free

PAR Software's *PARHome I*



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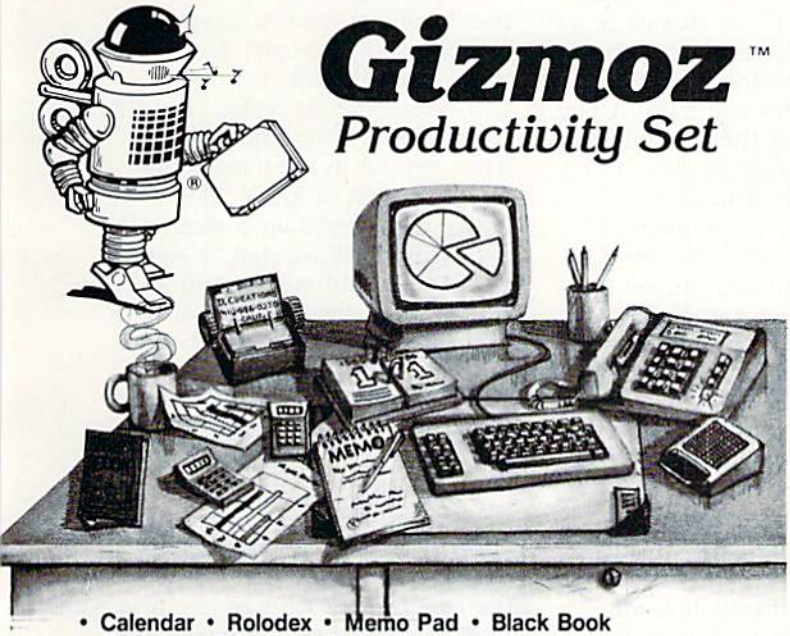

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updated version that includes a self-booting feature will be available to present owners. This will eliminate one complaint we had; the necessity of booting up ABasiC and then having to type a Run command for the program.

Other planned improvements in the updated version will do away with limitations such as the inability to provide customized expense categories in the Budget and Accounting modules and will include the ability to print checks.

These improvements will give *PARHome I* that little extra boost it needs to provide maximum utility for thousands of people who want to keep better track of their personal finances. The program performs very well when compared to similar applications on other computers.

—Tom Kempf

$129 retail
PAR Software, Inc.; PO Box 1089; Vancouver, Wash. 98666; 206-695-1368

TEXTCRAFT
Word processor

Although the literature describes *Textcraft* as an entry-level word processor, it is much more than that.

Textcraft is, in fact, two programs: a 256K version and a 512K version, both contained on the same disk. Instructions, contained on the errata sheets call for you to first make a working copy of the entire disk, then delete the version that does not apply to your machine.

The difference between the two versions has to do with the length of the files that may be handled without linking, and the fact that the 256K version must access the disk for certain Help routines.

After Kickstart, insert the *Textcraft* disk. *Textcraft* is installed over Workbench and is self-booting and easy to use with only one disk drive. Click on the disk icon, then on the *Textcraft* icon in the window and you're on your way.

The working screen that presents itself consists of five pull-down menus labeled Help, Project, Layout, Styles and Extras. To the right of that is a series of icons, representing the tools needed to cut, move and paste text.

The Help menu is unique. The first choice, Quick Reminder, defines all icons by superimposing a chart on the work screen. The second choice, Keyboard Reference, works in the same way, showing you shortcut keys that are alternatives to using the mouse.

The third option, One Minute Tutorial, presents you with a menu containing every feature of *Textcraft*.

Project allows you to start a new document, open an old one, save or print a document or exit *Textcraft*. Should you select New Document, you'll be treated to another unique feature: prefabricated forms for business letters, reports, resumes and more. Upon selecting one of these forms, the screen will change to show you a fill-in-the-blanks template.

Before saving a document, you'll want to pull down the Layout menu. Here you can set page numbering, titles and headers and footers; choose page size; and reset margins. Save also gives you the option of saving text only, without format.

Styles allows four type styles in one font: plain, boldface, italics or underline—or any combination of these, depending on how much emphasis you feel you need.

The Extras menu allows for "search and replace" as well as for choosing the screen display that is most comfortable for you. Like Workbench, you may choose to work in 60- or 80-column mode, choose a blinking or solid cursor and choose to display or not display end-of-paragraph markers.

In addition to the cut-and-paste icons, there is a subset of icons that allows for choosing line spacing as well as left or right justification, both left and right justification and centering of text.

Commodore's *TEXTCRAFT*

To move through your document, you may use the mouse and the grabber at the right border or you may page through it by using the numeric keypad or the cursor keys, depending on how fast you wish to go. Any of the formatting commands may be used for the current paragraph or for the entire document, as you choose.

When you first open *Textcraft*, you'll see a document icon entitled "Read me for News." Read it. It contains a description of updates not yet in the documentation and a list of know "bugs."

The documentation is clear, concise and well-illustrated, designed to get the first-time user up and working in a short amount of time.

Since *Textcraft* is installed over Workbench 1.0, some users may wish the added security of installing it over version 1.1, as contained in their upgrade kits.

To do this, copy Workbench 1.1, delete everything except Preferences and Trashcan, then boot *Textcraft* from drive two and drag the icon over to Workbench. It is most important that you also drag the TC drawer, even though it seems to contain nothing.

This done, you've created your own updated version of a powerful, easy-to-use word processor. "Entry level," indeed!

—Ervin Bobo

$99.95 retail
Commodore Business Machines; 1200 Wilson Dr.; West Chester, Pa. 19380

Accounting

B.E.S.T. Business Management System

Integrated business management
A 20MB hard disk will increase capacity approximately 20 times.

The *B.E.S.T. Business Management System* contains most of the major business functions needed by the majority of businesses that can operate from a single computer location.

These functions include accounts receivable, accounts payable, inventory management, order processing, purchase orders, invoices, statements, checks and others—even though the system contains no identifiable modules by those names.

The *B.E.S.T. Business Management System* extends the concept of integration to such an extent that it is difficult to dissect it into its various components, all of which are interrelated in actual operation.
Business Electronics Software & Technology, Inc.; PO Box 852; McMinnville, Oreg. 97128; 503-472-9512

CCI Bottom Liner

Personal, small-business accounting
External disk drive.

The *CCI Bottom Liner* is an expandable accounting system designed for personal, home and/or small-business use.

The heart of the system is a detailed Ledger file with automatically assigned transaction numbers that provide an audit trail. The method used to enter items into the Ledger is user selectable, and the Ledger file is linked to both Account and Project files.

Single- or double-entry bookkeeping can be used. Cash flow, bank balances and a trial balance can be obtained from the Ledger. When check writing is performed, the Ledger is automatically posted, eliminating the need to reenter data.

In addition, the *CCI Bottom Liner* provides Accounts Receivable and Payable Ledger listings or a Spread Sheet report of accounts receivable and payable. A Loan Amortization Schedule, Loan Payment calculator, Ledger Summary, single disk Copy and a file initialization and deletion routine are also provided.
Available July, 1986
Clockwork Computers, Inc.; 4612 Holly Ridge Rd.; Rockville, Md. 20853; 301-924-5509

CCI Merchandiser Plus

Accounting, inventory control
External disk drive.

CCI Merchandiser handles transactions, inventory records, financial reports and analyses, accounts receivable and more.

Point-of-sale transactions are prepared on the system, invoices produced and inventory updated. Short-period (usually daily) and long-period (up to one year) files keep track of sales by cash, check, credit card, store charges and CODs. Refunds by cash, check, store credit or credit card are also tracked.

The program's management reports provide information concerning net sales, net tax, cash update, cash on hand, checks on hand and nontaxable and taxable sales. Department sales and clerk sales are also maintained.
Available July, 1986
Clockwork Computers, Inc.; 4612 Holly Ridge Rd.; Rockville, Md. 20853; 301-924-5509

Integrated Accounting System

Small business accounting

Consists of accounts payable, accounts receivable, general ledger, payroll and word processing.
$295 retail
Byte By Byte; 3736 Bee Cave Rd., Ste. 3; Austin, Texas 78746; 512-328-2983

PHASAR

Accounting system; register

PHASAR (Professional/Home Accounting System And Register) helps users manage accounts, determine budgets, calculate and project taxes, analyze finances and organize affairs.

Using *PHASAR* for accounts is similar to using an ordinary checkbook. Users enter transactions into columns that look very much like the ordinary check registers they already use.

Users may also do tax calculations with the program, based on entered transactions, and calculate taxes using different methods to find the most advantageous.
Available May, 1986; $89.95 retail
Marksman Technology, Inc.; Rt. 5, Box 221A; Santa Fe, N.M. 87501; 505-455-2681 (information) or 800-334-7792 (sales)

Rags To Riches

Accounting

Rags To Riches modules include General Ledger, Accounts Receivable and Accounts Payable.

Features include numbered or name accounts; prints invoices; prints detailed statements; prints checks automatically; has five common commands; a text editor; provides continual on-screen summaries; and is RAM based.
$199.95 retail; per module
$499.50 retail; all three modules
Chang Labs; 5300 Stevens Creek Blvd.; San Jose, Calif. 95129; 408-246-8020

Business Graphics

Impact

Graphics
512K Amiga; external drive.

Impact displays numeric data in graphic form. There are two parts to the program; the first allows a user to create slides of graphs, charts, text and symbols in a free format, and the second plays the slides back in a predetermined sequence and fashion.

A user can enter tables of numeric data and plot the results in bar, line or pie chart format. There are a variety of each type to choose from, including horizontal and three-dimensional. Once a chart is displayed on the screen, a user can change the colors and add text, icons or freehand drawing to enhance the graphic.

Tables allow the creation of text slides. They operate as a word processor with the ability to use the draw functions. Draw functions include freehand, line, frame, circle and arc.

Slide show capabilities provide control of the type of transformation used between the slides, the wipe delay and the pause delay. Transformation types include fade in, fade out, random, trickle, spiral in, spiral out, curtain up, left, right and down.
Available April, 1986; $199.95 retail
Aegis Development; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Communications

A-TALK

Communications

A-Talk is a set of integrated communications tools that work together to help a user collect, control and transmit data.

Features include full control of all communications parameters; full support of various modem types with auto-dial, auto-redial, answer and hangup; a script language for automatic log in and log out; a phone number directory for auto-dialing; and full ANSI terminal emulation. VT100 emulation will be available.
$49.95 retail
Felsina Software; 3175 S. Hoover St., Ste. 275; Los Angeles, Calif. 90007; 213-747-8498

A Term

Communications

A terminal program that allows incoming data to be spoken through the speaker; data to be printed as it is coming over the line; support of protocols; auto-dialing; and more.
$49.95 retail
MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

BBS-PC

Bulletin board system

BBS-PC is a versatile electronic bulletin board system that transforms an Amiga into an on-line information network.

Other computer users can call a user's Amiga and read messages, leave messages, send a file or even take a file.
$99.95 retail
Brown-Wagh Publishing; 100 Verona Ct.; Los Gatos, Calif. 95030; 800-451-0900 or 408-395-3838

Communications Continued

D.A.S. Communications
Telecommunications
D.A.S. Communications features include VT100 emulation; support of 110 to 2400 baud; built-in bulletin board system with message base; upload and download options; and menu driven programs.
$45 retail
Developers of Advanced Software; 12455 Veterans Memorial Dr., Ste. 204; Houston, Texas 77014

Genie
Integrated software
10MB; networked environment.
Genie is an integrated IMEC (information management/electronic communication) application program for a networked environment. It is written in Pascal and designed for multiple user interfaces, including non-English interfaces.
Genie consists of a central required component, called *Coretex*, and a series of optional components; *Telefont*, *Telecalc* and *Telewrite*.
Available first quarter, 1987
Data Dynamics, Inc.; PO Box 2728; Portland, Oreg. 97208; 503-626-4635

MaxiComm
Communications; file transfer utility
Maxicomm is a terminal and file transfer utility program that allows users to connect their Amigas to the outside world via a telephone and modem.
$49.95 retail
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104

Online!
Telecommunications
Online! is a telecommunications program that can transform any Amiga into a terminal capable of interacting with micros and mainframes, so users can exchange information, news and data with other computers.
The program is also capable of linking up with commercial information services, as well as sending telex messages and electronic mail worldwide.
$69.95 retail
Brown-Wagh Publishing; 100 Verona Ct.; Los Gatos, Calif. 95030; 800-451-0900 or 408-395-3838

StarNet
Bulletin board network system
Starnet's features include X-modem protocol support, password operation, multilevel security systems, upload and download capabilities, menu operation and more.
Available September, 1986; $99.95 retail
Eight Stars Software, Inc.; 2900 Boniface Pkwy., Ste. 277; Anchorage, Alaska 99504; 907-345-6109

Creative

Aegis Draw
CAD drawing package
512K Amiga; external drive.
Aegis Draw is a CAD drawing package used to create structured drawings that can be sent to a plotter or printer. Commands can be issued via the mouse, the keyboard or a digitizer.
Features include automatic scaling, zoom, griding, layering, rulers, file merging and adjustable paper size.
Available April, 1986; $199.95 retail
Aegis Development; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Analytic Art
Graphics, pictures
Analytic Art can be used to produce precise drawings of striking beauty and complexity. Users don't have to understand math, programming or art to develop interesting pictures.
Program options for adjusting resolution include striping functions, color evolution, color flashing, three-dimensional stereo pairs and more.
Resulting pictures can be converted to a format compatible with other Amiga graphics programs.
Analytic Art is written in C language and Assembler.
Available May, 1986; $69.95 retail
Crystal Rose Software; 109 S. Los Robles; Pasadena, Calif. 91101; 818-795-6664

Animator
Aegis Development, Inc., see review on page 84

Art Director
Art Director is designed to aid the needs of advertising artists including art and creative directors.
The program allows a user to create storyboards and layouts, layout and justify text, experiment with colors and typefaces, create and move artwork and more.
Available fourth quarter, 1986
Grey Associates; 250 Bruton Way; Atlanta, Ga. 30342; 404-851-9103

DeluxePaint
Electronic Arts, see review on page 86

DeluxeVideo
Video production
512K Amiga.
Deluxevideo can be used to produce video slide shows, point-of-sale videos, animated commercials, business presentation videos, interactive educational videos, animations and home versions of MTV.
Videos made with the program can be recorded on a videotape and shown on a VCR. Also, these videos can be overlaid and mixed with those a user takes on a video camera.
Available April, 1986; $99.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

FutureSound
Digital sound recorder
Futuresound makes it possible to record, play back and store any sound directly on the Amiga.
Features include multitrack recording, variable recording speeds and variable playback speeds.
It connects directly to the parallel port. An additional connector is provided for a printer.
Futuresound comes complete with a microphone (a jack is provided for using other microphones), connecting cables and recording software.
Available Spring, 1986; $175 retail
Applied Visions; 15 Oak Ridge Rd.; Medford, Mass. 02155; 617-488-3602

Graphicraft
Graphics creation
An entry-level graphics design and paint program that features 32 colors and special effects such as color animation.
$49.95 retail
Commodore Business Machines; 1200 Wilson Dr.; West Chester, Pa. 19380; 215-431-9180

Images
Creative
512K Amiga.
Images allows a user to create paintings with as many as 32 different colors out of a possible 4,096. Colors can be mixed and changed on a palette to get the exact colors needed. Circles and rectangles as well as free hand shapes can be drawn. There are 20 different brushes and 16 patterns available, all of which can be modified for custom designing.
Available April, 1986; $79.95 retail
Aegis Development; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Imagine This
Image processing; software development
512K Amiga (recommended); video digitizer.
The *Imagine This* image processing software system turns an Amiga computer into an image processing workstation.
Imagine This comes with a menu- and icon-based interactive environment and an applications library that allows users to write their own image processing programs.
With *Imagine This*, users will be able to accept images from video digitizers, such as LIVE, as well as standard Amiga IFF graphics files.
Available second quarter, 1986
Zoxso; PO Box 283; Lowell, Mass. 01850; 617-655-9548

The Music Studio
Music composition
The Music Studio features pull-down win-

dows for composition and editing and editing functions that include commands to move, copy, repeat, transpose and change note values.

The program works with electronic musical keyboards and in stereo (where available) to create musical scores with up to 15 channels controllable at the same time.
Available April, 1986; $59.95 retail
Activision; PO Box 7286; Mountain View, Calif. 94039; 415-960-0410

TV*TXT
512K Amiga; two disk drives.

*TV*TXT* is a video production tool that enables a user to produce high-resolution, animated video titles on the Amiga.

The titles can be displayed on any one of the textured backgrounds supplied with the program or keyed over live video when used with the Amiga Genlock.

Included with the program are four high-resolution fonts that can be displayed in a variety of styles, including italic, bold, outline, metallic and extruded. Additional font libraries are available separately.
Available June, 1986; $249.95 retail
Zuma Group, Inc.; 6733 N. Black Canyon Hwy.; Phoenix, Ariz. 85015; 602-246-4238

Data Base

A Filer, A Report
Data base

A Filer features include creation of disk files; sorting of information; printing out mailing labels; printing out a sorted or partially selected list; 12 fields per record; and more. $49.95 retail

A Report features include creation of custom report headings; page numbering; column-type or multiple-line reports; calculation of totals; and more. $49.95 retail
MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

Amiga Record Holder
512K Amiga.

Features include 16 fields with user-definable input and length; sorts on any field; arranges into zip code order or alphabetically; prints mailing labels; accounts ledger; and on-line help and tutorials.
Available September, 1986; $38 retail
HC Software Australia; GPO Box 2204; Adelaide, South Australia 5001; 08-428377

The Data System
512K Amiga; two disk drives; Amiga-DOS 1.1 or later; ABasiC.

The Data System is a full-featured data base management package that builds files, reports and lists with posting, totals, subtotals, calculations, etc., all on up to nine conditions.
Available June, 1986; $200 retail; without ABasiC
$210 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

FoxFile
File management
512K Amiga, external disk drive optional.

Foxfile is a file manager that will accept up to 65,536 records. It works with *Workbench* Version 1.10 or CLI, 256K and one or two disk drives.

The program uses all available system memory to speed searches and sorts and it can sort five levels deep in either ascending or descending order.

Foxfile offers variable field types; file size limited only by available disk space; 50 fields available in each file, which may be up to 255 bytes in length; the ability to export and import data to and from other programs; mouse- and menu-driven control; and more.
Available April, 1986; $50 retail
Foxware; 1554 Park Creek Ln.; Atlanta, Ga. 30319

InfoBase
Data base
512K Amiga.

Infobase is a data base program that provides many powerful functions. Each record can contain up to 200 fields of information, and the number of records is only limited by memory available.

Records are easily added or deleted, there are flexible sorting and search functions and browsing through records is a simple matter.

Records can be sorted and printed by any field. The starting and ending sort information can also be specified, and multiple copies of the printout can be produced.
$45 retail
Harvsoft; PO Box 725; Kenmore, N.Y. 14217; 716-877-3510

Integrated

VIP Professional
Integrated spreadsheet, data base, graphics

VIP Professional brings together a spreadsheet, a data base and graphics capabilities in one program.

Modeled after *Lotus 1-2-3*, the program helps users do: home budgets; loan schedules; retirement, investment and insurance planning; accounting; inventory; payroll; business plans; check ledgers; and bookkeeping.

Built-in graph types include pie charts, stacked-bar charts, line graphs, bar graphs, scatter graphs and X/Y graphs. Titles, legends, grids and formats can be added, and users can also control scaling.
$199.95 retail
VIP Technologies; 132 Aero Camino; Goleta, Calif. 93117; 805-968-9567

Miscellaneous Management

Amiga Man; Business
Business software

Amiga Man provides two disks that contain business financial management programs. Each contains 10 programs.
$24.95 per disk retail
Amiga Man; PO Box 58768; Houston, Texas 77258; 713-480-1735

Computer Co-Pilot

Computer Co-Pilot helps a user to "fly" his life like a copilot helps a pilot to fly a plane.

It assists a user at his communication tasks, while learning about the user and his relation to the world.

The program includes a fully integrated relational data base and a self-programming expert system. It is I/O compatible with all standard communications channels, including ASCII files.
Available fourth quarter, 1986; $900 retail
Alive Systems Group; PO Box 50; Big Sur, Calif. 93920; 415-332-8018

D.A.S. Business Finance

D.A.S. Business Finance assists business owners in making financial decisions and planning for future business expansion.

Investment functions and information include purchase price for merger/acquisition; purchase/lease analysis; tax depreciation table; equipment price analysis; job bidding/cost analysis; variable and fixed production amount; depreciation value; and more.
Available June, 1986; $45 retail
Developers of Advanced Software; 12455 Veterans Memorial Dr., Ste. 204; Houston, Texas 77014

Gizmoz
Desk accessories
$49.95 retail
Digital Creations; 530 Bercut Dr.; Sacramento, Calif. 95814; 916-446-4825

MaxiDesk
Business tools

Maxidesk is made up of a set of useful business tools, including a calculator, appointment calendar, alarm clock, phone book, keyboard helper and notepad.

Maxidesk runs with other multitasking software, providing users with simultaneous access to all of its component parts.
$70 retail
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104

Time & Task Planner
512K Amiga; two disk drives; Amiga-DOS 1.1; ABasiC.

Time & Task Planner (TTP) is a time management tool for up to five users.

The program provides each user with a 60-item To Do List; a 60-item Future Plan-

Miscellaneous Management Continued

ning List; an Appointment Scheduler; a Copy to Scheduler utility that allows transfer of information from the To Do List or Future Planning List to the Appointment Scheduler; and a Calendar utility that allows a user to print single-sheet yearly, or monthly block calendars, for any year from 1911 through 2399.
$100 retail; without ABasiC
$110 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

Programming

3D Graphics Library

The *3D Graphics Library* is designed for users who want to incorporate three-dimensional transformations into their software.
Available third quarter, 1986
Computer Food, Inc.; 2215 Sarah Ct., Ste. 80H; Norcross, Ga. 30093; 404-851-9103

A Copier

Nibbler
$39.95 retail
MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

Advanced String Library

512K Amiga.

The *Advanced String Library* is full of handy tools that include source code.

Features include pattern matching routines, expression scanning, associative memories, text manipulation, character set manipulation, English text and Roman numeral conversion, DO programs that find and replace patterns in a current file, a 38,000-word dictionary and more.
Available April, 1986; $39.90 retail
True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

Amiga Lattice C Compiler

512K Amiga; two disk drives.

A full implementation of Kernighan and Ritchie with the ANSI C extensions and additional features for development of programs on the Amiga.
$250 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice dBC III Library

512K Amiga; two disk drives.

Contains more than 70 C functions that allow a user to create, access and update files that are compatible with Ashton-Tate's *dBASE III*.
$150 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice Maclibrary

512K Amiga; two disk drives.

Maclibrary consists of more than 60 C functions that aid in implementing screens, windows and gadgets by utilizing the functions, examples and sample programs included with the package.

Maclibrary routines are functionally compatible with most Macintosh Quickdraw Routines, Standard File Package and Toolbox Utility Routines, enabling a user to convert Macintosh programs to run on the Amiga.
$100 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice Make Utility

512K Amiga; two disk drives.

An automated product generation utility that allows a user to rebuild complex programs with a single command.

The program is similar to *UNIX Make* and can also be used to update text and spreadsheets or perform any executable commands.
$125 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

The Right Link, Ltd.

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Amiga Monitor Cables
Sony, Amdek, Taxan, and others . . . . . $34.95 to $39.95

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Hard Disk System 10-20-40-meg
(Complete with one-slot adapter) . . . . . $1,415.95 to 1762.95
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7-Slot expansion box $656.95
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Dual External 5.25 inch Floppy Drives $499.95

Sony Monitors . . . . . call for pricing

Printers
CITIZEN, OKIDATA, PANASONIC, C. ITOH, EPSON . . . . call for pricing

Modems
PEACHTREE TECHNOLOGY P-1200 . . . . . $279.95

AMIGA SOFTWARE

Business
CHANG LABS A/P, A/R, G/L $99.95
Business Pack $245.95
ELECTRONIC ARTS Financial Cookbook $39.95
OLAMIC SYSTEMS 2+2 Home Management System $89.95
MICRO SYSTEM Analyze $89.95
LATTICE Unicalc Spreadsheet $79.95

Languages
LATTICE "C" & Text Utilities $139.95
MICRO FORGE Text Editor $69.95
UBZ SOFTWARE UBZ Forth $79.95

Utilities
MICRO FORGE Ram Disk $24.95
MAXI CORP Maxicomm $42.95
MICRO SYSTEMS On Line $89.95
MICRO FORGE ProLog-Level I $89.95

Graphics
ELECTRONIC ARTS Deluxe Paint . . . . . call for price

Games
ELECTRONIC ARTS, INFOCOM, ACTIVISION, MINDSCAPE . . . . . $31.95 to $44.95

Manuals
BANTAM Amiga Users Manual $24.95
ADDISON WESLEY Amiga Technical Reference Manual $89.95

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Amiga Lattice Screen Editor
512K Amiga; two disk drives.
The *Lattice Screen Editor* is a multiwindow editor that provides the standard editor functions, such as block moves, keyboard macros and cut and paste.
$100 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice Text Utilities
512K Amiga; two disk drives.
Text Utilities consists of eight programs that provide a language-independent set of tools for examining and editing text files. These utilities can be used on program source code or files produced by a text processor.
$75 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga-Lint
Diagnostic facility for C
Amiga-Lint analyzes C programs and reports on bugs, glitches and inconsistencies. The program looks across multiple modules and compares calls against a user's standard library. It aids in developing reliable programs and in porting programs from other machines and operating systems.
$98 retail
Gimpel Software; 3207 Hogarth Ln.; Collegeville, Pa. 19426; 215-584-4261

Amiga MS-DOS C Compiler
512K Amiga; two disk drives.
Allows Amiga development on an MS-DOS system. Includes the *Amiga Lattice C Compiler.*
$250 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Panel Forms Manager
512K Amiga; two disk drives.
Panel enables users to allow full user editing of data entries, provide custom data entry validation and create pop-up help messages and menus. Users can also layer their screen designs with up to 10 overlapping images to create background screens.
$195 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Programmer's Library
Software development; file transfers
IBM PC for file transfers; C compiler; Amiga assembler and linker.
The *Amiga Programmer's Library* contains 14 tools for developing software and 10 utilities that complement existing development tools, such as the Lattice C compiler and the Amiga assembler and linker.
The program also contains four utilities, which run on an IBM PC, that allow file transfers of either binary or text files—both to and from an Amiga.
$200 retail
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104

Commodore-Amiga
Programming languages
$199.95 retail; *Amiga LISP*
$149.95 retail; *Amiga C*
$99.95 retail; *Amiga Pascal*
$99.95 retail; *Amiga Macro Assembler*
Commodore Business Machines; 1200 Wilson Dr.; West Chester, Pa. 19380; 215-431-9180

Doost Forth
Software development
Doost Forth is a descendant of the F83 systems. It is upwardly compatible with F83, but also has additional features.
One of these features is the capability to access all of Amiga's internal data structures and routines mneumonically through the implementation of extensions on the Forth vocabulary and operations.
Available summer, 1986; $40 retail
Doost Software; PO Box 209; Amherst, Mass. 01002; 413-549-5168

EnterAct
Authoring system
512K Amiga recommended.
Available Fall, 1986 to Spring, 1987
Battenberg and Associates, Inc.; 4740 Hinesley Ave.; Indianapolis, Ind. 46208; 317-283-3129

Hippo Eprom Burner
Reads, verifies and burns most Eproms.
$199.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

HobKit I
Programming utilities
Hobkit I is a basic set of programs and utilities that includes *Funtime I* and *File Clerk I.*
Funtime I is a collection of animated color graphic routines, a music transcriber/composer and a music player driven by an extensive music meta language (MML).
File Clerk I includes all the utilities and routines needed to create commercial or data processing applications.
All code is written in C for portability to other computer systems.
Available June, 1986
$125 retail; *Hobkit I,* includes *Funtime I* and *File Clerk I*
$50 retail; *Funtime I*
$100 retail; *File Clerk I*
Getting Enterprises, Inc.; 204 Hamilton Rd.; Bossier City, La. 71112; 318-747-4829

Metacomco
Programming
512K Amiga.
Cambridge Lisp: This is an implementation of LISP for computers based on the Motorola 68000 range of microprocessors. Its features include an integral compiler, 16MB address space, rational and floating-point arithmetic, structure editor and more.
ISO Pascal: This is a full ISO standard Pascal compiler for the 68000 for commercial, educational and personal uses.
$199.95; *Cambridge LISP*
$99.95; *ISO Pascal*
Tenchstar, Inc. Metacomco; 5353 #E Scotts Valley Dr.; Scotts Valley, Calif. 95066; 408-438-7201

Metadigm Software
Programming tools
Metascope: The Debugger offers Memory Windows, which allow users to move through memory, display data or disassembled code and freeze to preserve a display; Other Windows, such as status windows that show register contents and program state; Execution Control, featuring breakpoints with repetition counts and conditional expressions; and more. $95 retail
Metascribe: The Editor features mouse support for text selection, command menus and scrolling; search/replace of regular expressions either forward/backward, full file or marked block; multiple windows that allow users to work with different files or different portions of the same file; and more. $85 retail
Metatools I provides the following programming tools: a program maintenance utility, pattern matching utility, source file compare, text file filter, single file compare, file dump utility, Amiga-to-PC file transfer, PC-to-Amiga file transfer and more. $69.95 retail
Metadigm, Inc.; 19762 MacArthur Blvd., Ste. 300; Irvine, Calif. 92715; 714-955-2555

The Micro Forge Programming
Programming utilities
Programmer's Editor allows a user to redefine the keyboard and assign commands to any key combination, as well as write new commands for the *Editor.*
The program comes with complete macro capabilities and a built-in macro compiler. More than 400 macros may be defined by the user.
Available March, 1986; $69.95 retail
Prolog Level 1. Available April, 1986; $89.95 retail
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

Multi-Forth
Software development
Multi-Forth can be linked to C and other libraries in order to take advantage of existing library routines, and its compact code allows large programs to fit into small spaces.
The program features a built-in Assembler, which provides the ability to optimize code; a Turnkey Compiler, for creating

Programming Continued

stand-alone programs; Trace and Debug system testing; Command Key Macros, for customizing programs; Online Help; an Online Tutorial; and more.
$179 retail
Creative Solutions, Inc.; 4701 Randolph Rd., Ste. 12; Rockville, Md. 20852; 301-984-0262

Program Generator
512K Amiga; two disk drives; Amiga-DOS 1.1 or later; ABasiC; The Data System.

Program Generator is a power code to help write applications, menus, reports, etc. The program writes actual BASIC code that can be modified and tailored.
Available July, 1986; $400 retail; without ABasiC
$410 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

Programmers Toolkit
512K Amiga.

The *Programmers Toolkit* consists of an editor (PED), a symbolic debugger (SDB) and a program profiler.

Utilities include compare, dump, grab, list, search/sort directory, search/replace and a print program.
Available second quarter, 1986; $124.95 retail
MicroDimensions, Inc.; 455 North University Ave., Ste. 206; Provo, Utah 84601; 801-377-0933

Quick Test 1000
Digital waveform aquisition and storage
512K Amiga.

The *QT-1000* is a tool for testing and debugging digital hardware circuits.

The *QT-1000* plugs into the expansion slot of the Amiga and comes with a software package for programmable testing and analysis.

The *QT-1000* makes use of the Amiga as a programming tool for specifying the test sequence to be run; the multitasking capabilities allow data gathering and analysis programs to be run simultaneously; the graphics capabilities are used for display of the waveforms and their associated timing information; and the audio output capability allows a user to follow waveforms audibly, if desired.
Available September, 1987; $800 to $1,200 retail
Syquest; PO Box 758; Snowdon Station; Montreal, Quebec, Canada H3X 3X9; 514-935-5881

RTL
Relocatable threaded language
512K Amiga.

RTL is a language designed for a user who wants more interaction with a computer than traditional languages allow.

Instead of writing programs as in other languages, a user modifies the language to the point where the desired application is contained as a subset of the language. This allows the language to evolve with each application and become better adapted to a wide range of applications.

RTL consists of a dictionary of routines or "words" and allows multiple words to be strung together to form new ones.

A full word processor, *Wordwright*, is included for editing.
Available June, 1986; $200 retail
RTL Programming Aids; 10844 Deerwood SE; Lowell, Mich. 49331; 616-897-5672

Sorting & Searching
512K Amiga.

Sorting & Searching includes all the routines needed for both string and numeric sorting.

The library provides 14 subroutines for sorting arrays. All are "in-place" sorts, which means that they require little memory over and above that taken by the array and require no disk access.
Available April, 1986; $65 retail
True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

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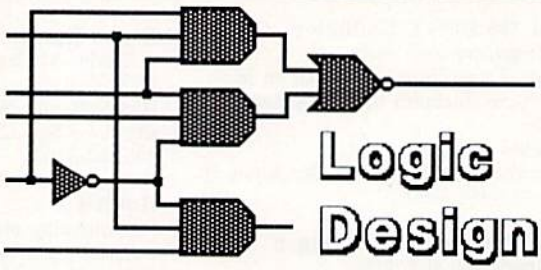

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True BASIC Language System
512K Amiga.
Features of the language include control structure support; named subroutines accept parameters passed by reference or by value; line numbers and traditional GOTO and GOSUB statements are optional; subroutines can be separately compiled and saved in external libraries; a complex matrix package; support of multiple windows for text or graphics; built-in two-dimensional graphics transformations; and follows the proposed ANS standard for BASIC.
Available April, 1986; $149.90 retail
True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

TxEd
Text editor
Features include use of mouse and menus; display and compact code; visible highlighting of cut and paste; multiple windows; editing of IBM text files; and menus for on-line help.
$39.95 retail
Microsmiths, Inc.; PO Box 561; Cambridge, Mass. 02140; 617-576-2878

WAO Robot
Computerized logic controlled robot that teaches robotics and programming.
Available second quarter, 1986; $149.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

ZLI
Line interpreter
Features include pipes, search paths, user-definable command-line editing, definable function keys, UNIX-like wild cards, versatile redirections, command aliases, built-in commands and command history.
Available April, 1986; $69.95 retail
Zoxso; PO Box 283; Lowell, Mass. 01853; 617-655-9548

Specific Application

Amiga Man; Math
Science and math software
Amiga Man provides several disks that contain collections of scientific and mathematical programs.
$19.95 per disk retail
Amiga Man; PO Box 58768; Houston, Texas 77258; 713-480-1735

Digital Building System
Digital Building System (D.B.S.) allows a user to design and test digital electronic circuits graphically.
Standard schematic symbols are used to build the circuits and the Amiga shows the circuit in operation by changing colors of the wires to indicate logic states.
Available June, 1986; $299 retail
MicroMaster Software; 113 W. Woodland Dr.; Aliquippa, Pa. 15001; 412-728-7472

ES5C Calculator
Programmable scientific calculator
The *ES5C Calculator* is a software module that emulates a programmable scientific calculator.
It resides in its own window and can run concurrently with other applications.
The program operates almost identically with the Hewlett-Packard HP-15C handheld calculator, except that it doesn't suffer from any of the HP-15C's memory or speed limitations.
Available June, 1986; $19.95 retail
Emusoft Corp.; 1400 Chicago Ave., Ste. 303; Evanston, Ill. 60201; 312-869-6676

Grade Manager
Gradebook and statistics
Grade Manager allows for the entry of any type of grade entry with full category weighting and renaming, automatic conversion of grades to a true 100-point scale and after-the-fact grade maintenance.
A special interface allows *Grade Manager* to hook up to a Scan-Tron optical scanner, allowing a teacher to give a test on scanner cards. These can then be fed into the Scan-Tron and automatically graded and placed into the grade book.
Full attendance recording capabilities are also included.
Available April, 1986; $89.95 retail
Associated Computer Services; 839 South Glenstone; Springfield, Mo. 65802; 417-865-6555

Lionheart Business Software
Business analysis books with software
$145 retail; *Business Statistics*
$145 retail; *Experimental Statistics*
$145 retail; *Multivariate Analysis*
$145 retail; *Forecasting and Time Series*
$145 retail; *Sales and Market Forecasting*
$110 retail; *Decision Analysis Techniques*
$95 retail; *Linear and Non-linear Programming*
$95 retail; *Pert and Critical Path Techniques*
$110 retail; *Optimization*
$75 retail; *Explanatory Data Analysis*
Lionheart Press; PO Box 329; Alburg, Vt. 05440; 514-933-4918

LogicWorks
Integrated logic design
A tool that contains schematic diagram entry and simulation capabilities, user-definable macro devices, PROM and PLA support and interactive operation.
$199.95 retail
Capilano Computing Systems, Ltd.; PO Box 86971; N. Vancouver, B.C., Canada V7L 4P6; 604-669-6343

PCLO
Printed circuit board layout
PCLO is a multiple layer, interactive autorouting CAD tool for engineers and technicians who want complete control over their printed circuit board artwork.
$1,000 retail; single sites
Multiple site license terms available
SoftCircuits, Inc.; 401 SW 75th Terrace; North Lauderdale, Fla. 33068; 305-721-2707

Quiz Master
Music
Quiz Master allows a teacher to create and give tests or quizzes directly on the computer. Two additional support packages, *Music Student I* and *II*, take the student through all major areas of music theory such as symbol recognition, scales, chords, etc. These quiz disks are examples of the type of material that can be created using *Quiz Master.*
Quiz Master not only gives the quiz, but also grades it, stores those grades for future review and prints out a progress report.
Available April, 1986; $79.95 retail; *Quiz Master*
Available May, 1986; $49.95 retail; *Music Student I* and *II*
Associated Computer Services; 839 South Glenstone; Springfield, Mo. 65802; 417-865-6555

SciCalc
Scientific calculator
Scicalc is an algebraic calculator that uses a hierarchy system that is similar to the advanced algebraic calculators.
There are 10 memories available that can be stored, recalled or summed by a two-button operation.
Available March, 1986; $22.95 retail
D.L. DeFore; PO Box 47577; St. Petersburg, Fla. 33743

Station Manager
Station Manager is a full-featured television station management system.
The first module to be completed is the weather graphics system. The system has full color maps of the world, country, county, state and ADI (Area of Dominant Influence). Each uses standard IFF format for loading into such packages as *Deluxepaint* and *Aegis Images*. This allows for complete modification and recoloring by the end user.
Additional modules will be available to handle interoffice mail, teleprompting, downloading from news and weather services and production of news "copy." This will link together all newsroom services.
Available June, 1986; $1,995 retail; *Station Manager*
Available March, 1986; $995 retail; weather system
Associated Computer Services; 839 South Glenstone; Springfield, Mo. 65802; 417-865-6555

Spreadsheet

Analyze!
Brown-Wagh Publishing, see review on page 81

Spreadsheet Continued

Amiga Unicalc Spreadsheet

512K Amiga; two disk drives.

Unicalc is an electronic spreadsheet that provides a 256-column by 1,024-row processing area.

Cells can contain numeric data, algebraic formulas or text, and *Unicalc* can be used to create sales reports, expense accounts, balance sheets or other reports.

Features include context-sensitive help screens; foreign language customization for all prompts and messages; complete library of algebraic and conditional functions; dual window capabilities; floating point and scientific notation options; load, save and print capabilities; and full compatibility with other leading spreadsheets.

$79.95 retail

Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

MaxiPlan

Spreadsheet

512K Amiga; external disk drive recommended.

Maxiplan is a spreadsheet program that provides what-if analysis with numerical data. Output can be in the form of numerical tables as well as line, pie or bar charts.

The program's graphics can be connected to numerical data in one of two modes, static or dynamic. Static mode provides a "snapshot" of all numerical data for graphing; dynamic mode retains the connection between the numerical data and a graph so that, as a user changes the data, the graph is automatically redrawn.

Available April, 1986; $150 retail

MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104

Utilities

A Disk

A two-drive emulator that allows a user to load and run programs without continually swapping the Workbench disk.

$29.95 retail

MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

Amiga Man; Utilities

Utility software

Amiga Man provides two disks with collections of Amiga System utilities. There are five programs per disk.

$29.95 per disk retail

Amiga Man; PO Box 58768; Houston, Texas 77258; 713-480-1735

DeluxePrint

Printing program

512K Amiga.

Deluxeprint is a full-function color printing program.

It contains 15 formats for creating a variety of customized printouts, in either color or black and white.

The program allows a user to place an unlimited number of different images anywhere on the page, edit them, flip, shrink or expand these images and change their colors from among the 4,096 available.

The grid system allows a user to arrange images with equally spaced placement or according to seven pre-formatted patterns.

Available March, 1986; $99.95 retail

Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

Disk Guru

A utility program that includes undeleting of files, recovering of bad files (when possible), viewing of files in various formats, editing of files and directories one byte at a time and more.

Available third quarter, 1986

Computer Food, Inc.; 2215 Sarah Ct., Ste. 80H; Norcross, Ga. 30093; 404-851-9103

Disk Library

Disk Library provides a way to organize the contents of a disk for easy access.

Each disk, file and folder in the library is filed, categorized and cross-referenced, and a permanent record is created on each.

Available March, 1986; $49.95 retail

Classic Image, Inc.; 510 Rhode Island Ave.; Cherry Hill, N.J. 08002; 609-667-2526

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*There is an additional $4.50 U.S. and Canada, 15.00 Europe and Asia shipping charge per order. California residents add sales tax.

PET and AMIGA are trademarks of Commodore Electronics Ltd.

Disk Traffic Controller
Two disk drives recommended.
Disk Traffic Controller is a master disk catalog system.
Each disk is logged onto the master disk, where the user may locate files, find the most up-to-date version, uncover duplications and more.
Available second quarter, 1986
Grey Associates; 250 Bruton Way; Atlanta, Ga. 30342; 404-851-9103

HippoPixel
A font and sprite editor that includes timed animation sequence.
Available second quarter, 1986; $59.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

Laserwriter Utilities
AmigaDOS; Apple Laserwriter; serial cable; modem eliminator; external disk drive.
A collection of *Postscript* procedures for formatting text on the Laserwriter.
Each procedure is self-contained so that it can be independently sent out of the Amiga's serial port, via a call to AmigaDOS's TYPE command, or combined with other procedures to form complete *Postscript* programs.
Each procedure can be edited with AmigaDOS's ED for custom applications.
Available April, 1986; $25 retail
S. Anthony Studios; 889 De Haro St.; San Francisco, Calif. 94107; 415-826-6193

Marauder
Discovery Software, see review on page 88

The On-line AmigaDOS Manual Version 1.1
An on-line help utility
Menus provided are DOS Help, which contains how-to sections on DOS devices, directories, command formats and other DOS features; Commands, which contains all of the AmigaDOS commands underlying the Workbench, broken down into menu categories; and more.
Available March, 1986; $29.95 retail; *AmigaDOS Manual*
Available October, 1986; $29.95 retail; *AmigaBASIC Manual*
Omega Star Software; PO Box 1831; Clemson, S.C. 29633; 803-882-3602

RAM Disk
Memory partitioning utility
The *RAM Disk* gives high-speed capabilities to users of the Workbench interface.
The program appears as a normal disk icon and functions in all ways as a normal Amiga disk drive. The only difference is that everything in the RAM Disk is lost when the machine is turned off or reset.
$24.95 retail
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

Word Processing

Flow
New Horizons Software, see review on page 87

HippoConcept
An outliner and idea processor with multilevel conceptual structuring and unrestricted outline formatting.
Available second quarter, 1986; $119.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

Hippo Fonts
Twelve additional fonts to be used with *Hippoword*.
Available second quarter, 1986; $39.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

HippoSpell
A generic spell checker that contains a user-defined or 30,000-word dictionary.
Available second quarter, 1986; $59.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

HippoWord
A full-featured, multiple-font word processor with mail-merge and macro capabilities.
Available second quarter, 1986; $189.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

Laserwriter Fonts Vol. 1
AmigaDOS; Apple Laserwriter; serial cable; modem eliminator; external disk drive.
A collection of three downloadable analytic (not bit-mapped) fonts for the Laserwriter printer.
These include Round, a stroked, thin-lined font based on lines and circles; Classic, a stylized Roman-like typeface; and Showtime, based on the Broadway typeface.
Available April, 1986; $30 retail
S. Anthony Studios; 889 De Haro St.; San Francisco, Calif. 94107; 415-826-6193

Nancy
Spelling checker and utilities
Nancy is a spelling checker with a compressed dictionary file containing more than 80,000 words.
The program can be run passively, marking words in a document that were not found in the dictionary for later review, or interactively, allowing for word correction.
Available May, 1986; $60 retail
The Computer Club; 4843A South 28th St.; Arlington, Va. 22206; 703-998-7588

Textcraft
Commodore Business Machines, see review on page 92

Wordwright
Word processing
512K Amiga.
Wordwright is a word processor that can handle large text files and is oriented to the user who wants total control over the way text is printed.
In addition to functions such as block, copy, string search, word wrap, etc., *Wordwright* features macros and conditional statements.
Available June, 1986; $75 retail
RTL Programming Aids; 10844 Deerwood SE; Lowell, Mich. 49331; 616-897-5672

Personal and Home Software

Education

Algebra
512K Amiga.
Algebra is a tool that can be used as a supplement to a high school Algebra II course. Several of the topics may also be used in a precalculus course or an advanced Algebra I course.
The program can also be used by individual students for free exploration and self-study.
Available June, 1986; $39.95 retail
True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

Amiga Man; Education
Educational software
Amiga Man provides several disks that contain collections of educational programs including mathematics, spelling, and vocabulary for many age groups.
$19.95 per disk retail
Amiga Man; PO Box 58768; Houston, Texas 77258; 713-480-1735

Amiga Training Tapes
Basic and advanced video training
These two tapes are training videos of one hour apiece that explain the basic workings of the Amiga in an entertaining fashion. They will be available on VHS, Beta or ¾-inch video and accompanied by a user's guide and disk containing sample programs.
Available May, 1986
$29.95 retail; ½-inch tape
$17.95 retail; disk and user guide
$39.95 retail; tape disk and user guide
Organic Productions; 71 Fair St.; Wallingford, Conn. 06492; 203-284-0525

Education Continued

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Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

Calculus

512K Amiga.

Calculus is a tool to be used as a supplement to any calculus course.

Features include a general-purpose routine that accepts a user-defined function, takes multiple derivatives, plots the function and its derivatives and displays tables of values; and eight special-purpose routines for individual topics, namely limits, tangents to a curve, maxima and minima, area under curve, L'Hopital's rule, parametric equations, Taylor series and differential equations.

Available June, 1986; $59.95 retail

True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

Comprehensive Grammar Review I and II

Comprehensive Grammar Review I—contains over 200 exercises on identifying the parts of speech, the subject and the predicate, sentence fragments, kinds of sentences, making the verb and the subject agree, etc. Grade seven and above. $54.95 retail

Comprehensive Grammar Review II—contains over 200 exercises on parts of speech, subject and predicate, complements of verbs, kinds of sentences, verb forms, comparison of adjectives and adverbs, agreement of subject and verb, correct case of pronouns, identifying participles, gerunds, etc. Grade seven and above. $54.95 retail

Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

Decimal Dungeon
Fraction Action

Math programs

Decimal Dungeon is a learning game in which a user is trapped inside the crystal caverns of a dungeon master. The only way to escape is to answer math problems correctly.

Available July, 1986; $49.95 retail

Fraction Action takes place in the basement of a mad professor's dungeon where his crew is holding the user captive. The only way to escape is to answer fraction problems correctly. Available June, 1986; $49.95 retail

Unicorn Software Co.; 2950 E. Flamingo Rd.; Las Vegas, Nev. 89121; 702-732-8862

Discrete Math

512K Amiga.

Discrete Math is a flexible package that can be used as a supplement to enhance any course in discrete or finite mathematics.

Features include truth tables, Venn diagrams, elementary combinatorics and graph theory, recursive definition of functions, probability, binary trees and systems of equations.

Available June, 1986; $59.95 retail

True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

French and Spanish Grammar

French Grammar I—includes The Noun, The Definite Article, The Indefinite Article, Prepositions, The Verb Avoir and Etre, Idiomatic Expressions with Avoir and the Use of Il est and C'est. First year level of French. $34.95 retail

Spanish Grammar I—includes gender of nouns, definite and indefinite articles, plural of nouns, contradictions, regular verbs, etc. First year level of Spanish. $34.95 retail

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Spanish Grammar II—includes agreement and gender of adjectives, plural of adjectives, adjectives used as nouns, etc. Second year level of Spanish. $34.95 retail

Spanish Grammar III—includes the preterit tense of regular verbs, how the preterit is used, some irregular preterits, the demonstratives, etc. Third year level of Spanish. $34.95 retail

Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

Geography

U.S. Geography Adventure—players travel to all 50 states plus Washington, D.C., Puerto Rico, Guam and the Virgin Islands as they learn to identify each state and its capital, largest cities, rivers and other geographical features. Grade level seven and above. $59.95 retail

World Geography Adventure I—players travel to every country in North and South America while learning noteworthy geographical features about each. Grade level seven and above. $59.95 retail

World Geography Adventure II—players travel to each of the countries of Europe. Grade level seven and above. $59.95 retail

World Geography Adventure III—players travel to each of the countries of Africa. Grade level seven and above. $59.95 retail

World Geography Adventure IV—players travel to each of the countries of Asia. Grade level seven and above. $59.95 retail

Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

Hippo Computer Almanac

Reference software that contains more than 35,000 useful facts in 17 topic areas. $34.95 retail

Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

History

American History Adventure—players must meet and identify historical characters in American history and be able to locate them in time and place. High school level and above. $59.95 retail

How A Bill Becomes A Law—the user becomes a Congressperson trying to get a bill passed in the U.S. Congress. Teaches about the legislative system, lobbying, subcommittees, committees, parliamentary procedure, senatorial courtesy, amendments, vetos and overrides. Grade seven and above. $59.95 retail

World History Adventure—players must locate in time and place events in world history and identify the important personalities connected with those events. High school level. $59.95 retail

Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

Lessons In Reading And Reasoning

Introduces many types of fallacies and shows a user how to recognize them in his own thinking and in others' arguments. High school level.

$149.95 retail

Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

MasterType

Typing tutor

$39.95 retail

Scarborough Systems, Inc.; 55 S. Broadway; Tarrytown, N.Y. 10591; 914-332-4545

Mindscape Educational Games

The Halley Project: A Mission in Our Solar System—in this game, the Halley Project is looking for highly skilled star pilots to participate in a top secret space exploration. To qualify, a user must successfully complete a series of 10 missions, navigating by the stars. Available March, 1986; $44.95 retail

Keyboard Cadet—trains a user to touch-type using either the standard QWERTY or Dvorak keyboard and follows the course of study that typing teachers use. Available March, 1986; $39.95 retail

Mindscape, Inc.; 3444 Dundee Rd.; Northbrook, Ill. 60062; 800-221-9884 or 800-942-7315 in Ill.

Paraclete

Music aid

Paraclete allows a student to have complete access to a variety of musical tutorials. It deals with everything from the most basic of musical skills, such as note and symbol recognition, to complex chord structures, scales and harmonics. The program has several skill levels and allows for sight and ear training.

Available April, 1986; $89.95 retail

Associated Computer Services; 839 South Glenstone; Springfield, Mo. 65802; 417-865-6555

Practical Composition and Sentence Completion

Practical Composition I: Making Words Work—tutorial on choosing the right word, denotation and connotation, emotional and unemotional words, specific and general words, little versus big words, avoiding foreign and slang words and more. High school level. $44.95 retail

Practical Composition II: Logical, Clear Sentences—tutorial on sentence sense, coordination and subordination, sentence length, incorrect omissions and comparisons. High school level. $54.95 retail

Practical Composition III: Selecting The Best Approach—tutorial on description, narration, argumentation, exposition, blending the four types, introductions and conclusions, first draft and revision and developing an effective style. High school level. $44.95 retail

Practical Composition IV: Making Sentences Work—tutorial and drills on managing the sentence. Includes sentence unity, logic, coherence, parallelism and variety. High school level. $44.95 retail

Practical Composition V: Using Words Correctly—tutorial with practice drills on more than 100 words and phrases often misused in writing and conversation. High school level. $44.95 retail

$149.95 retail; *Practical Composition Package I;* includes *Practical Composition I, II* and *III*

$85 retail; *Practical Composition Package II;* includes Practical Composition IV and *V*

Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

Pre-Calculus

512K Amiga.

Pre-Calculus can be used to illustrate concepts in a precalculus, elementary functions or advanced algebra course.

Features include a general-purpose routine that accepts user-defined functions, plots them and displays tables of values; as well as eight special-purpose routines for individual topics, namely finding roots of a function, solving triangles, composition of functions, the equation of a line, conic sections, polar coordinates, inverse functions and logarithms to any base.

Available June, 1986; $49.95 retail

True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

Reading

College Aptitude Reading Comprehension Exercises—helps prepare for college aptitude tests. High school level. $65 retail

Reading Adventure I—interactive fiction that allows players to choose their own story line while earning points and practicing comprehension skills. Reading level is second to third grade. $39.95 retail

Reading Adventure II—reading level is fourth to fifth grade. $59.95 retail

Reading Adventure III—reading level is sixth to eighth grade. $59.95 retail

Reading and Thinking I—supplements for readers that contain challenging exercises. Covers second and third grade levels. $54.95 retail

Reading and Thinking II—covers fourth and fifth grade levels. $54.95 retail

Reading and Thinking III—covers sixth to eighth grade levels. $54.95 retail

Intellectual Software; 798 North Ave.; Bridgeport, Conn. 06606; 800-232-2224

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A simulation game that teaches the ins and outs of starting a new business venture by making decisions about trade name, partnership agreement, incorporation, budgeting, marketing, inventory, advertising, hiring employees, raising capital, record keeping, taxes and insurance. High school level and above.

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G103: 20 GAMES: Star Wars, Swarms, Pinball, Deep Space, Bomb Run, Dice, Poker, Rocket, Qubic, Furs, Tic Tac Toe (advanced), Salvo, Warri, King, Taxman, Baccarrat 2, 21, Yahtzee, Hangman 3, Love $19.95

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Vocabulary Adventure I—the user is in a 50-room castle in which he must earn treasures by answering vocabulary questions. Ten years of age to adult. $59.95 retail

Vocabulary Adventure II—a story adventure designed to encourage players to learn the meaning of new words. Grades seven to nine. $59.95 retail

Vocabulary Adventure III: Marauders Of The Lost Ark—to score points a player must earn treasures by answering vocabulary questions. Grades 10 to 12. $59.95 retail

How To Spell—contains suggestions for improvement, definitions of terms, basic spelling rules, forming plurals of nouns, forming possessives, forming contractions, misspellings caused by suffixes and 100 spelling demons. Grades four to seven. $39.95 retail
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Amiga Man; PO Box 58768; Houston, Texas 77258; 713-480-1735

Championship Star League Baseball

Sports game
Available Summer, 1986
Gamestar; 1302 State St.; Santa Barbara, Calif. 93101; 805-963-3487

Diablo

Consists of tracks, panels and a ball.
Available March, 1986; $29.95 retail
Classic Image, Inc.; 510 Rhode Island Ave.; Cherry Hill, N.J. 08002; 609-667-2526

Electronic Arts Games

Available now
$39.95 retail; *Archon* (chess-like game), see review on page 85
$39.95 retail; *Seven Cities Of Gold* (adventure)
$39.95 retail; *Dr. J and Larry Bird Go One-On-One* (basketball simulation)
$39.95 retail; *Skyfox* (strategy game)
Available March, 1986
$39.95 retail; *Arcticfox* (combat tank simulation)
Available April, 1986
$49.95 retail; *Adventure Construction Set* (build your own adventure)
$39.95 retail; *Return To Atlantis* (adventure)
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

Garry Kitchen's GameMaker: The Computer Game Design Kit

Allows a user to create animation programs and computer games of his own design.
Available Summer, 1986
Activision, Inc.; PO Box 7286; Mountain View, Calif. 94039; 415-960-0410

Gridiron
Football simulator
Gridiron is a football simulation game in which users select plays from a playbook and then direct the execution of those plays using the mouse.
Available April, 1986; $39.95 retail
Bethesda Softworks; 9208 Burning Tree Rd.; Bethesda, Md. 20817; 301-469-7060

Hacker; Borrowed Time; Mindshadow
Activision, Inc., see reviews on page 80

HC Software Australia Games
Cosmos—a space game in which players master the galaxy, colonize and mine for minerals. Requires 512K Amiga. Available April, 1986; $38 retail
Napoleonics G.A.P.—a war-game assist program covering the period 1800 to 1820. Available July, 1986; $38 retail
Land G.A.P.—a game assist program that contains rules for table-based war games covering 1939 to 1979. Available June, 1986; $38 retail
HC Software Australia; GPO Box 2204; Adelaide, South Australia 5001; 08-428377

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Infocom; 125 CambridgePark Dr.; Cambridge, Mass. 02140; 617-492-6000

Leader Board
Pro golf simulator
Joystick.
Leader Board is a golf simulator that features multiple 18-hole courses, sandtraps, trees, three-dimensional animation and three levels of play.
Available April, 1986; $44.95 retail
Access Software; 2561 South 1560 West; Woods Cross, Utah 84087; 801-298-9077

Micro League Sports Association
Baseball
Available July, 1986
$59.95 retail; *Micro League Baseball*
$39.95 retail; *General Manager's Owner Disk*
Micro League Sports Association; 2201 Drummond Plaza; Newark, Del. 19711; 302-368-9990

Mindscape Games
Deja Vu: A Nightmare Comes True—transports a player into the suspense- and danger-filled world of a 1940s mystery. The player, suffering from amnesia, must solve a murder and find his identity before being arrested for the crime. Available May, 1986; $49.95 retail
Brataccas—the player is a scientist who has developed a genetic process for creating a superbeing. With the government and the underworld both after this process for their own evil purposes, you escape to a colonized asteroid, Brataccas. Requires 512K Amiga. $49.95 retail
Racter—a software program that uses a 2,800-word vocabulary and grammatical expertise to converse with computer owners. $44.95 retail
Mindscape, Inc.; 3444 Dundee Rd.; Northbrook, Ill. 60062; 800-221-9884 or 800-942-7315 in Ill.

Nitroman
Nitroman is an action game in which a user has a job transporting nitroglycerine. He must design and build his own vehicle, and use it to navigate a course through treacherous terrain.
Available Fall, 1986
Spectra Soft, Inc.; 6435 Dillon Cir.; Colorado Springs, Colo. 80919; 303-598-8417

Solar System
Space adventure game
512K Amiga.
Available November, 1986
Ace Computer Enterprises; 1140 Sparta Dr.; Lafayette, Colo. 80026; 303-665-9475

Personal and Home Finance

2+2
Home management
512K Amiga; two disk drives; printer recommended.
2+2 is a home management system that features an integrated data base to help organize daily activities and financial transactions.
The program can also be used as a mailing list manager, a personal calendar and to generate a personal telephone directory.
2+2 is menu driven and offers on-line prompts and user assistance. The program can be password protected.
$99 retail
Olamic Systems Corp.; 141 W. Jackson Blvd.; Chicago, Ill. 60604; 312-786-1410

Amiga Man; Home
Personal and home software
Amiga Man provides a disk that contains a collection of programs useful around the home and for small businesses. These include banner, labels, calendar, checkbook, budget, and more.
$19.95 retail; H101 Home Programs disk
Amiga Man; PO Box 58768; Houston, Texas 77258; 713-480-1735

D.A.S. Home Finance
D.A.S. Home Finance assists the homeowner in making financial decisions and in planning for future investments.
Investment functions include future investment value; initial investment; nominal interest rate; annual interest rate; net present value; present and future annuity value; present value of bonds, common stocks, treasury notes and tax deduction; and more.
The program also includes a built-in tutor to assist in these investment functions.
Available June, 1986; $45 retail
Developers of Advanced Software; 12455 Veterans Memorial Dr., Ste. 204; Houston, Texas 77014

Financial Cookbook
Financial analysis
Financial Cookbook is designed for home financial decision making.
The program offers 32 financial calculation "recipes" that contain formulas that produce answers about taxes, investments, savings, mortgages, IRAs and other personal finance questions.
$49.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

Financial Planner
512K Amiga; two disk drives; Amiga-DOS 1.1 or later; ABasiC.
Financial Planner is a what-if planning tool for all common financial transactions with amortizations. All math, rows and columns are built in.
Available June, 1986; $100 retail; without ABasiC
$110 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

Home I, Real I, Biz I
PAR financial software
Amiga 512K recommended; two disk drives.
PAR Home I: See review on page 90
PAR Real I assists a realtor or investor with several property financial management areas, such as preparing investment analyses, financial statements, amortization tables, loan evaluations and more. Available March, 1986; $129 retail
PAR Biz I helps an accountant, executive, controller or manager with certain areas of business financial management, such as present and future investment analyses, annuities, income and balance sheet financial statements, amortization analyses and more. Available April, 1986; $129 retail
PAR Software, Inc.; PO Box 1089; Vancouver, Wash. 98666; 800-433-8433

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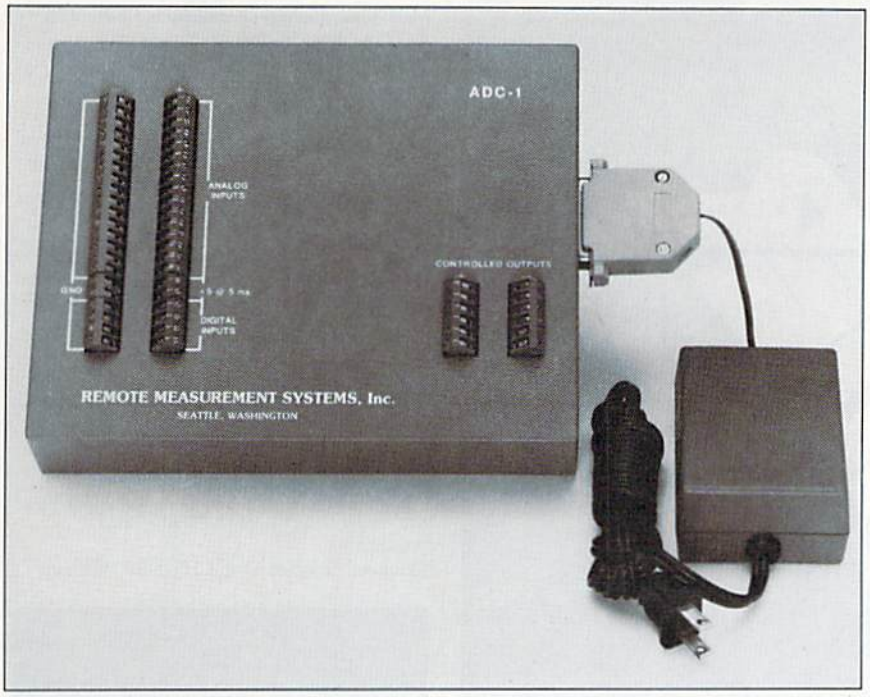

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Desktop Amp; Disk Mate
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Interactive Video Systems; 15201 Santa Gertrudes Ave., Y-102; La Mirada, Calif. 90638; 714-739-5020

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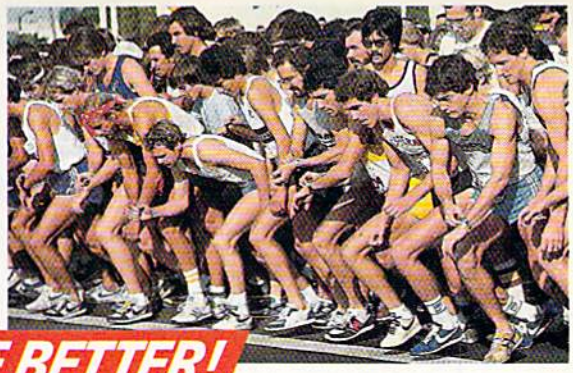

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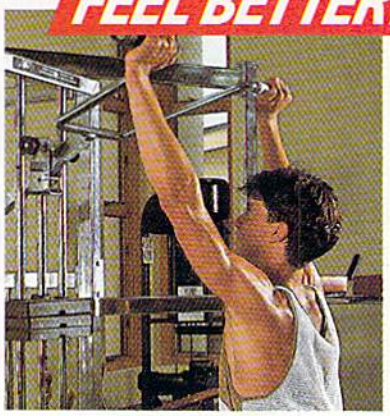

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COMPACT DISKS: The Next Revolution?

BY DAN GUTMAN

"SPIELBERG, STEVEN" You type those words into your keyboard. Maybe you've got a term paper to write about the man, or a newspaper article. Maybe you're a movie buff. Maybe you're just curious. Two seconds after you hit the letter N, a photograph of Steven Spielberg jumps to your computer screen. You're using the first photographic, full-motion, audio/video encyclopedia.

The entire encyclopedia is on a single disk that goes in your disk drive. After you read Spielberg's biography off the screen, you can hit a few keys and view scenes from *Jaws*, *Close Encounters*, *E.T.*, *Raiders of the Lost Ark*, *Back to the Future*, and *The Color Purple*. You can watch an interview with Spielberg, save it on another disk, edit it into a videotape you're making, maybe even send Hollywood's boy genius some electronic mail.

That encyclopedia is a few years away, but the seeds are being planted right now. A revolution is brewing, and it may be the next evolutionary step in computer software after punched cards, tapes and disks.

Cee Dee. CD. CD-ROM. Compact Disks. Get used to the sound of it rolling off your tongue. "AI" was last year's buzzword, this year it's "CD." Maybe you already have a compact disk player hooked up to your stereo system at home. If not, you've surely heard about them. These 4.7-inch disks turn a living room into Carnegie Hall. They don't warp or wear out. Ever. They're not scraped by a needle—they're caressed by a beam of light. They're indestructable. They can't be pirated. You can pour chocolate syrup over one and just wipe it off as if it were a kitchen table.

The compact disk may very well turn our 33-1/3 rpm records into dinosaurs, just like LP's did to the old 78's. It's the first revolution in recording technology in 25 years.

Now it just so happens that those microscopic ones and zeros that digitally store music on a compact disk can also store computer data. And to go from Springsteen to *Sargon* requires only slight modifications in the CD players on the market today. Get the picture? Hitch a laser beam to your computer, and you can throw those pesky floppy disk drives in the trash heap with the cassette recorders, punch-card readers, and vacuum tubes.

Best of all, this revolution is affordable. The first compact disk player to hit the market in 1983—Sony's CDP-101—cost $1,000. Now Sony makes one for $199. This isn't science fiction technology of the future anymore. It's coming this year to personal computers. In fact, the first International Conference on CD-ROM took place in Seattle this past March.

So what? We can wipe our floppy disks clean with a cloth. What's the big deal? The big deal is storage. A floppy or hard-disk drive is limited by the width of its drive head. But a disk drive that uses *optical* media is only limited by the width of a single laser beam. Hard disks can store about 60 megabytes of data. CD-ROMs store 540 megabytes *on one side of a disk*. That's a good *1,350 times* what they can jam on a floppy—270,000 double-spaced pages of text on a disk the size of your old Beach Boys singles.

"It's 50 feet of bookshelves on one little disk," John Messerschmitt of North American Philips told *The New York Times*. This is the stuff revolutions are made of. *Disk/Trend Report* predicts that 20% of all computers will be equipped with optical disks as early as 1990.

With so much memory to work with, software will go through some changes. It will be possible to put multiple formats of the same program on a single disk, eliminating compatibility problems. We'll be seeing ten or more different programs on a single disk, with digital, video, and audio information combined. Reference Technology of Boulder, Colorado, has created a disk that has *8,800* programs on it! You'll be able to buy a single disk with ten years of stock prices or 100 years of baseball statistics. It's almost too much memory to comprehend.

We can only guess the applications we're going to start seeing. Education is a natural. Medical students will practice surgery by using an interac-

tive disk, without risking the life of a real patient. High school students will do on-screen chemistry experiments. Instead of blowing up the whole school, they'll watch an explosion on television. In the military, a tank gunner will learn how to aim and fire without wasting expensive ammunition or endangering lives. Companies will train employees for new jobs. Simulation education is an inexpensive alternative to on-the-job training or human teachers.

Interac of Woodland Hills, California, is putting interactive optical disk technology into stores. They've designed a system for Monsanto that allows a customer in a carpet store to choose from over 2,500 colors and styles. After the customer has narrowed down the possibilities at the terminal, a salesperson comes over to close the deal. Information kiosks similar to this are starting to pop up in airports and train stations around the country.

The CD-ROM may be the thing that wakes up the home computer market. The major application of the new technology will be storing huge data bases—dictionaries, encyclopedias, road atlases, Library of Congress catalogs, and telephone books will be published on disk. At the June 1985 CES, a compact disk containing Grolier's 21-volume Academic American encyclopedia was demonstrated, and eager conventioneers were looking up things as if it were their first time inside a library. It only takes three to five seconds to find any entry in the nine million-word publication. Grolier is selling it for $199, a lot less than their paper encyclopedia. Activenture, the company that did the "optical typesetting" for Grolier, recently introduced a CD-ROM player, controller card, and encyclopedia package for $995.

Naturally, there will be optical disk games. The entertainment potential of interactively combining text, audio, and video is enormous. Broderbund's Doug Carlston says, "I'd like to turn traveling around the world into a game. Imagine *Around the World in 80 Days* with real places. Those are the things I would get most excited about." Spinnaker's chief Bill Bowman confides, "We're talking to studios, motion picture companies."

In the rumor mill is a "home appliance" coming next year from Sony, Matsushita and Philips. This mystery machine is said to include a 500-Mbyte CD-ROM, 128K RAM, 68000 chip and keyboard for $500 to $1,000. Also in development is a Polygram and Warner Communications product that includes a compact disk player with a built-in computer. Stan Cornyn, who is in charge of the operation, thinks the machine could come out in 1987 for about $1,000, according to *Fortune* magazine. You can bet that Commodore and other companies are working on ways to interface compact disk players with the Amiga and the Commodore 64 and 128. It's just a matter of time.

"WE CAN SAY GOODBYE TO FLOPPY DISKS. WE CAN SAY GOODBYE TO CARTRIDGES.... THE NEW FORMAT WILL BE CD-ROM."

THE OLD CATCH-22

Before you get too excited, you should know the down side of the CD-ROM revolution. Like any new technology, compact disks have a few obstacles to overcome before they tear the cover off the computer industry. First of all, there's the old hardware/software Catch-22: We won't buy the hardware until there's some software to run on it, and the software companies won't release products until enough of us own CD-ROM drives. "There are probably five or ten products that we've considered putting out that are possible only if there is an installed base of CD-ROM players that interface with computers," says Broderbund's Doug Carlston. Dr. Egil Juliussen of the market research company, Future Computing, says, "CD-ROM drives will have an impact when somebody builds one into a personal computer." He expects that to happen this year.

When software does start to appear, it will come a lot slower than floppy disk software. It takes much more time and money to develop programs that fill 170,000 pages. A CD-ROM software package costs $500,000 to produce, according to Spinnaker's David Seuss. Another problem will be price. Why should we pay for a telephone book on disk when paper telephone books are free?

CD-ROMs are not devoid of technical problems, either. For one thing, they're currently "read-only." Data can be accessed over and over, but it can't be written, changed or erased like a floppy. The next generation, called WORM ("Write once, read many times"), should be out this year. At the National Computer Conference in July 1985, Verbatim announced an erasable thermo-magneto-optical disk and the drive to go with it. Wonderful, but even Verbatim admits it won't be ready for two years. Don't expect to see erasable optical disks for a while.

CD-ROMs also suffer from limited graphics and slow access time. You can't watch *Raiders of the Lost Ark* in any encyclopedia just yet. The Grolier encyclopedia is all text. "We're not talking about full motion video." says Spinnaker's Bowman. "You only have 500 frames. You can actually fill up a CD-ROM pretty quickly." And scanning a disk filled with so much data is a potential problem as well. The more memory, the harder it is to trace that information back.

Finally, there are manufacturing problems. With music on a compact disk, a few misplaced bits and bytes probably won't be noticeable unless you're a trained musician. But with computer data, a single incorrect digit could mean catastrophe. There are only 12 compact disk factories in the world right now, and only one in the United States. With music lovers and computer lovers all clamoring for disks, shortages and long waits are to be expected for a while.

Most likely, compact disk drives will have to go through the same agonizing cycles that personal computers have already been through in the last ten years—the glitches, delays, shakeouts, layoffs, Chapter 11's. Like computers, the hackers, hobbyists, and pioneers may have to experiment with compact disks before it becomes

HOW DOES A COMPACT DISK WORK?

A CD may look like a record, but it works very differently. Instead of one long groove that goes from the edge to the middle, a CD has 54,000 separate bands on it. The data (or music) is burned into the substrate of the disk in the form of tiny pits. To get an idea of the size of these pits, each pit is about 0.3 microns, while the period at the end of this sentence is about 500 microns.

Like all other digital information, the data is stored as electrical pulses representing the numbers one and zero. Each pit on the disk represents a one, and spaces between the pits represent zeros.

As the disk spins (1800 rpm), a laser beam is focused on it. There's no danger—the laser is low-power and shines from below so the disk stops it from shining up in the air. When the laser hits the surface of the disk, it reflects off the pits and spaces, "reading" the digitally encoded bits of information. This information is then sent to an amplifier (with a music disk) or a computer (with a CD-ROM disk). Precise tracking of the laser is crucial, and CD players have mechanisms that instantly sense the slightest deviation and correct it.

the technology "for the rest of us."

But light waves are almost definitely the medium of the future. Telephone transmission is switching from wires to optical fibers. Records and motion pictures sound and look better when the signal is a laser beam. And data is still data, whether it's in the form of *Born in the USA*, *Gone With the Wind*, or *Bank Street Writer*.

Audio, video, and computer technology begin to blur together when they can all be translated into a common medium such as optical disks. That should be a plus for the chaotic computer industry. If people are already familiar with listening to music on compact disks, they won't be so intimidated by data on compact disks.

In fact, both Philips and Hitachi have compact disk players in the works that will play both CD music disks *and* CD data disks. Computer systems will share the same disk drives as stereo systems. "If that one unit can be with your stereo system or your computer, what a great peripheral!" exclaims Tom Rolander of Activenture.

There are plenty of obstacles to be overcome, but CD-ROM may be the most exciting thing to hit the computer world since *VisiCalc*. The manufacturers are high on it. As Spinnaker's Bill Bowman says, "We can say goodbye to floppy disks. We can say goodbye to cartridges. We can say goodbye to cassette tape. The new format will be the CD-ROM."

Turn Toys Into Droids With ROBOT MAKER

by John E. Conway

Simple circuits and software connect your Commodore 64/128 to radio-controlled toys

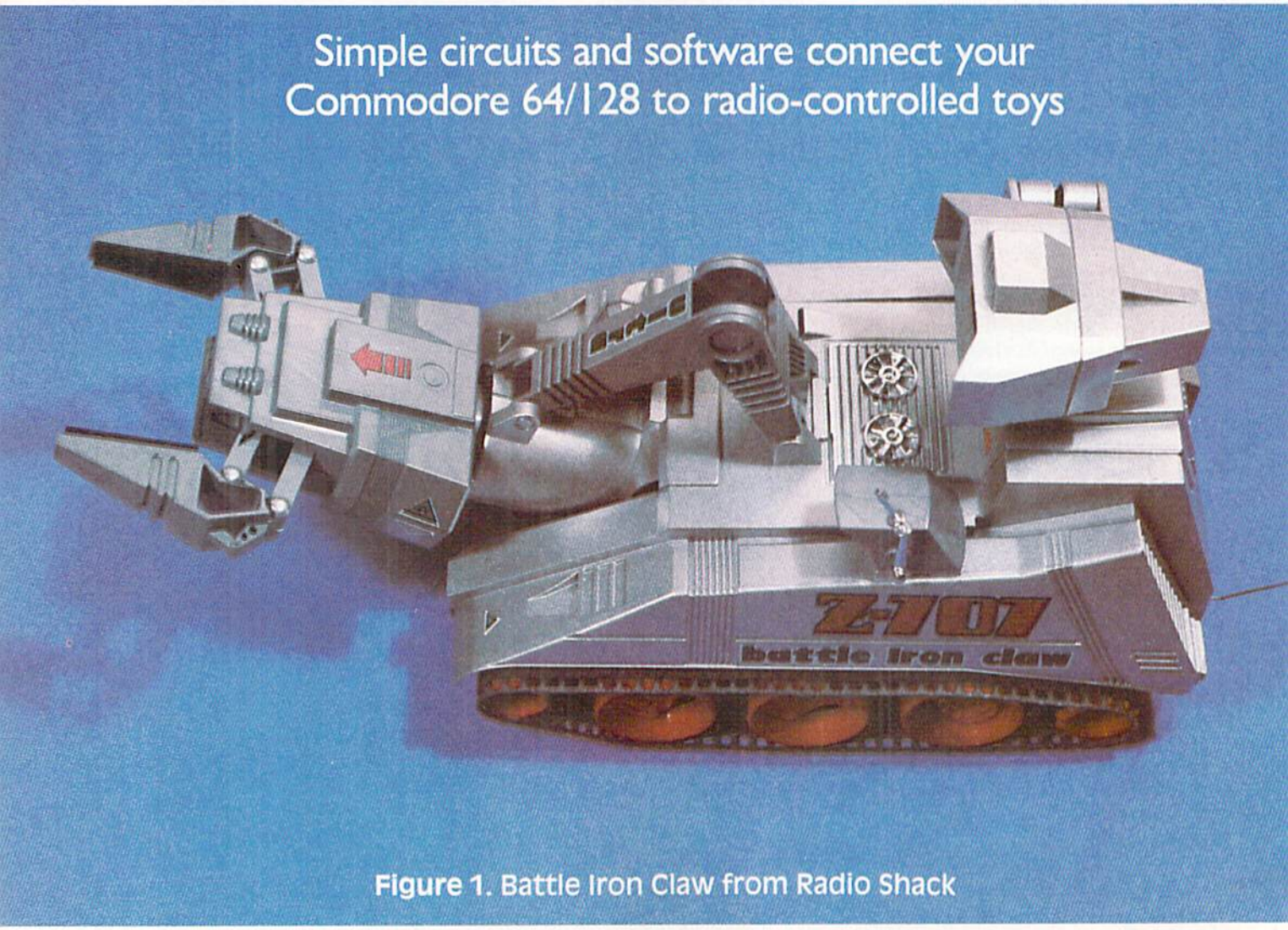


Figure 1. Battle Iron Claw from Radio Shack

Commodore Power/Play's last robot construction article ("Operation: Mock Turtle," September, 1985) closed with a tantalizing thought: Would it be possible to cut the computer-to-robot control cord and build a low cost, untethered "house rover"? Though many hobbyists have assembled stand-alone droids, most of these robots use dozens of expensive parts and take hundreds of hours to build. There had to be a better way.

A Saturday morning TV ad touting radio-controlled (RC) toys triggered an idea. Could RC toys provide the basis for a simple robot? Hmmmm. All the pieces seemed to fit. RC toys are certainly untethered, low cost and mobile. Though these toys lack a brain, the operator usually makes up for this shortcoming. Could the Commodore 64 replace the operator?

In a word, YES! In fact, compared to the Mock Turtle, the Robot Maker project is, well, duck soup!

So fire up the soldering irons and break out the wire cutters. In this and a future issue, we will once again prove that robot making is easier than most people imagine—and a whole lot of fun.

You'll need a few basic tools, some solder, electronic parts easily acquired at Radio Shack—and a Radio Shack radio-controlled toy called a Battle Iron Claw.

Start with an RC Toy

First, of course, you'll need a radio-controlled toy vehicle. These are available in two categories: joystick-controlled and push-button operated. The joystick-controlled units cannot be used with the Robot Maker interface. However, the simple RC toys, those that rely on switch closures to transmit control information, make good candidates. Since each switch represents a single on-off bit of information, switched RC toys are perfect for use with home computers like the Commodore 64 and 128. In fact, even the simplest of these devices can be given robot-like computer brains.

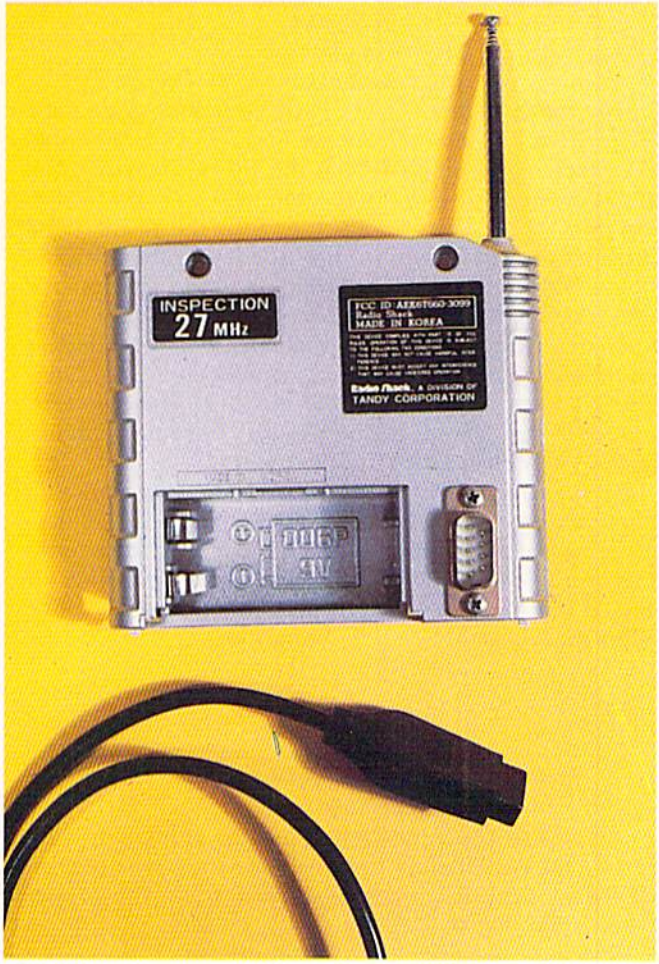
Take, for example, the one-button RC car.

Under manual control, the toy moves forward until the remote controller button is depressed. With the button pressed, the little car backs up. This causes the front wheels of the vehicle to rotate left, and the car changes direction. If the button remains pushed, the car runs about in a little circle...in reverse. Once the button is released, the wheels slide into the forward/straight position and the toy auto goes forward in whatever direction it currently points.

Now imagine replacing the button with a computer-controlled switch. If the computer could be programmed to toggle the switch on or off at the proper times, you'd have the essential ingredients of a remotely controlled robot (and the Robot Maker interface).

Though one-button robots are fun to work with, we wanted to base our experiments on a more functional gadget—something that could be made to stop, go forward, reverse, go right and left, maybe even pick up objects under computer/switch control. Our search ended with the discovery of a toy called the Battle Iron Claw (Figure 1). The Claw is a tank-like, tread-driven vehicle with a manipulator that can open/close and raise /lower on the front (referred to in robotics as "two degrees of freedom"). It's available for $49.95. The robot itself requires four C batteries plus one 9-volt battery for hours of operation. The controller box or pendant needs only a single 9-volt battery. The transmitter in the controller produces about 100 mW output. This gives the robot an operating range of 200 yards in any direction away from the controller. It's more than suitable for household "roving."

The following section provides a how-to, step-by-step set of instructions for converting the Battle Iron Claw into a full-blooded cyborg.



Simple as 1,2,3...4,5

Before beginning, obtain all of the parts listed in the "Parts and Vendors" list. (The table also lists the names and addresses of some suggested vendors.) You'll also need a few basic tools such as a pair of long-nose pliers, diagonal wire cutters, wire strippers, a ruler, and a soldering iron with some electronics-certified solder (rosen, not acid-core). It's also a good idea to have a multimeter handy. If you don't own one already, the 8-range meter (RS PN 22-212) is a rugged little unit for beginners. It, and most of the tools mentioned above, are also available from Radio Shack.

The robot has an operating range of 200 yards in any direction away from the controller. It's more than suitable for household "roving."

Step 1

Parts: hook-up wire, edge connector, keys

Cut eight lengths of wire each 12 inches or so long. Strip about 1/4 inch off of each end. Tin each wire end (i.e., melt a dab of solder on the tip of the iron, then apply the melted solder to the wire end). Tin the soldering pins of the edge connector. With the pliers, bend one end of each wire to form a little hook. Mechanically fasten the hook to the appropriate solder pin on the edge connector. Then solder the wire into place.

To determine the correct pins, simply look at the rear end (solder tail end) of the edge connector. Each pin is labeled with a tiny letter or number. These letters/numbers correspond to the proper connection points, as shown in Figure 2.

Next, take a plastic edge-connector key (small plastic tab) and insert it at location A-B/1-2 on the edge connector. Use the long-nose pliers for this. Insert another at location L-M/10-11. This guarantees that the connector can be inserted into the user port only one way.

Put this assembly aside for later use.

Step 2

Parts: hook-up wire, female D-connector

Cut and strip seven, 12-inch lengths of hook-up wire and tin the ends. Solder the wires into the solder pins on the rear of the D-connector. Figure 3 lists the proper connection points.

Place this assembly aside for future use.

Step 3

Parts: PC board, transistors, resistors, hook-up wire

Using the placement diagram (Figure 4), take the components and mount them onto the PC board. Make sure the solder side of the board (the side with the copper pads) is on the bottom, components on the top. Tack-solder the components into place. Then point-to-point wire them using the schematic of Figure 5. Take care to make neat, direct connections with good, bright solder joints. Properly constructed, the Robot Maker interface should last a lifetime.

When finished, put this assembly aside.

Step 4

Parts: assemblies from Steps 1, 2 and 3

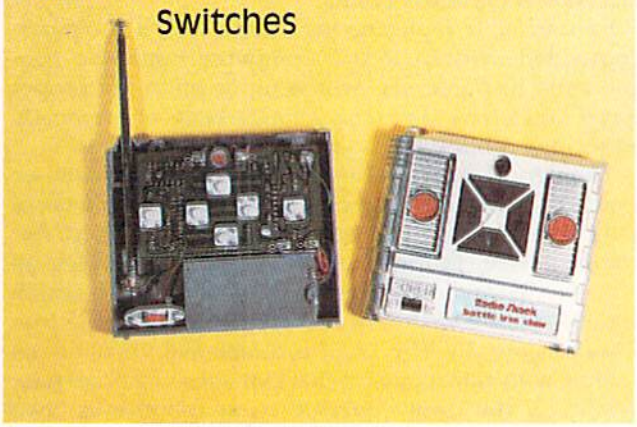
Connect the assembly from Step 1 to the assembly of Step 3 and the assembly of Step 2 to the assembly of Step 3. Again, use the schematic of Figure 5 as a guide. The finished product should look something like Figure 6. This concludes construction of the actual Robot Maker interface.

Step 5

Parts: #30 wire, 2 small screws, male D-connector

Construction continues with some simple modifications to the controller. To connect the Robot Maker interface to the toy's controller, you must wire the switch contact points and the ground lead of the controller to the "outside world." This requires some surgery to the controller as well as the addition of a nine-pin connector.

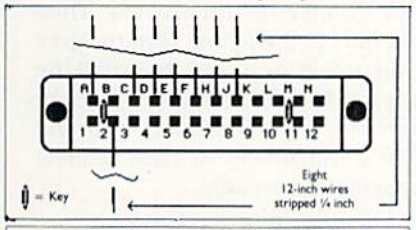
Figure 7. Battle Claw's Rubber Snap Switches



As shown in Figure 7, remove the cover from the Battle Claw's controller and expose the rubber snap switches. In the Claw, these switches are gray in color and six in number. Remove the rubber switches from their mounting pins. Take care not to break off the switch-mounting pins, as the gray rubber contacts will be replaced after the operation. Inspect the printed circuit etches that lie beneath the rubber contacts. One set of etches runs to the ground side of the battery (-9Vdc). The other side connects to some circuitry in the controller. For each switch, trace the etch that goes to

RC toys are untethered, low cost and mobile. Though these toys lack a brain, the operator usually makes up for this shortcoming.

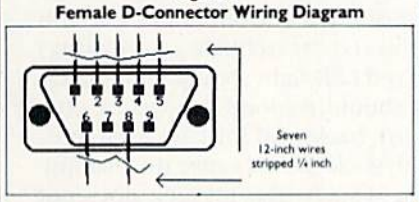
Figure 2
Edge Connector Wiring Diagram



EDGE CONNECTOR CONNECTION TABLE

Pin	I/O Port Function	Interface Connection
A	Ground	Ground
C	PB0	Q1 Base
D	PB1	Q2 Base
E	PB2	Q3 Base
F	PB3	Q4 Base
H	PB4	Q5 Base
J	PB5	Q6 Base
2	+5Vdc	R1 thru R6

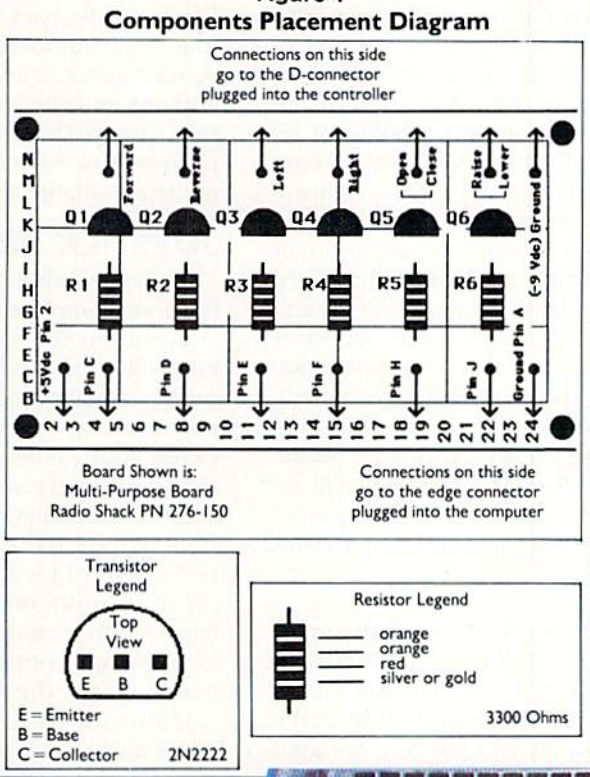
Figure 3
Female D-Connector Wiring Diagram



D-CONNECTOR CONNECTION TABLE

Pin	Controller Function	Interface Connection
1	Forward Switch Pt.	Colector of Q1
2	Reverse Switch Pt.	Collector of Q2
3	Left Switch Point	Collector of Q3
4	Right Switch Point	Collector of Q4
5	Manip. O/C Switch Pt.	Collector of Q5
6	Manip. R/L Switch Pt.	Collector of Q6
8	Ground (−9Vdc Point)	Emitters Q1 thru Q6

Figure 4
Components Placement Diagram



Transistor Legend

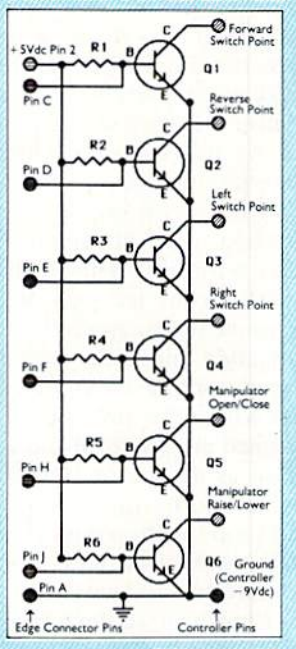
E = Emitter
B = Base
C = Collector 2N2222

Resistor Legend

orange
orange
red
silver or gold

3300 Ohms

Figure 5
Robot-Maker Interface Schematic



Transistor Legend

C = Collector
B = Base
E = Emitter

NOTE
All Q's = 2N2222
All R's = 3.3K

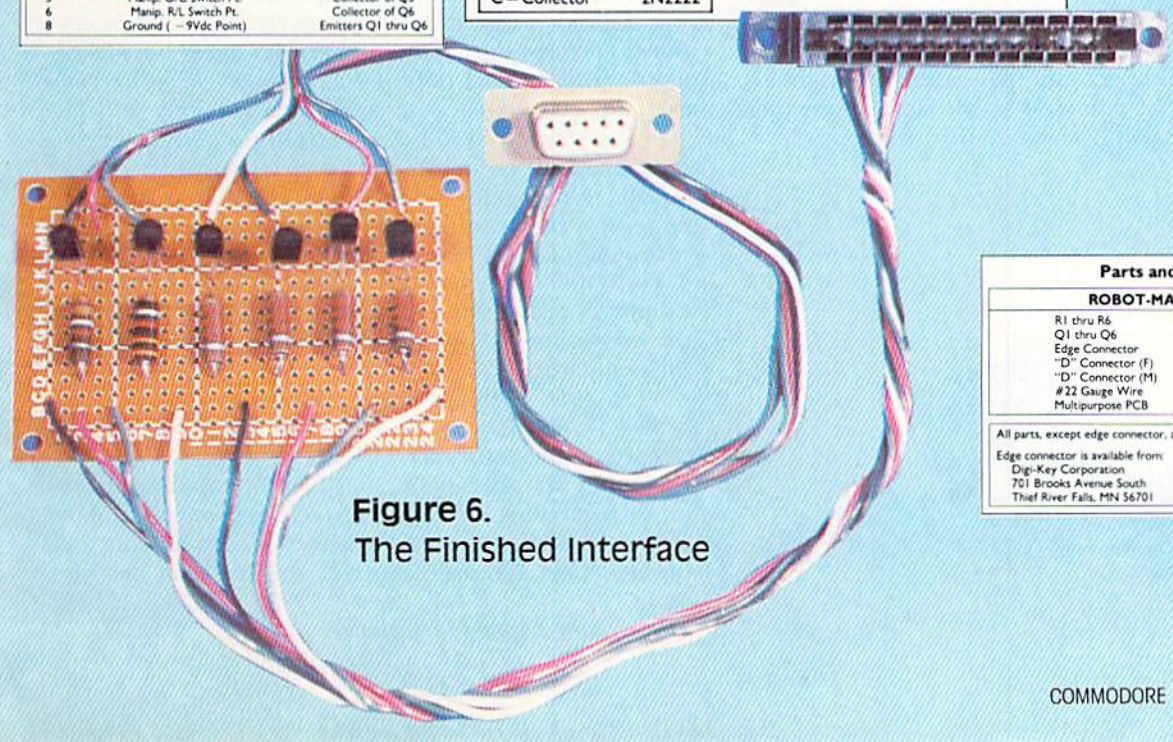


Figure 6.
The Finished Interface

Parts and Vendor List

ROBOT-MAKER INTERFACE

R1 thru R6	3.3K ohms 1/4 W
Q1 thru Q6	2N2222 transistor
Edge Connector	PN C1-12
"D" Connector (F)	PN 276-1538
"D" Connector (M)	PN 276-1537
#22 Gauge Wire	Single or Stranded
Multipurpose PCB	PN 276-150

All parts, except edge connector, are available from any Radio Shack store.

Edge connector is available from:
Digi-Key Corporation
701 Brooks Avenue South
Thief River Falls, MN 56701

Radio-controlled toy vehicles with simple on-off switches are easily transformed into home robots using this simple interface.

the circuitry, i.e., the etch that *does not go to the ground side of the battery*, until you encounter a solder point. (If you've got a multi-meter, you can use it to identify the correct etches. Set the meter scale to ohms and test for etch continuity to the -9Vdc side of the battery. Etches that connect to ground should not be used.) When you have identified the non-grounded contact points, make pencil marks next to them. (Figure 8 roughly identifies these contact points.)

Next, carefully remove the antenna from its mount and, wire still attached, move it to one side. Put a pencil mark on the left side of the on-off switch. Loosen and remove the small screw that holds the switch and, wires attached, move the switch to one side. These last two operations have exposed a small space with the controller where the male 9-pin D-connector will mount. Using a small electric drill and a file, cut a hole into the plastic case as shown in Figure 9. Patience and skill will be rewarded in this operation. Now, use the small screws and mount the connector, solder-side pointing toward the inside of the case.

One task remains.

Cut seven, six-inch lengths of #30 gauge (wire-wrap) wire. Strip and tin the ends. Carefully solder one wire to each of the six contact points in the Battle Claw, identified earlier in this step. Solder the seventh wire to the ground lead (-9Vdc) of the controller where it emerges from the battery compartment.

Finally, using the table in Figure 3 as a guide, solder the free ends of the wires into the solder pins on the D-connector. (Don't be confused by the fact that the pins in the male D-connector are the mirror image, i.e., reverse, of the female connector. Just read the number labels on the back of the connectors themselves. Then follow the numbered pin-outs in the figure.) Put the gray rubber switches back onto the switch pins. Re-install the antenna and the on-off switch (pencil mark to the left side). Route the wires so they do not interfere with the push-button switches (it's still handy to have manual control available). Re-assemble the case.

Joystick Serves as a Tester

With the Robot Maker interface and controller modifications complete, the fun can begin...almost.

To be on the safe side, it's a good idea to give the controller a shakedown test prior to connecting it to the interface/computer. This is accomplished by plugging a conventional Commodore-compatible joystick into the newly added connector on the controller unit. Turn on the Claw (make sure the red "searchlight" is blinking) and the controller (the red LED light should illuminate). If all is well, the Claw should respond to joystick control. Forward for forward, backward for backward, etc., the fire button on the joystick should cause the manipulator to open and close. (Sorry, the joystick does not have enough contacts to control the lift/lower functions. Not to worry, the Robot Maker interface does.)

If the test fails, recheck the connections from the controller switch points to the internal D-connector.

If the modified controller passes the joystick test, it's time to involve the computer. Connect the Robot Maker interface to the user port of the computer. Make certain that the edge connector is inserted properly. (If the "keys" in Step 1 have been inserted properly, there is only one way to install the connector.) Connect the female D-connector of the interface to the male D-connector newly installed in the controller.

Congratulations! You're finished!

Turn the robot and the computer on. (If using a Commodore 128, set it to Commodore 64 mode.) Leave the controller *off*. Type the following commands into the computer:

```
POKE 56579,255
POKE 56577,0
```

Turn on the controller.

Nothing should happen. In fact, if the robot begins to move, something is wrong. Turn off the computer, robot and controller. Then recheck the connections in the Robot Maker interface. Correct the problem and try again.

If nothing happened, proceed!

Since the Robot Maker interface can be controlled via simple BASIC routines, just about anyone can learn to teach the robot tricks.

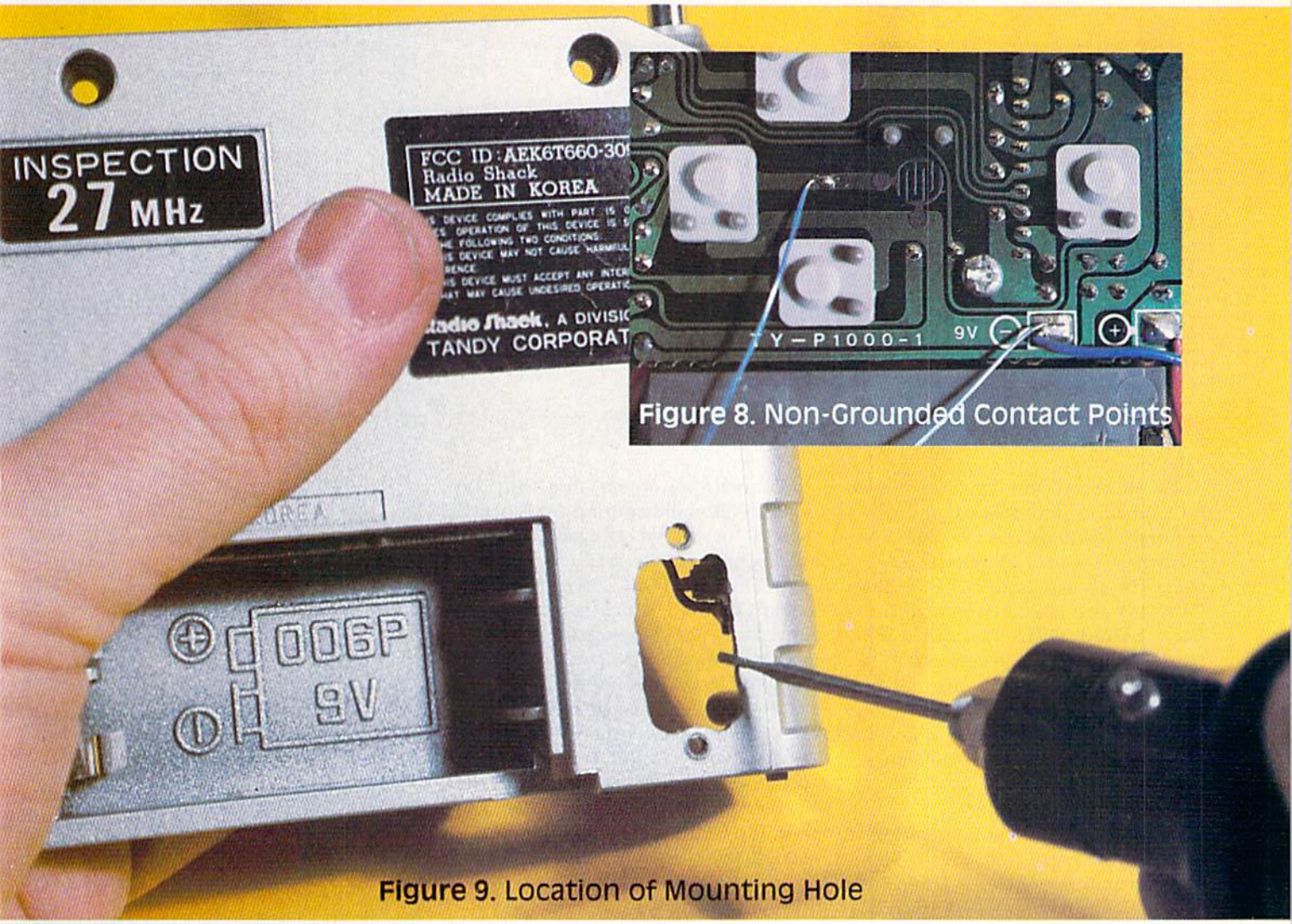


Figure 8. Non-Grounded Contact Points

Figure 9. Location of Mounting Hole

Type: POKE 56577,1
The robot should move forward.
Type: POKE 56577,0
The robot should stop.
Type: POKE 56577,2 for reverse
POKE 56577,4 for left turn
POKE 56577,8 for right turn
POKE 56577,16 for open/close manipulator
POKE 56577,32 for raise/lower manipulator
POKE 56577,0 to stop

If the Claw has responded appropriately, you've got yourself a functional, computer-controlled robot.

Let the Robot Roll!

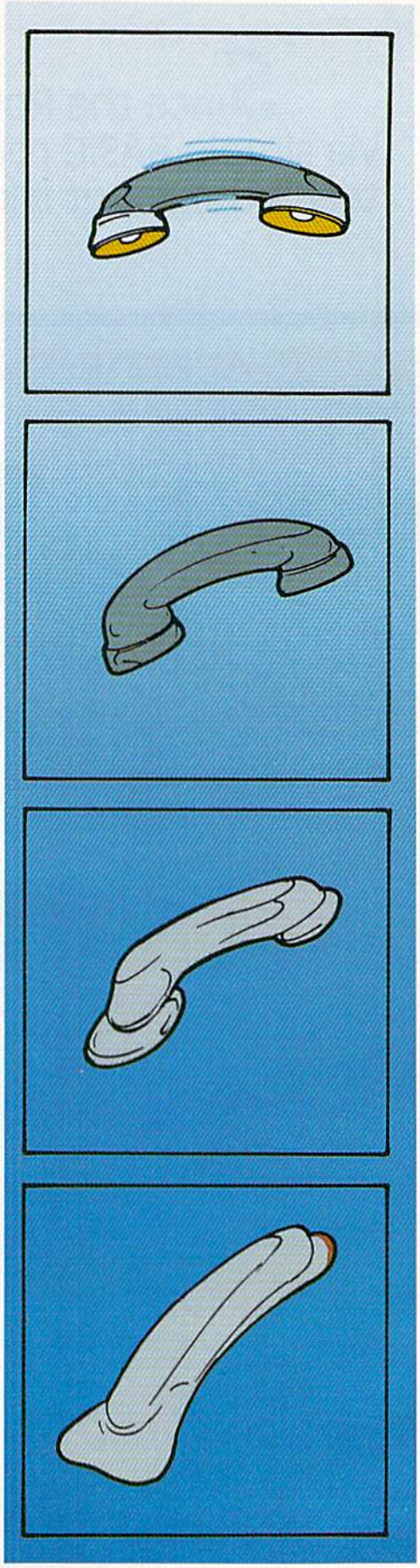
Next time we'll look more deeply into the theory behind the operation of the interface. This will set the stage for a wide range of programming experiments. In the meantime, try tinkering on your own. Since the Robot Maker interface can be controlled via simple BASIC routines, just about anyone can learn to teach the robot tricks. Before long, your home will have a new little creature wandering about.

And just think—no hairs on the furniture!

Amiga Animation Using AmigaBasic

BY LOUIS R. WALLACE

One of the Amiga's many special features is animation. So it comes as no surprise that AmigaBasic supports animation with over twenty commands and functions.



The Amiga has the most powerful animation potential of any microcomputer (and almost any minicomputer) presently in existence. It supports sprites and BOBs (Blitter OBjects), and linked combinations of each called GELS (Graphic ELements). And, although commands like LINE, CIRCLE and BOX are not normally considered animation commands, on the Amiga they are fast enough to act like animation elements.

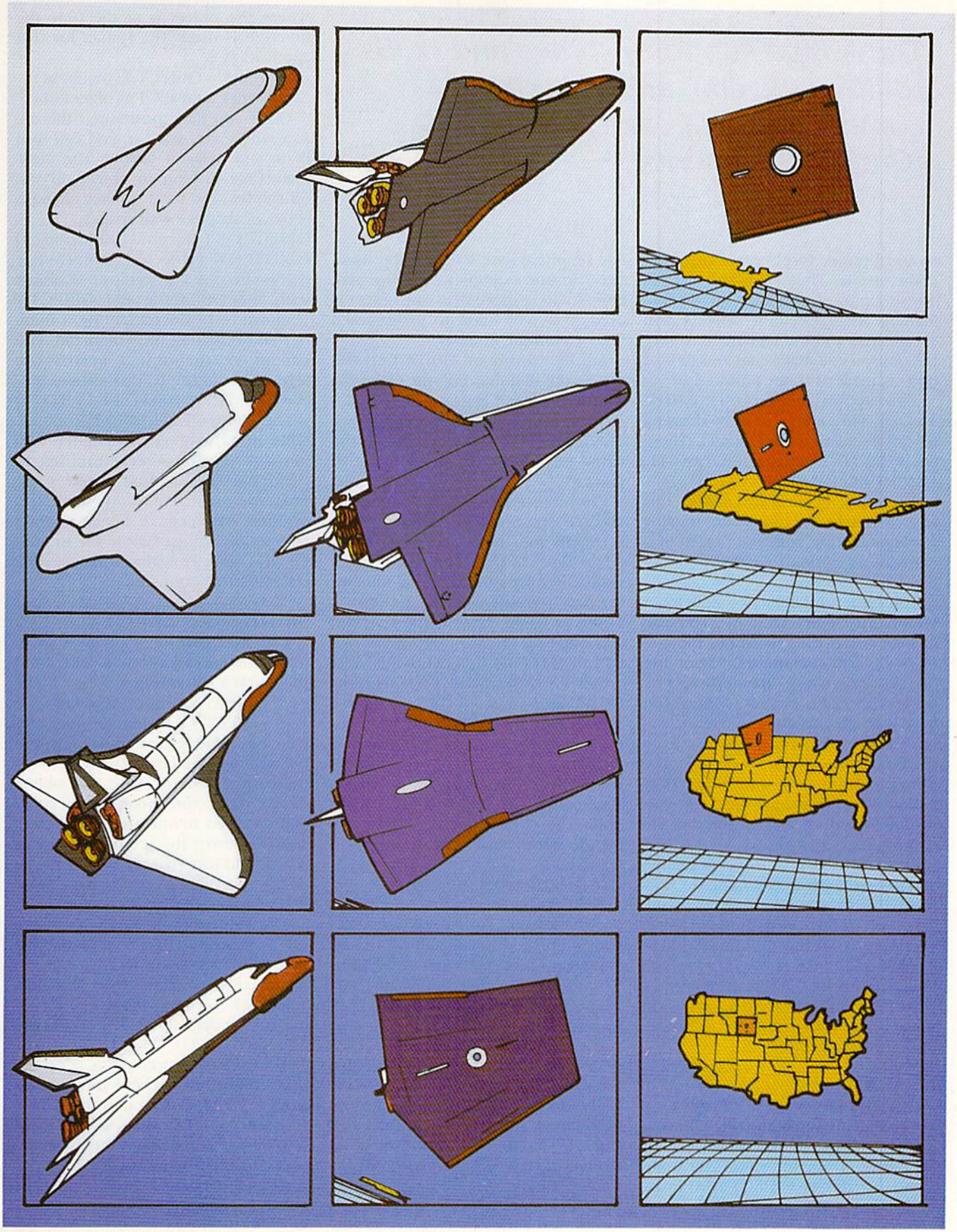
Creating an Object

Before you can begin animating an object, you must first create something to animate. On your AmigaBasic disk is a program called OBJEDIT. This is a sprite/BOB editor, and it allows you to create objects in up to four colors using drawing tools like PEN, LINE, OVAL, RECTANGLE and PAINT. On a 512K or larger Amiga you can make some simple modifications to the program that will allow you to draw in 16 or 32 colors, depending on the graphics mode the object is intended for. (In low resolution you can have 32 colors, while in high resolution you can have up to 16.)

To create an object, first load the object editor either from Workbench directly or within AmigaBasic. From Workbench choose the icon labeled BASICDEMOS. Then choose the icon called OBJEDIT, which will load both AmigaBasic and the program. If you are already in AmigaBasic you can load by using the mouse to choose OPEN from the Project menu and typing BASICDEMOS/OBJEDIT. Or simply type LOAD "BASICDEMOS/OBJEDIT" and press RETURN. The program will quickly appear in the LIST window. When you type RUN, the screen will clear for a second, followed by the statement:

Enter 1 if you want to edit sprites
Enter 0 if you want to edit bobs >

It doesn't matter at this point which one you choose. Once you enter 0 or 1, the screen clears, a small window appears in the upper left screen, and four colors are displayed in boxes in the lower left. The upper window is the drawing area, and its size can be changed using the sizing gadget in its lower right corner. (Sprites are limited in size, while BOBs can take up to about one-fourth of the screen. Stick to a small size for these examples.) If you press the right



The Amiga supports sprites and BOBs (Blitter OBjects), and linked combinations of each called GELs (Graphic ELements).

mouse button, three menu titles become visible. The first is called FILE. These options concern saving and loading the animation objects you create. You will use this menu to save the objects you make, and also to load objects made at other times.

The second option is called TOOLS. This menu has six drawing tools for creating your object. These are PEN, LINE, OVAL, RECTANGLE, ERASER and PAINT.

The third menu is ENLARGE. This allows you to enlarge your drawing for finer editing with the pen. It also contains an option to reduce the object after enlarging.

You create the object by drawing it within the "edit" window. You can change colors by pointing to the color boxes and clicking the left mouse button, and change drawing tools by using the right button. When you have a shape you want to use for animation, use the SAVE AS option from the FILE menu to store it on disk. The example animation statements later will use the name "myobject," so you should save this object using that file name.

Once you have finished designing and saving your object, choose QUIT from the object editor FILE menu. This will return you to AmigaBasic (unless you loaded the object editor from Workbench, in which case you will need to load AmigaBasic again). Type NEW and you are ready to begin using some of the animation routines built into AmigaBasic.

First Step Toward Animation

The first step in animating your object is to write the routine that reads the object from the disk. The command for this is OBJECT.SHAPE. Its entire syntax is:

OBJECT.SHAPE object-id,definition

The object-id is a number you assign to the object for identification. For simplicity, we will use the number 1 in our examples. In other programs, where more than one object is used, you will need to assign each object a unique number.

Another form of OBJECT.SHAPE copies the definition of one object to another. Its form is:

OBJECT.SHAPE id-1,id-2

This form of the command causes the shape of object 2 to be assigned to object 1.

The object's definition is a string variable describing the object, and it is exactly this information the object editor saves to disk. To use this information in a program we need to input the data from the disk file and store it in the program. Here is the standard way of doing so:

```
OPEN "MYOBJECT" FOR INPUT AS 1
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
CLOSE 1
```

This opens the file "MYOBJECT" for reading as file number 1, then reads the data and assigns it to object 1 as it is read from the disk. The CLOSE 1 statement closes the data file. At this point, the object is available for animation from within a program.

Positioning the Object

Next we must position the object on the screen. To do this the commands OBJECT.X and OBJECT.Y are available. Their statement syntax is:

OBJECT.X object-id,value
OBJECT.Y object-id,value

As always, the object-id is the number you assigned with the OBJECT.SHAPE command. The value is an integer between -32768 and 32767, but, for the object to be on the screen, must be between 0 and 639 for x values (0 and 319 for low-resolution graphics mode), or between 0 and 199 for the y values (0 and 399 interlaced mode). By assigning a value to the x and y locations for the object, you can precisely control its position.

These commands also double as functions. In this capacity, they are used to return a value that indicates where the object is at the time the function is used. The syntax for that application is:

currentX = OBJECT.X(object-id)
currentY = OBJECT.Y(object-id)

Once you have positioned the object where you want it, you can turn it on and make it visible. The commands for turning an object on and off can be used for a specific shape, a series of shapes, or all shapes:

OBJECT.ON (object-id (,object-id...))
OBJECT.OFF (object-id (,object-id...))

It is also possible to move an object with the OBJECT.X and OBJECT.Y commands. By incrementing a number and reissuing the command, you can move the object across the screen. For example, this statement

```
OBJECT.Y 1,100:FOR I = 1 TO
600:OBJECT.X 1,I:NEXT I
```

will cause the object assigned as 1 to move across the screen from left to right. But this method requires the program to be constantly issuing a position statement. A better method is to let the Amiga handle the motion for you, and AmigaBasic has several statements to do just that.

Moving the Object

The first pair of animation commands defines an object's velocity in the X and Y directions:

OBJECT.VX object-id,value
OBJECT.VY object-id,value

Here the value is the number of pixels per second the object will move. A value of 1 would mean the object would move one pixel per second, and take ten minutes to move horizontally across the screen. A value of 300 would take two seconds. You can define the value over and over again within your program, as needed.

The velocity commands also double as functions that return the current velocity of an object.

currentXvelocity = OBJECT.VX(object-id)
currentYvelocity = OBJECT.VY(object-id)

AmigaBasic also contains acceleration commands. Acceleration differs from velocity, in that it is the rate of *increase* in an object's speed, not just how fast it is moving. Of course, velocity changes as a function of acceleration. If the acceleration is zero, the velocity remains unchanged. Otherwise it increases or decreases, depending on the acceleration factor. The inclusion of velocity and accel-

eration commands makes AmigaBasic ideally suited to simulating various physical actions.

To set an acceleration use:

OBJECT.AX object-id,value
OBJECT.AY object-id,value

Here, "value" is the rate of acceleration in pixels per-second-per-second (pixels per-second squared).

Once you have positioned your object and set its velocity and acceleration, you must issue another statement in order to make it begin moving. This is the START command, and it can be used much like the OBJECT.ON or OBJECT.OFF commands to start or stop moving one or more objects:

OBJECT.START (object-id (object-id...))
OBJECT.STOP (object-id (object-id...))

If your animation needs are complex, you can use the LIBRARY statement to access subprograms built into the Amiga's ROM routines.

Collisions

Whenever a collision occurs, AmigaBasic does an OBJECT.STOP on both colliding objects. If one object collides with a border, the object will stop then, too. It is necessary to reissue an OBJECT.START for these objects in order to make them move again. But collisions occur only when you have enabled them with the COLLISION commands.

Many times you will want to have something happen when two objects collide. But it is much too time-consuming for you to monitor all the positions of all the objects and check to see if they are in contact. However, the Amiga can do just that very easily using the OBJECT.HIT command. You can decide in your program what objects will collide with what, and what to do if it happens. By default, all objects will collide with each other and with the border. The OBJECT.HIT command can also be set to allow some objects to pass through each other. Its basic syntax is:

OBJECT.HIT object-id,MeMask, HitMask

MeMask is a number that describes the object in object-id. It is chosen by you. HitMask is a number that signifies what the object is to collide with. By performing a logical AND (a Boolean function) of the MeMask of one object with the HitMask of another, the Amiga determines if the objects will collide. And, if the least significant bit is set in HitMask, the object will also collide with the border.

In your AmigaBasic manual are some examples of OBJECT.HIT. Since they can be rather confusing, it will be helpful if we go over them.

OBJECT.SHAPE 1,Asteroids
OBJECT.SHAPE 2,Ships
OBJECT.SHAPE 3,Missiles
OBJECT.HIT 1,8,7 'Collides with border, ship and missile
OBJECT.HIT 2,2,9 'Collides with border, asteroid
OBJECT.HIT 3,4,9 'Collides with border, asteriod

In these examples the MeMasks of objects 1, 2 and 3 are 8, 2 and 4. (These are numbers picked to represent bits raised to the power of 2. Object 1 is 2~3, object 2 is 2~1 and object 3 is 2~2.) The last numbers are the HitMask of each object. These indicate what objects they can collide with. In all three cases bit 1 is set (bit 1 has the value of 0 and 2~0 = 1).

If you were to perform a logical AND of the HitMask and the value 1 on any of the examples, the result would be 1 (7 AND 1 = 1, 9 AND 1 = 1). Since the result of the AND is not zero, it indicates all will collide with the border. Object 1 (the asteroid) has a MeMask of 8. If you logically AND that value with the three HitMasks, you will see that objects 2 and 3 give a result of 8, which is non-zero and indicates a collision will take place between the asteroid and the ship and the asteroid and the missile. If you were to logically AND the MeMask of the asteroid (8) with its own HitMask (7), the result is 0, indicating asteroids will not collide with each other.

By adding up the MeMasks of all the objects that you want another object to collide with, and assigning that number to its HitMask, you can selectively choose what collides with what. While this can be a conceptually difficult idea to understand, once you have it mastered it becomes a

Continued on pg. 168

Amiga Animation Demo program

```
'Simple animation demo

'input object

    OPEN "basicdemos/myobject" FOR INPUT AS 1
    OBJECT.SHAPE 1,INPUT$(LOF(1),1)
    CLOSE 1

'position object 1

    OBJECT.X 1,300
    OBJECT.Y 1,30
    OBJECT.AY 1,3.5 'initial acceleration of 3.5 to act as gravity
    OBJECT.ON 1

OBJECT.START 1

'Main program loop

bounce:

    IF OBJECT.Y (1)>145 THEN
       OBJECT.VY 1,-115 'give reverse velocity for upward motion
       OBJECT.START     'turn on
       SOUND 140,.3,255 'make bouncing noise
    END IF

    GOTO bounce:        'start loop again
```

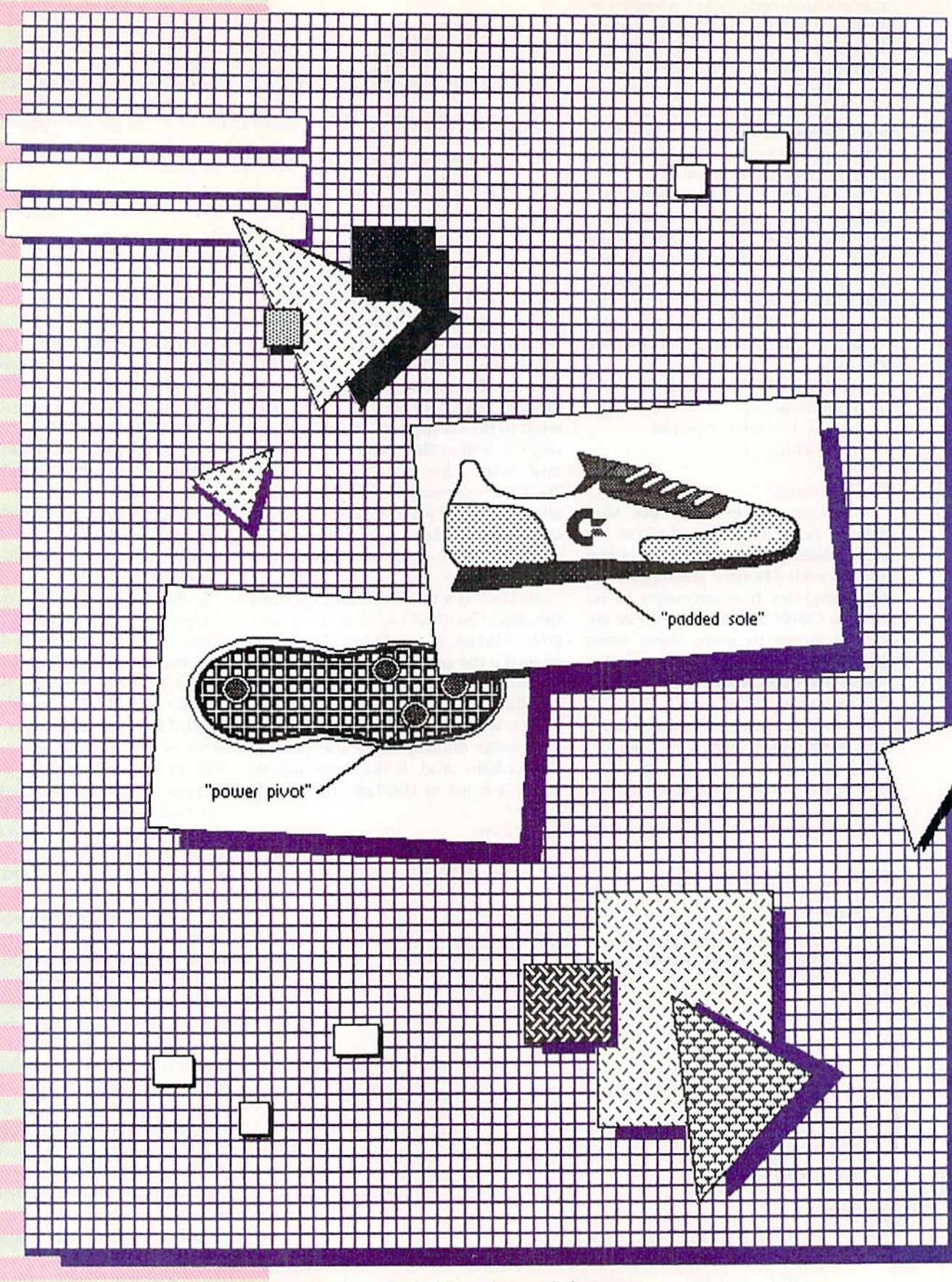


Figure 6. Full-page Output from *geoPaint*

GEOS FOR THE 64

By Mathew Leeds

The computer world has changed since I first started with my Commodore 64, and I have watched with not a little envy as several computers have arrived with operating systems that made them easier to use. (Friends still think of my 64 as a game machine, even though I use it to earn a good living writing.)

But now Berkeley Softworks has created a new software package that finally gives the 64 all the power and features that I've been waiting for. It transforms my world of wedge commands and utility programs into a "desktop" environment of menus, icons, and windows.

This new operating system is called GEOS (Graphic Environment Operating System). It includes a disk "turbo" that speeds up all disk transfer times by a factor of five to seven. And it comes bundled with two applications, *geoPaint* and *geoWrite*, as well as several desktop accessories: calculator, note pad, alarm clock, photo and text albums, and preference manager.

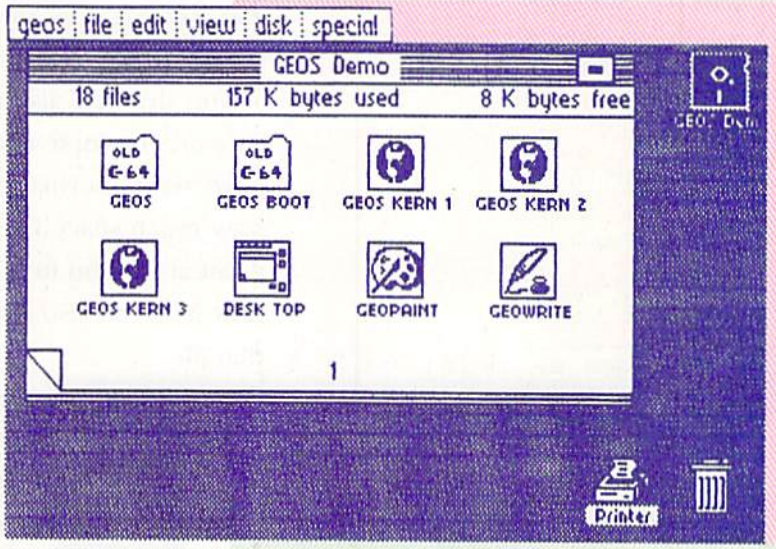


Figure 1. Desktop

The President of Berkeley Softworks, Brian Dougherty, explained, "I've always wanted to do this kind of operating environment since the 64 was first made. We realized that the current operating system of the 64 was limiting the capabilities of applications and the consumer's perception of the quality of the machine. What we've created for the 64 was inspired by the Xerox Star, and has more recently been seen on the Amiga. We developed a new operating system with faster disk access and built-in support for sharing data between applications.

"I think the people at Commodore created a great piece of hardware, and at the time it was built it wasn't clear that a lot of disk drives would be sold, so a lot of effort was not put into designing a full blown disk operating system. Most of the add-ons just turbo the drive; they haven't created an entirely new operating system like GEOS. The 64's memory has plenty of room for an operating system—the PDP-11's that I had for use in college originally came with only 64K of memory. The question

is how quickly can you do something, and is the tradeoff in time worth the added functionality? We think that GEOS represents the best balance of function and speed for the 64."

THE DESKTOP

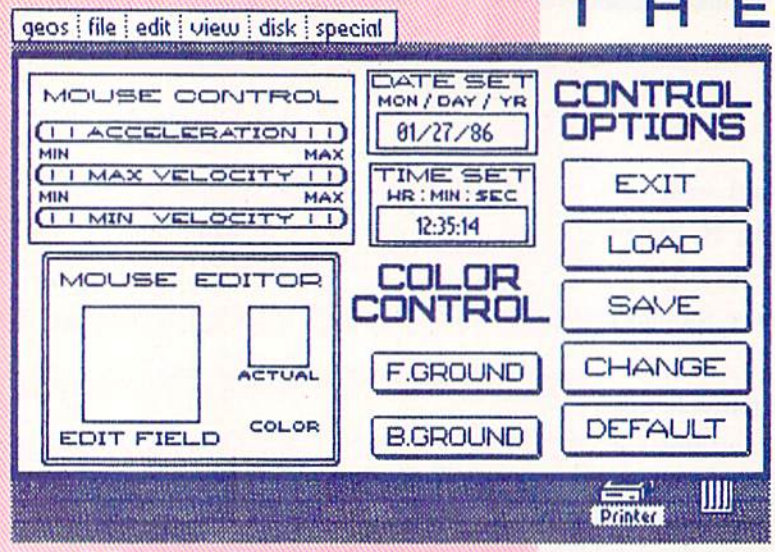


Figure 2. Preference Manager

The heart of GEOS is the "desktop" (see Figure 1), which provides menu access to functions like disk formatting, loading applications, using desk accessories, deleting or renaming files, copying files or whole disks, printing files, and viewing disk directories. Disk files are represented as icons, with the file name underneath.

A new file structure called VLIR (variable length indexed record) is used in GEOS. It lets you have linked lists of records, in which each record can grow to any length it needs to be. It starts with a single block that has pointers to mark the start of each record. For instance, fonts will be stored in a single file, with each point size being a record in the file. Each file contains information on its file type, name, date of last modification, and size. Six files are displayed on each page of the desktop, with a possible 18 pages on a disk.

The desktop also displays an icon for each disk in use. (GEOS supports multiple disk drives.) A status line appears at the top of the page, with information on how many files are on the active disk, and how much space is available on the disk. Use a joystick or mouse to point at a menu item or icon, and click the button to run an application. You can also drag a file to the printer, and GEOS will then print that file.

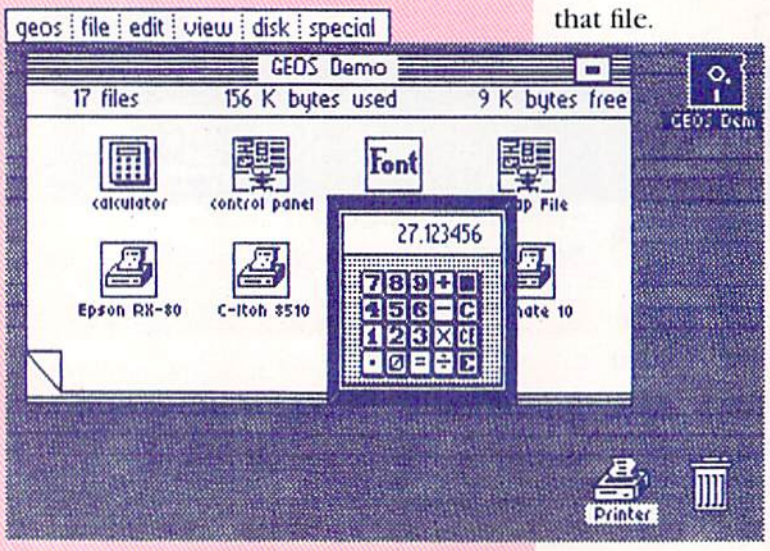


Figure 3. Pop-up Calculator

You may also access accessories from the desktop, including the preference manager shown in Figure 2. Using the preference manager you can change the movable pointer from its standard arrow shape to any that you prefer, set the date and time, change foreground and background colors, change the mouse response controls and save your changes to disk.

Another accessory is the calculator. When called, it pops up over any existing application as shown in Figure 3. When you are finished, it then disappears, leaving you where you left off in the program you were using.

The alarm clock can be set to remind you of what time it is, regardless of what application you are using, and the notepad allows you to jot notes while in another program, without loading your word processor.

GEOS supports a second drive, and will allow the swapping of files from one drive to another by just dragging the file icon from one disk to another. There are also plans for a hierarchical file structure to support a hard disk, and to support the new 3-1/2 inch drives from Commodore. Since GEOS files are disk-intensive, drives with more storage and faster access times become much more attractive and cost-effective.

Only the GEOS system disk is copy-protected. It has a unique disk ID that is then recorded on all disks that have your GEOS applications installed on them. The applications will run only under your copy of the GEOS system disk. This allows you to back up all of your applications and data disks. Since the entire GEOS system resides in memory, you only need to use the system disk when you first turn on your 64.

Several printers are currently supported by GEOS, as are combinations of printers and interfaces. The Commodore 1525, Epson/Star types, C Itoh 8510, and Okidata printers all have printer drivers included.

Berkeley Softworks plans to create a version of GEOS for the Commodore 128.

GEOPAINT

GeoPaint, one of the two applications included with the package, operates, as do all applications under GEOS, with a display of 80 dots per inch (DPI), using a virtual page of 8-1/2 x 11 inches. This allows the use of hundreds of public-domain text fonts that have been created for other computers.

This display resolution requires just over 70K of memory space. But, since there is no way to display an 8-1/2 x 11-inch page on a monitor, and a 70K file will not fit in a 64K computer, GEOS uses a virtual file system. The disk drive is used as a portion of the computer's memory, and sections are swapped from memory in the computer to the disk drive as needed. Special "turbo" routines are used to speed up this process, and special data-compression algorithms reduce the on-disk space required for a file. Unlike many existing fast-load utilities, the routines used in GEOS operate during disk write (save) as well as disk read (load). About 1/6 of the page can be displayed at a time, and the section that is being shown is indicated in the status window (see Figure 4).

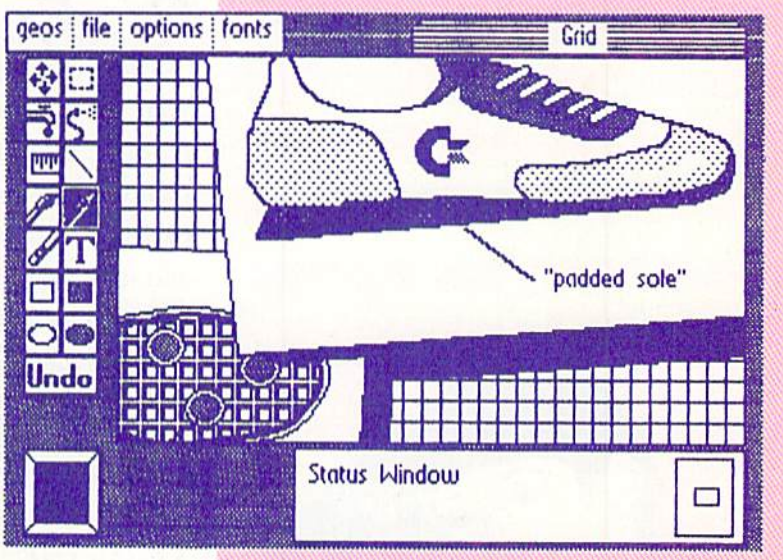


Figure 4. Portion of a *geoPaint* Page

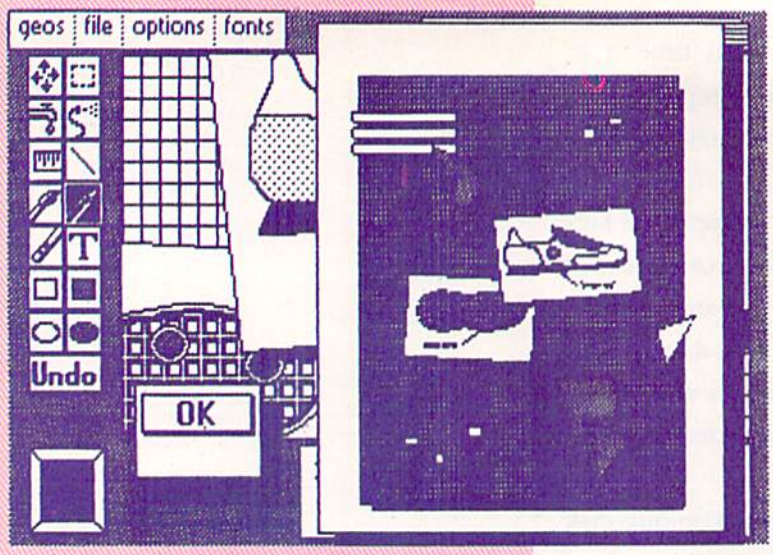


Figure 5. The Show Page Function in *geoPaint*

GeoPaint has all the basic functions you need in a paint program. Lines, rectangles, circles (that print as true circles), pattern fills, spray paint, erase, text, magnify, cut and paste, invert, undo, current pattern indicator, and some special functions. The Ruler can be used to measure the size of an object either in pixels, for relative size to another object on the screen, or in inches, for an idea of what size it will be in the printout. The Ruler is scaled according to which printer driver you have selected, so that if your printer will not support 80 DPI, it will still give an accurate report of the final size of a printout. The Show Page function (see Figure 5) will provide an on-screen representation of the full picture.

The user interface is well thought out, and most people will find they do not need to read the manual to use *geoPaint*. One example of the careful thought that went into the design of this application is that when you select a different text font size, the program automatically puts you into text mode, if you were not already there.

Other features include a pattern editor, print function (see Figure 6), and a photo album for storing pieces of *geoPaint* drawing for use in other applications (see Figure 7).

G E O W R I T E

The other application included with GEOS is *geoWrite*, a "what you see is what you get" word processor. It features the use of multiple, proportionally spaced fonts and has the most needed commands in a word processor: wordwrap, tabs, insert, delete, cut-and-paste, and on-screen display of fonts and styles. Normal, bold, outline and italic typestyles are available for all fonts in any point size. Style and font selection is done by marking the section of text to be changed and then selecting from the menu the style or font change desired (see Figure 8). Berkeley Softworks will be releasing library disks with additional fonts.

LOOKING TO THE F U T U R E

Berkeley also plans to support third-party development of applications for GEOS. Early support includes information on how to create disk icons to label programs, and how to return to the desktop. A full

Figure 7. Store Small Drawings in *geoPaint*'s Photo Album

programmer's reference manual should be available by June. The entire operating system, all the graphic primitive routines, and the proportional font routines have jump table entry points. This allows for fixes if necessary, and allows developers to use all the existing routines. All this will be published, as well as how parameters are passed, the menu and icon-support routines, plus how to use the photo and text albums for the cutting and pasting of text or image data.

Also in the works are plans for a 128 version of GEOS. One new feature planned for the 128 version is an application-exchange manager. This would allow several programs to be resident in memory at the same time, so the user could switch from one application to another in mid-stream, without loading from the disk drive, or losing data from any of the programs in use. All the applications that run on the 64 version are planned to run on the 128 version, but the advantages of running GEOS on a 128 would include more memory space, faster disk access on the 1571, and faster processor speed.

There are also plans to support the 128's RAM expansion unit, a plug-in device that will be available for the 128 soon. It uses direct memory access (DMA) techniques to speed data transfer. GEOS will be able to address it as either a RAM disk or as additional data storage. With the addition of the RAM expansion, the 128 becomes a 640K computer.

Other plans include the addition of color to the *geoPaint* program, currently available only in monochrome, and printer driver support for several laser printers. There are no firm timelines for the development of these features, but Berkeley Softworks hopes to at least demo the 128 version with support for the 128's RAM expansion at June CES.

Upgrades to the GEOS operating system will become available as major new functions are added. Compatability will be maintained across all existing applications. GEOS should be available by the time you read this. There may be some new features added by then, as well (I got to see an almost-finished version of GEOS in late January). There is no question in my mind that GEOS is a revolutionary step in the history of the C64. The power and functionality that it adds is tremendous. It is another brick in the foundation of home computing that the 64 has been building for years—a brick that adds user-friendliness and enhanced power to the world's most affordable home computer.

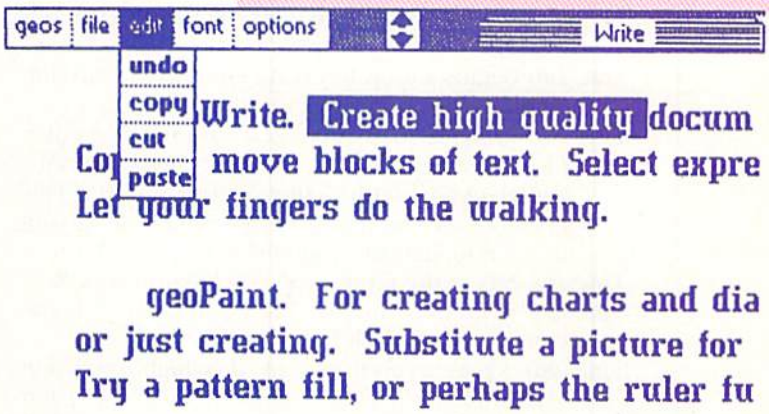


Figure 8.
The *geoWrite* Word Processor

BY BRUCE JAEGER

Rotation Tag
for the Commodore 128

Rotation Tag is a chase game that combines the game of tag with the pool game "rotation." Seven numbered balls are moved at random about the screen. The object of the game is to use the joystick to touch or "tag" each ball *in numerical order* with your white cue ball, and rack up the highest score possible in the two minutes allowed. When you reach ball number seven, your next target is ball number one again, and if you touch *any other* ball, you lose points.

If you have a disk drive, the program will even memorize the high score and player for you.

Rotation Tag demonstrates some of the powerful new graphic commands of the Commodore 128, including MOVSPR, BUMP, CIRCLE, CHAR, SSHAPE AND SPRSAV.

One of the first things you might notice is that, even though we use eight different sprites, there is not a single DATA statement to type! Lines 200-330 show how we do this:

Line 210 skips around the sprite definition routines if you're re-playing the game.

Line 220 turns on the high-resolution graphics mode and clears the screen.

Line 230 prints the message "CREATING SPRITES" on the high-resolution screen.

Line 240 begins a loop to create sprites two through eight.

Line 250 draws a small circle of the foreground color (1) at x,y coordinates 12,12. The 9 is the horizontal radius, with 7 the vertical radius. (This corrects for the monitor's aspect ration, giving us a circle instead of an ellipse.)

Line 260 fills in the circle with the foreground color.

Line 270 prints, in reverse, the numbers 1-7 in the center of the article.

Line 280 saves everything on the high-resolution screen from x,y coordinates 0,0 (the upper left of the screen) to x,y coordinates 23,21 as a *sprite shape* in string A$.

Line 290 takes the previously defined shape A$ and saves it in sprite memory as sprite X.

Line 300 finishes the rest of the sprites.

Line 310: We didn't do our first sprite, the cue ball. Instead of a number, we'll print an asterisk in this ball for a character.

Line 320 converts to a shape.

Line 330 saves as sprite #1.

By using the high-resolution graphic commands CIRCLE, DRAW, BOX, CHAR and PAINT, you can now draw high-resolution shapes and convert them to sprites in the middle of a program. A good use might be "customized" sprites using the player's name or initials.

Once we've got our sprites created, we want to "turn them on" and place them somewhere on the screen. No poking is necessary. Lines 380-420 show how it's done:

Line 380: Again, we loop through the sprites.

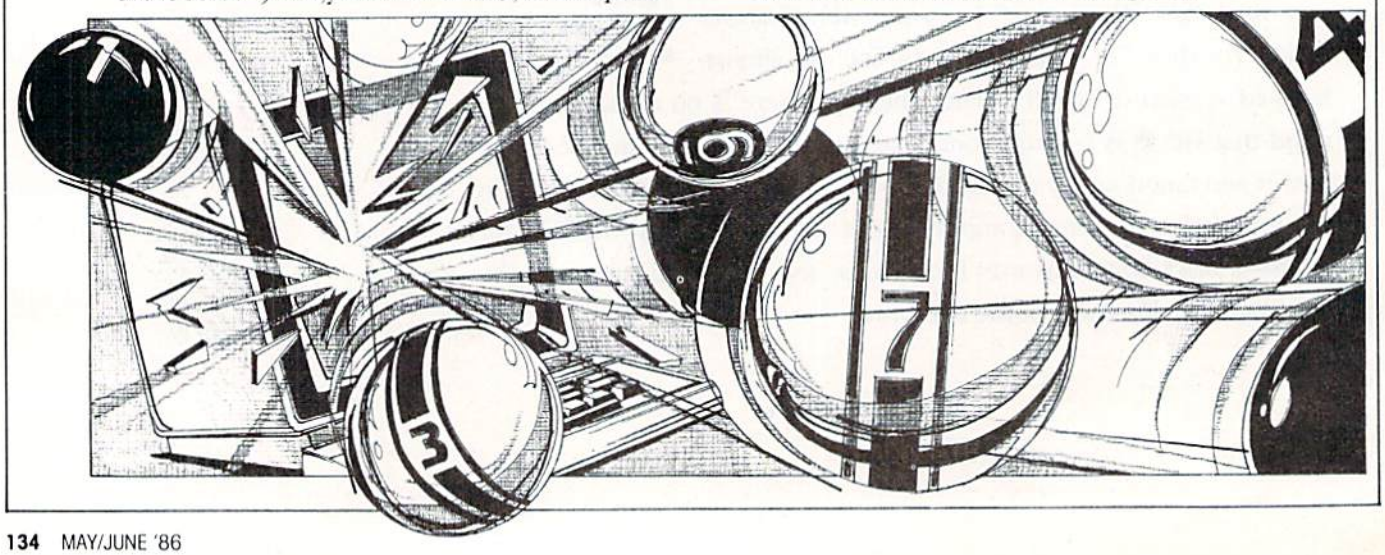
Line 390: Using the SPRITE command, we execute the following.

SPRITE X	(We're referring to sprite #X)
1	1 = sprite on, 0 = sprite off
X + 1	Sets the color. On the 128, setting our first sprite #1 to color 2 gives us a white sprite—just what we want for the cue ball.
1	Sprite priority. 1 = behind characters on screen, 0 = in front of characters on screen.
0	Make sprite normal size in horizontal direction. (1 = double size)
0	Make sprite normal size in vertical direction. (1 = double size)

If you want, you can follow these with a final parameter, where a zero indicates the sprite is to be displayed in "standard" mode, and a one indicates that the sprite is to be displayed in multi-color mode. The default is zero, which I wanted, so I skipped the last parameter.

Line 400 in this format, this command moves sprite X to the X,Y coordinates following. The simple multiples of X I'm using here make the sprites go down the screen diagonally from left-to-right.

Line 410 finishes the rest of the sprites.



Line 420: I really didn't want the cue ball to be in line with the rest, so here I move it to a position in the lower left quadrant of the screen.

The actual playing loop of the game is in lines 670-970. Note that to improve the reaction time of your cue ball, you should eliminate all the REM statements I put in.

The playing loop uses the new BASIC 7.0 DO WHILE/LOOP loop structure. There's really nothing very complicated about it; while the variable OVER is equal to zero, all the statements between DO WHILE (at line 670) and LOOP (at line 970) will be repeated. I could also have said "DO UNTIL OVER = 1." Or, of course, it could also be done in the old way: 670 REM START OF LOOP...970 IF OVER = 0 THEN 670.

Now look at the way MOVSPR is used in lines 690 and 720. The parameters here stand for MOVSPR X, direction of movement in degrees (0-360) # speed of movement (0-15). The pound sign (#) indicates that this is a *relative* movement, instead of an *absolute* movement like the one we used to set the sprites in the diagonal line. Once this command is executed, the sprites will move in the direction and at the speed defined, whether the program is running or not! They'll keep moving until you hit RUN/STOP and RESTORE, or turn them off with a MOVSPR X,0#0, setting the speed to zero.

These sprites are being moved by an interrupt routine that "steals" time from BASIC to do the sprite positioning. You'll notice that when all eight sprites are making their merry way about the screen, program execution slows down. That's why I recommend removing all REM's from the playing loop. C

Before typing this program, read "How to Enter Programs." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Rotation Tag

```
100 GRAPHIC 1,1:GRAPHIC 0
120 SCNCLR 0 : REM CLEAR SCREEN
130 PRINT CHR$(14):REM LOWERCASE
140 COLOR 0,1 : REM BLACK BACKGROUND
150 COLOR 1,8 : REM YELLOW FOREGROUND
160 COLOR 4,1 : REM BLACK BORDER
170 :
180 DEF FN R(X)=INT(RND(1)*X)+1
190 :
200 REM CREATE SPRITES
210 IF PEEK(4000)=252 THEN 350
    : REM OK TO SKIP
220 GRAPHIC 1,1 : REM HIGH-RES MODE
230 CHAR 1,20,1,"CREATING SPRITES"
240 FOR X = 2 TO 8
250 CIRCLE 1,12,12,9,7
    : REM DRAW CIRCLE
260 PAINT 1,12,12 : REM FILL IT IN
270 CHAR 1,1,1,RIGHT$(STR$(X-1),1),1
    : REM PLACE CHARACTER
280 SSHAPE A$,0,0,23,21 : REM CONVERT
290 SPRSAV A$,X : REM SAVE AS SPRITE
300 NEXT
310 CHAR 1,1,1,"*",1 : REM USE "*"
    FOR YOUR SPRITE
320 SSHAPE A$,0,0,23,21
330 SPRSAV A$,1
340 :
350 GRAPHIC 0 : SCNCLR 0
    : REM BACK TO NORMAL SCREEN
360 :
370 REM COLOR AND PLACE SPRITES
380 FOR X = 1 TO 8
390 SPRITE X,1,X+1,1,0,0
400 MOVSPR X,40*X,20*X+20
410 NEXT X
420 MOVSPR 1,60,180
430 :
440 REM READ BINARY
450 FOR X=1 TO 8 : READ B(X) : NEXT
460 DATA 1,2,4,8,16,32,64,128
470 :
480 REM FOR DISK USERS ONLY!
490 DOPEN #2,"TAG.SCORE"
500 IF DS<>0 THEN HS=0:HS$=""
    : GOTO 530
510 INPUT#2,HS
520 INPUT#2,HS$
530 DCLOSE #2
540 :
550 REM PRINT PREVIOUS HIGH SCORE
560 IF HS=0 THEN 600
570 COLOR 5,13
580 P$="[SHFT B]EST [SHFT S]CORE
    :"+STR$(HS)+" BY "+HS$
590 CHAR 0,5,22,P$,0
600 SC = 0 : TA = 1
610 :
620 TI$="000000" : REM RESET CLOCK
630 :
640 REM RANDOM TAG *** MAIN ACTION
    LOOP ***
650 REM  WHEN YOU TYPE THIS IN,
     ELIMINATE ALL
660 REM  'REM' STATEMENTS BETWEEN
    LINES 670 AND 970
670 DO WHILE OVER=0
680 REM CHANGE DIRECTION?
690 IF FN R(10)<3 THEN MOVSPR FN
    R(7)+1,FN R(360)#3
700 J=JOY(1): REM GET JOYSTICK VALUE
710 IF J>127 THEN J=J-128:SP=7
    :ELSE SP=5
720 IF J THEN MOVSPR 1,J*45-45#SP
    :GOTO 730:ELSE:MOVSPR 1,0#0
    :REM CHANGE DIRECTION
730 B=BUMP(1):REM SEE IF SPRITES
    BUMPED
740 IF(B AND 1)=0 THEN 850
    : REM NOT YOUR BUMP
750 IF(B-1 AND B(TA+1))<>B(TA+1)THEN
    830 : REM WRONG BUMP!
760 MOVSPR TA+1,0,0: REM MOVE TAGGED
    TARGET OUT OF WAY
770 SC=SC+100 : REM INCREASE SCORE
780 TA=TA+1 : REM NEXT TARGET
790 IF TA>7 THEN TA=1
800 SOUND 1,TA*500+20000,10 : REM BEEP
810 GOTO 850
```

```
820 REM TAGGED WRONG SPRITE!
830 SC=SC-100 : REM PENALTY
840 SOUND 1,5000,10,0,0,0,3
850 B=BUMP(1) : REM RESET BUMP
    REGISTER
860 REM PRINT SCORE, TIME LEFT
870 PRINT"[HOME,WHITE,RVS,SHFT S]CORE
    [RVOFF] ";:
880 PRINT USING"######";SC;
890 PRINT"[SPACE2,RVS,SHFT T]ARGET
    [RVOFF] ";TA
900 PRINT"[HOME,WHITE]"TAB(25)"[RVS,
    SHFT T]IME[RVOFF] ";
910 M=VAL(MID$(TI$,3,2))
920 S=VAL(RIGHT$(TI$,2))
930 TR=120-M*60-S:IF TR<0 THEN OVER=1
940 M=INT(TR/60):S=TR-M*60
950 PRINT USING "##.##";M+S/100
960 GET A$:IF A$="Q"THEN OVER=1
970 LOOP : REM BACK TO "DO WHILE"
980 :
990 REM GAME OVER
1000 FOR X=1 TO 8
1010 MOVSPR X,0#0 : REM FREEZE SPRITES
1020 NEXT
1030 COLOR 5,14
1040 CHAR 0,16,12,"[SHFT G]AME
     [SHFT O]VER",1
1050 COLOR 4,7 : COLOR 0,7 : SLEEP 1
1060 COLOR 4,1 : COLOR 0,1
1070 FOR X = 1 TO 8
1080 SPRITE X,0 : MOVSPR X,0#0
1090 NEXT
1100 :
1110 IF SC<=HS THEN 1260
1120 REM NEW HIGH SCORE
1130 HS=SC
1140 COLOR 0,6 : COLOR 4,8 : SLEEP 1
1150 COLOR 4,1 : COLOR 0,1
1160 CHAR 0,0,18,"*** [SHFT N]EW
     [SHFT H]IGH [SHFT S]CORE! ***",1
1170 PRINT : INPUT "[SHFT Y]OUR
     [SHFT N]AME";HS$
1180 :
1190 REM FOR DISK USERS ONLY!
1200 SCRATCH "TAG.SCORE"
1210 DOPEN #2,"TAG.SCORE,S,W"
1220 PRINT#2,HS
1230 PRINT#2,HS$
1240 DCLOSE #2
1250 :
1260 CHAR 0,5,22,"[SHFT P]RESS '
     [SHFT P]' TO PLAY, '[SHFT Q]
     ' TO QUIT.",1
1270 GET KEY A$ : IF A$<>"P"AND
     A$<>"Q" THEN 1270
1280 IF A$="P" THEN RUN
1290 SCNCLR 0 : END
```

END

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BY JIM STRASMA

BASIC 7.0 Makes Programming Easier

Commodore 128 programs written in BASIC 7.0 are not only easier to write, but faster, easier to read, and easier to debug.

The new version of BASIC built into the Commodore 128—BASIC 7.0—contains many new statements and commands that make programming easier. Many of these are specialized commands for creating graphics and sound, but others are general-purpose commands that simply help programmers write in a more clearly structured fashion. This makes 7.0 programs not only easier to write, but faster, easier to read, and easier to debug, as well.

Believe it or not, it has been demonstrated mathematically (by Jacopini and Bohm in 1966) that computers understand only three different programming structures: sequence, selection and repetition. Let's look at each of these structures as they apply to the Commodore 128's new commands, and perhaps we can gain some insight into the benefits of programming with BASIC 7.0.

Sequence

The first structure, sequence, is automatic. Unless otherwise instructed, BASIC and most other computer languages automatically proceed through a program from beginning to end, one statement after another. In a flow chart or program listing, this structure simply places each statement below the one that is executed before it and above the one executed after it. Used this way, a computer is much like a calculator, solving problems one after another in the order it receives them. Figure 1 shows an example of sequence in a flow chart.

A short BASIC listing that calculates a variable's value based on another variable, and then displays the value of both variables would look like this:

```
10 Y=3*X+5
20 PRINT X,Y
```

The calculation corresponds to statement 1 in the flow chart, and the print corresponds to statement 2. The top (earlier-numbered) statement is executed first in each case, and no paths exist through the program other than straight down, top to bottom.

Selection

The second structure, selection, has the computer make a decision, choosing only one of two possible actions it could perform next. In BASIC, selection is usually controlled with an IF-THEN-ELSE statement. After the word IF, a condition is stated in such a way that it must be true or false. If true, the program executes the statement following the word THEN. Otherwise, it executes the one following the word ELSE. Either way, the program eventually reaches the line following the end of the ELSE statement, and resumes execution from that point.

Most Commodore BASICs prior to the Commodore 128 didn't allow the full expression of this structure, either leaving out the ELSE portion or limiting the structure to a single program line. BASIC 7.0 on the C128 rectifies this, including a full set of selection commands that let you use as many program lines as necessary.

In a flow chart, a full selection starts with a decision point, below which there are two options, one (any only one) of which is executed immediately after the decision. Afterward, both options lead to the same point and continue.

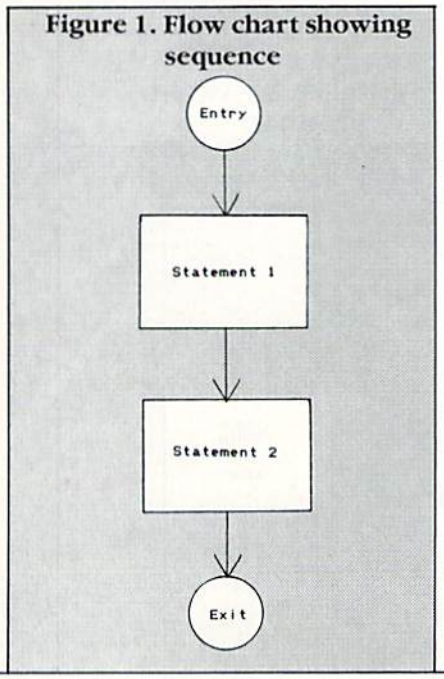

Figure 1. Flow chart showing sequence

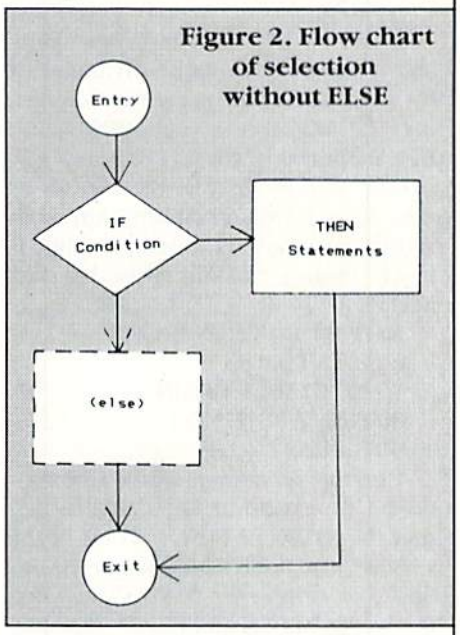

Figure 2. Flow chart of selection without ELSE

Computers without an ELSE statement follow a slightly different flow chart, but the net effect is much the same, provided care is given to making sure the program branches around the implied ELSE section after doing the THEN portion, rather than dropping into the ELSE unintentionally. Unfortunately, in BASIC, this requires a GOTO statement, and GOTO's movements can be difficult to follow and understand.

Figure 2 shows a flow chart of a traditional Commodore BASIC IF-THEN statement, with an implied ELSE section. Below is a program listing using the same logic, which shows the division of one variable into another, with protection against trying to divide by zero. The GOTO statement is essential in line 50, to keep from dropping into line 60 when the condition we are testing is true:

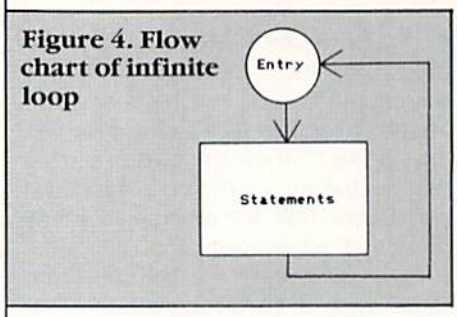

Figure 4. Flow chart of infinite loop

```
50 IF B<> 0 THEN PRINT A / B:
   GOTO 70
60 PRINT "INFINITE"
70 REM
```

Figure 3 shows the same flow chart, rearranged to take advantage of the ELSE statement in recent Commodore BASICs, and the new BEGIN and BEND options of the C128.

Here is how that version looks as part of a BASIC program. Although this program is a bit longer, its logic is much clearer, making mistakes less likely:

```
50 IF B <> 0 THEN BEGIN
60 PRINT A / B
70 BEND:ELSE BEGIN
80 PRINT "INFINITE"
90 BEND
```

A further advantage of the Commodore 128 version of BASIC is that neither the THEN or ELSE portion of the statement is limited to a single BASIC line, as it is in other BASICs. Between the words BEGIN and BEND, you may now insert as many BASIC statements as you like, without affecting the operation of the IF-THEN-ELSE statement.

Repetition

The third structure, repetition, is simply a loop of repeated statements, with a way of breaking out of the loop when some condition is met. Repetition is set up in different ways, depending on how the loop ends.

Repetition is simply a loop of repeated statements, with a way of breaking out of the loop when some condition is met.

The simplest version of repetition is the infinite loop. It goes on forever until halted by other means (such as pulling the plug). Figure 4 shows an infinite loop in flow chart form.

Here is an example of an infinite loop in BASIC that fills the screen with the word "HI."

```
10 PRINT "HI",
20 GOTO 10
```

The problem is that we need a more elegant way out of such programs than turning off the computer or pressing the STOP key. One solution is to add an IF-THEN statement inside the loop that branches outside the loop when something happens. This method is illustrated by this BASIC listing, which waits for a correct input, then prints a message:

```
30 INPUT "PASSWORD";N$
40 IF N$ = T$ THEN 60
50 GOTO 30
60 PRINT "PASSWORD
   ACCEPTED"
```

This next listing does the same thing, with fewer lines, by turning around the logic of the comparison:

```
30 INPUT "PASSWORD";N$
40 IF N$ <> T$ THEN 30
50 PRINT "PASSWORD
   ACCEPTED"
```

Figure 5 takes the same example and illustrates it in flow chart form, using three new BASIC words on the C128. They are DO, LOOP, and EXIT. DO and LOOP surround statements to be treated together, with DO at the start and LOOP at the end. EXIT provides a clean way out of the loop, resuming the rest of the program at the first statement after the word LOOP. Use of these words in BASIC is shown in the listing below:

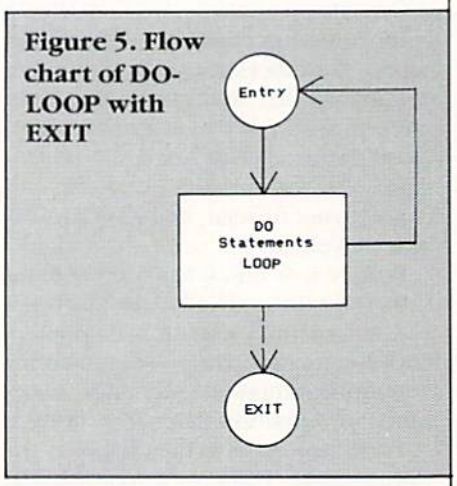

Figure 5. Flow chart of DO-LOOP with EXIT

```
30 DO
40 INPUT "PASSWORD";N$
50 IF N$ = T$ THEN EXIT
60 LOOP
70 PRINT "PASSWORD
   ACCEPTED"
```

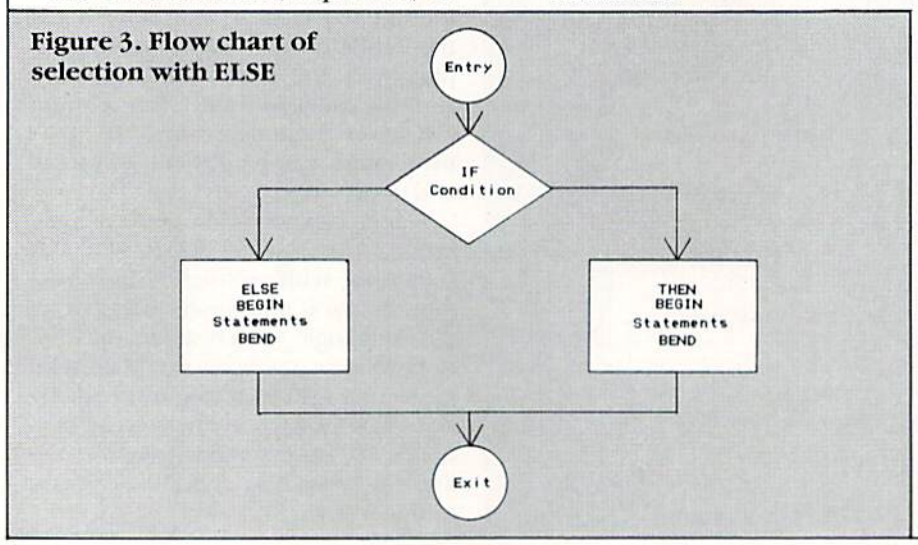

Figure 3. Flow chart of selection with ELSE

FOR-NEXT Problems

The FOR-NEXT statement in all Commodore BASICs provides another way to control repetition. Given a starting and ending value for a variable used as a counter, a loop can be designed to execute a preset number of times and quit. The following program looks through an array for a value. If a match is found, the program branches to line 70, with the position of the match in variable I:

```
40 FOR I = 0 TO 9
50 IF A$(I) = N$ THEN 70
60 NEXT I
70 REM
```

There is a problem with searching

this way. Each time the program jumps out of a FOR-NEXT loop, rather than finishing it, the loop values are left in a special part of the computer's memory called a stack.

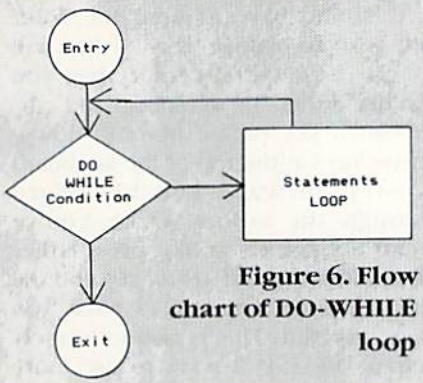

Figure 6. Flow chart of DO-WHILE loop

Here they can accumulate until there is no room left for them, at which time the computer announces "OUT OF MEMORY" and halts.

The DO-WHILE/DO-UNTIL Solution

BASIC 7.0 adds two new words, WHILE and UNTIL, to eliminate this problem. They set conditions for completing a loop, without leaving garbage on the stack. Figure 6 shows a flow chart of a DO-WHILE loop that is similar to the FOR-NEXT loop in the previous listing.

This program shows how the WHILE loop is written in BASIC:

```
40 I = 0
50 DO WHILE A$(I) <> N$
60 I = I + 1
70 LOOP
```

Notice that we have to explicitly state the starting value of our counter variable in advance, and increment it ourselves in line 60. These chores are handled automatically in a FOR-NEXT statement. Also note that there is no provision for quitting if no match is found.

If the very first value in the array were a match, the loop would not execute even once. This saves a bit of time, and avoids potential problems from passing through a loop when it isn't needed.

Figure 7 shows the same loop written with a LOOP UNTIL statement. In this version, the test is at the end of the loop, as in a FOR-NEXT statement, and the body of the loop is always executed at least once. That is why the BASIC listing below starts the variable I out as minus one instead of zero; by the time the loop condition is tested, its value will already have been increased:

```
40 I = -1
50 DO
60 I = I + 1
70 LOOP UNTIL A$(I) = N$
```

Actually, there are more possibilities than we have shown. We could also write a loop that starts out with a DO UNTIL, or one that ends with LOOP WHILE. The choice of whether to test the condition at the start or end of the loop will depend on the problem.

As suggested before, there are usually two ways to state a logical condition. The same is true of WHILE and UNTIL. Within limits, loops can be made with either one.

Loops that continue looping while the tested condition is true, use WHILE. Those that continue looping until the tested condition becomes true use UNTIL. That is, WHILE loops on a true condition, and UNTIL loops on a false condition. Both have a real advantage over a FOR-NEXT loop. Its condition is limited to determining whether the variable it uses as a loop counter has reached its ending value, whereas UNTIL and WHILE can test any condition.

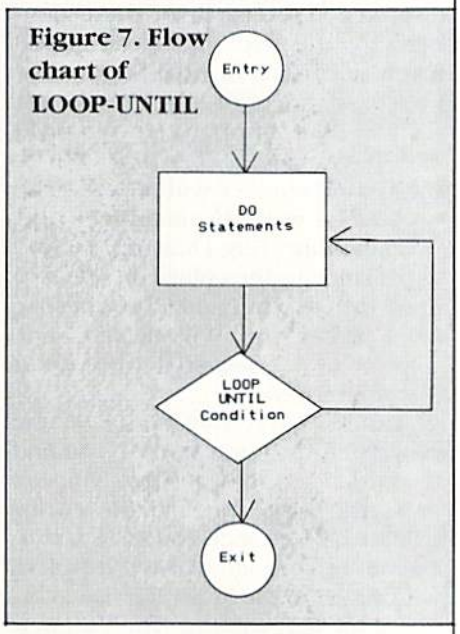

Figure 7. Flow chart of LOOP-UNTIL

With all these options and added words, BASIC 7.0 makes it easy to express any structured loop on the Commodore 128. C

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BY JOHN J. KOTTLER

Commodore 128 Drawing Tablet

Create and save graphics displays with ease, using a joystick and the keyboard.

The 128 computer has the strongest BASIC language that I have ever worked with. A single command can accomplish several tasks. For example, with the CIRCLE command you can draw circles, arcs, boxes, triangles, pentagons, hexagons, octagons, or any other geometric objects. You can also rotate the object any number of degrees and even make the object elliptical. With a few commands, you can make a complex graphics program extremely simple. Try entering the following line:

```
GRAPHIC1,1: FOR L=250TO1STEP
2: CIRCLE1,160,100,L,L,0,360,L,90:
NEXT
```

The screen should clear and a polyhedron should start to draw. For those who aren't sure what a polyhedron is—did you ever make a drawing of boxes that got smaller and rotated around the same center point? When your picture is complete, it appears to be a twisting tunnel. The same picture should appear on your screen. The amazing thing is that this program required only one line, whereas this same program written for other computers usually requires at least ten lines full of sines, cosines, and pi's. This example clearly shows the power of the 128.

The Tablet

The Commodore 128 Drawing Tablet is a graphics program that allows you to use all of the 128's fantastic graphics capabilities with a joystick and inputs from the keyboard. To use this program, first type it in and save it, and then plug a joystick into port two. Once the program has been run, a cross-hair will appear in the center of the screen and the program will be in the Drawing Mode. You can determine the mode the program is in by reading the instructions in the window at the bottom of the screen. In the case of the Drawing Mode, the screen displays the keys to press in order to select colors, brush sizes, and brush speeds. Most of the modes are self-explanatory and the program is quite simple for the user. Table 1 displays all of the keyboard commands and their functions, but if you need to look them up at any time, press the HELP key, and a help menu will be displayed in the window.

In the Drawing Mode, 0 through 3 on the keyboard selects the drawing color, SHIFT 1 through SHIFT 5 will select the brush size, and COMMODORE 1 through 5 will change the brush speed. On the right side of the screen, you will find two numbers displayed in reverse field. These numbers are the size and speed of the brush, according to what keys you've pressed. If you press SHIFT 5, the first number will display a reverse-field five. If you press COMMODORE 5, the second number will be a reverse-field five, as well. The underlined title, "Commodore 128 Drawing Tablet," will change to the color you select to draw with. For example, if you choose color 3, the title will become red, since color 3 is defaulted to red when the program is run.

Another interesting option of the program is the Burst Mode. If you find the cursor too slow at times, you can press the space bar and the cursor will speed up. Once you have selected the Burst Mode, the word BURST will appear in the lower left-hand corner of the text window. This option is also available in the other paint, circle, box, and line modes. To return the normal speed, press the space bar again.

To clear the screen, simply press SHIFT and the CLR/HOME key. However, the CLR/HOME key by itself selects the colors you wish to use. Once you've pressed this key, you next select which color you want to change. The computer will accept a number between one and five where the keys 1 through 3 select colors 1 through 3. The 4 key will select the background, and 5 will select the border color.

After you have entered the color you wish to change, a color bar will appear in the current color. Here you can use either the cursor-up and cursor-down key or the up- and down-arrow keys at the top of the keyboard to step forward and backward through the colors. Once you've found the color you like, press either RETURN or the left-arrow key and the color will be updated to what you have selected. This is also extremely helpful when you want to use more than just three colors, because it will only update the current drawing colors, not the colors that have already been drawn on the screen.

Graphics Commands

The 128 Drawing Tablet also supplies you with all of the Commodore 128's graphics commands, such as the box, circle, line, paint, and text commands. You can select each mode by pressing the first letter of the command mode you wish to use. For example, press the B key for the Box Mode. Once you have entered the mode, you will be greeted by brief instructions, which will ask you to select a horizontal and vertical cursor position. During this time, you can press the ESC key to abort from the mode or the space bar to activate the Burst Mode. After you have moved the cursor to your desired position, press the key for the mode you want, and you will be asked a series of questions. The questions will prompt you to enter specific details about your graphic. If you find the cursor blinking after a prompt, make sure to press the RETURN key after your entry, or press it alone to use the default values.

Disk Commands

After you complete your masterpiece, you will want to save it for future use. To do this, press SHIFT S and you will be asked to enter a file name for your picture. If the file name you entered already exists on disk, the program will print "File Exists" and return to Drawing Mode. When

you are ready to retrieve your picture from a disk, press SHIFT L and enter the appropriate file name.

Sometimes you may forget a file name or what picture files are on a diskette. For these reasons, the Commodore 128 Drawing Tablet supplies you with an option to view the disk directory. By pressing SHIFT D, you can read the directory on the screen and press any key to return to the Drawing Mode. However, you will have to wait approximately five seconds before the directory will be displayed. While reading through the directory, you can use the NO SCROLL key to stop the directory and read it.

A disk that has many pictures on it may require the following disk commands. If you press SHIFT W (for Wedge), a miniature menu will appear in the text window containing four common DOS disk commands. One command will allow you to format a new diskette for your picture gallery, other commands will erase a file or rename it, and the final command will "clean up" your diskette. Each command, except for the "Collect Disk" command, will prompt you for a header, file name, or file names. If you are formatting a disk, enter the header "filename, disk id" and press RETURN. If you wish to erase a file, enter the file name you wish to erase from the diskette. Finally, if you care to rename a file, enter "new filename = old filename" and press RETURN. Remember, there is no need to enter the "N0:", "S0:", or "R0:" prefixes before the file names.

Notes to Programmers

This program should demonstrate some of the new powerful Commodore 128 BASIC commands and graphics commands. If you glance through the program, you will find both new and familiar commands. However, I should mention a few useful points. For instance, examine the joystick routine and how the fire button works. This routine is shared by the other mode routines so that the program can be entered much easier. You may notice many basic WINDOW statements. These are for the text window at the bottom of the screen and the smaller ones that are used for the inputs. If a one-line window is placed where you plan to have an input, you can avoid clearing the screen, or destroying other screen data. You may also notice that INPUT #S statements are used instead of the common INPUT. This alternative will erase the question mark that appears before your entry.

The POKE's and PEEK's found in this program are also quite interesting. You may notice that the program uses a "PEEK(212)" statement often. This is the memory location that holds the current key that was pressed. Try entering the following line and pressing numerous keys:

```
FOR A=1T0 50000:PRINT PEEK
(212):NEXT
```

You should find different values for each key, but try pressing the HELP and ESC keys. You should find the same values that are used in the program. A program can easily test every key on the keyboard through this location except for the Commodore key, the SHIFT key, the CONTROL key, and the RESTORE key. The RUN/STOP key can be tested as long as you disable its stop function by poking the value 234 into location 808.

There are another group of locations that are used in the program between 842 and 851. This is the keyboard-buffer area. Another location that works with the keyboard buffer is location 208, which holds the number of characters in the keyboard buffer. Together, these locations can execute BASIC statements, but in this program, they are cleared to prevent too many characters from entering into it. Without the buffer clears, the program would most likely jump around from mode to mode.

Wrapping it All Up

With the Commodore 128 Drawing Tablet, you can draw rather impressive pictures, but you can also load

Table 1. 128 Drawing Tablet Commands

Key	Function
HELP	Display keys and functions in the bottom text window.
ESC	In drawing mode, exits program. In other modes, aborts to drawing mode.
SPACE	Toggles "Burst" cursor speed.
0-3	Selects drawing color 0-3, 0 being erase.
SHIFT 1-5	Selects brush size.
C= 1-5	Selects cursor/brush speed.
SHIFT/CLR/HOME	Clears drawing screen.
CLR/HOME	Enters Color Selection Mode.
1-5	Selects color to change: 1 - Color 1 2 - Color 2 3 - Color 3 4 - Background 5 - Border
CRSR UP or UP ARROW	Step forward through colors.
CRSR DOWN or DOWN ARROW	Step backward through colors.
RETURN or LEFT ARROW	Enters color into selected color register.
B	Selects Box Mode.
C	Selects Circle Mode.
L	Selects Line Mode.
P	Selects Paint Mode.
T	Selects Text Mode. In this mode, you can use a "checker-board" character (C= +) before text to print the text in reverse writing.
SHIFT S	Save picture.
SHIFT L	Load picture.
SHIFT D	List disk directory.
SHIFT W	Select disk command summary (Wedge).

your masterpieces into your BASIC programs. Use the following commands in your own BASIC programs to do so:

BLOAD "SC/filename",B0,P 7168 This loads the high-resolution screen and color 1 and color 2 data.

POKE 1,116:BLOAD "CL/filename", B15,P 55296:POKE 1,115 This loads color 3 data.

BLOAD "BC/filename",B15,P 53280 This loads the background and border colors.

The Commodore 128 is clearly one of the most powerful home computers ever developed. It should be interesting to see the quality programs that will be created for it in the future. But for now, enjoy experimenting with this incredible computer and the Commodore 128 Drawing Tablet. C

Before typing this program, read "How to Enter Programs." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Commodore 128 Drawing Tablet

```
50 FOR HL=4169 TO 4172:POKE HL,0:NEXT
   :REM CHANGE HELP KEY TO JUST H (SO
   THAT 'L' OR 'P' WON'T GET STUCK IN
   THE KEYBOARD BUFFER)
60 C1=7:PRINT"[CLEAR]":COLOR 0,2
   :COLOR 4,2:GRAPHIC 4,1
   :PRINT"[UNLOCK,LOWER CASE,BLACK]";
   :RG=1:C=1:GOSUB 1800
   :WINDOW 0,22,39,24,1:BK=2:BO=2
   :DIM CM(1000)
70 X=80:Y=75:SP=1:BS=0:C2=6:C3=3:D$=""
80 DRAW 1,80,75 TO 88,75
   :DRAW 1,84,71 TO 84,79
   :BOX 0,83,74,85,76,0,1:LOCATE 80,71
   :SSHAPE D$,+11,+21:SPRSAV D$,1
   :SPRITE 1,1,1,0,0,0,1:SCNCLR:X=160
   :Y=100:WINDOW 0,22,39,24,0
90 IF BK=1 THEN COLOR 5,16:SPRCOLOR 16
   :ELSE COLOR 5,BK-1:SPRCOLOR BK-1
100 PRINT"[SPACE10,RVS]0[RVOFF]-[RVS]
    3[RVOFF] [SHFT S]ELECTS [SHFT C]
    OLORS":PRINT"[SPACE2,RVS] [SHFT S]
    HIFT [RVOFF] [RVS]1[RVOFF]-[RVS]5
    [RVOFF] [SHFT S]ELECTS [SHFT B]
    RUSH [SHFT S]IZE":PRINT"[SPACE7,
    RVS,SHFT C]=[RVOFF] [RVS]1[RVOFF]
    -[RVS]5[RVOFF] [SHFT S]ELECTS
    [SHFT B]RUSH [SHFT S]PEED[HOME]"
110 COLOR 0,BK:COLOR 4,BO:DO
120 REM ********************
121 REM *** DRAW ROUTINE ***
122 REM ********************
130 MOVSPR 1,X+12,Y+16:JY=JOY(2)
    :JD=JY-128:LOCATE X/2-2,Y-30
140 COLOR 1,C1:COLOR 2,C2:COLOR 3,C3
150 IF PEEK(212)=60 AND SP<>10 THEN
    NS=SP:SP=10:ELSE IF PEEK(212)=60
    AND SP=10 THEN SP=NS
160 REM LINE 120 CHECKS SPACE BAR TO
    TOGGLE 'BURST' MODE,
     LINE 130 PRINTS IF IT'S ON OR
    NOT.
170 IF SP=10 THEN PRINT"[HOME,DOWN2]";
    TAB(2);"[RVS,SHFT B,SHFT U,SHFT R,
    SHFT S,SHFT T,RVOFF,HOME]"
    :ELSE PRINT"[HOME,DOWN2]";TAB(2);
    "[RVOFF,SPACE5,HOME]"
180 FOR KB=843 TO 851:POKE KB,0:NEXT
    :POKE 208,10:POKE 208,1
190 IF JY=1 OR JD=1 THEN Y=Y-SP
200 IF JY=2 OR JD=2 THEN Y=Y-SP
    :X=X+SP*2:IF DD=2 THEN X=X-8
210 IF JY=3 OR JD=3 THEN X=X+SP*2
    :IF DD=2 THEN X=X-8
220 IF JY=4 OR JD=4 THEN Y=Y+SP
    :X=X+SP*2:IF DD=2 THEN X=X-8
230 IF JY=5 OR JD=5 THEN Y=Y+SP
240 IF JY=6 OR JD=6 THEN Y=Y+SP
    :X=X-SP*2
250 IF JY=7 OR JD=7 THEN X=X-SP*2
    :IF DD=2 THEN X=X+8
260 IF JY=8 OR JD=8 THEN Y=Y-SP
    :X=X-SP*2:IF DD=2 THEN X=X+8
270 IF X<4 THEN X=4
280 IF X>322 THEN X=322
290 IF Y>166 THEN Y=166
300 IF Y<30 THEN Y=30
310 IF DD=1 THEN 870:ELSE IF DD=2
    THEN 940:ELSE IF DD=3 THEN 1050
    :ELSE IF DD=4 THEN 1090
    :ELSE IF DD=5 THEN 1130
    :ELSE IF DD=6 THEN 1170
    :ELSE IF DD=7 THEN 1370
    :ELSE IF DD=8 THEN 1410
320 IF DD=9 THEN 1450
330 REM LINES 260 AND 270 TEST TO SEE
    IF PROGRAM SHOULD CONTINUE AT A
    DIFFERENT ROUTINE SUCH AS PAINT.
    (TO SHARE SAME JOYSTICK ROUTINE)
340 IF SP=10 THEN P3=NS:ELSE P3=SP
350 PRINT"[HOME,DOWN,RVS]";TAB(35);
    BS+1;"[LEFT] ":PRINT"[HOME,DOWN2,
    RVS]";TAB(35);P3;"[LEFT] [HOME]"
360 IF BS>=2 THEN FL=1:ELSE FL=0
370 IF JOY(2)>=128 THEN BOX C,X/2-2,
    Y-30,(X/2-2)+BS,Y-30+BS,0,FL
380 FOR KB=843 TO 851:POKE KB,0:NEXT
    :POKE 208,10:POKE 208,1
390 K$="":GET K$:IF K$=""OR K$=" "
    THEN LOOP:ELSE IF K$>="0"AND
    K$<="3"THEN C=VAL(K$):GOSUB 1800
400 SOUND 1,16384,15
410 IF PEEK(212)=64 THEN 1570
420 IF K$>="!"AND K$<="%"THEN
    BS=ASC(K$)-33
430 IF K$="[ORANGE]"THEN SP=1
    :ELSE IF K$="[BROWN]" THEN SP=2
    :ELSE IF K$="[L. RED]"THEN SP=3
    :ELSE IF K$="[GRAY1]"THEN SP=4
    :ELSE IF K$="[GRAY2]"THEN SP=5
440 IF K$="[SHFT D]"THEN 1770
450 IF PEEK(212)=72 THEN COLOR 5,C3
    :PRINT"[CLEAR] [SHFT Q,SHFT U,
    SHFT I,SHFT T] THIS PROGRAM,
     ARE YOU SURE? ([SHFT Y]/[SHFT N]
    )":GOTO 1850
```

```
460 IF K$="[SHFT S]"OR K$="[SHFT L]
    "THEN PRINT"[CLEAR,SHFT E]NTER
    [SHFT F]ILENAME:";:WINDOW 15,22,
    32,22,1:OPEN 9,0,0:INPUT#9,FL$
    :CLOSE 9:WINDOW 0,22,39,24,1:FAST
    :GOTO 740
470 IF K$="[CLEAR]"THEN SCNCLR:X=160
    :Y=100:GOTO 90
480 IF K$="[HOME]"THEN 570
490 IF K$="[SHFT W]"THEN 1260
500 IF K$="P"THEN 860
510 IF K$="T"THEN 930
520 IF K$="L"THEN 1040
530 IF K$="B"THEN 1120
540 IF K$="C"THEN 1360
550 LOOP
560 REM ****************************
561 REM *** SELECT COLOR ROUTINE ***
562 REM ****************************
570 COLOR 5,C1:PRINT"[CLEAR] [RVS]1
    [RVOFF] - [SHFT C]OLOR 1[SPACE2]";
    :COLOR 5,C2:PRINT"[RVS]2[RVOFF]
     - [SHFT C]OLOR 2[SPACE2]";
    :COLOR 5,C3:PRINT"[RVS]3[RVOFF]
     - [SHFT C]OLOR 3"
580 IF BK=1 THEN COLOR 5,16
    :ELSE COLOR 5,BK-1
590 PRINT" [RVS]4[RVOFF] - [SHFT B]
    ACKGROUND [SHFT C]OLOR[SPACE2,RVS]
    5[RVOFF] - [SHFT B]ORDER [SHFT C]
    OLOR[HOME]"
600 GET KEY K$:IF K$="[HOME]"THEN 600
610 IF K$>="1"AND K$<="5"THEN GOSUB
    630:PRINT"[CLEAR]":IF BK=1 THEN
    COLOR 5,16:GOTO 1800
    :ELSE COLOR 5,BK-1:GOTO 1800
620 GOTO 600
630 PRINT"[CLEAR,SPACE11,SHFT S]
    ELECT NEW COLOR:"
640 IF K$="1"THEN CC=C1
    :ELSE IF K$="2"THEN CC=C2
    :ELSE IF K$="3"THEN CC=C3
    :ELSE IF K$="4"THEN CC=BK
    :ELSE IF K$="5"THEN CC=BO
650 COLOR 5,CC:PRINT"[HOME,DOWN,
    SPACE11,RVS,SPACE17]"
660 IF PEEK(212)=83 OR (PEEK(212)=7
    AND PEEK(211)=1)THEN CC=CC+1
    :GOTO 690
670 IF PEEK(212)=84 OR PEEK(212)=7
    THEN CC=CC-1
680 IF PEEK(212)=85 OR PEEK(212)=1
    THEN 710
690 IF CC>16 THEN CC=1:ELSE IF CC<1
    THEN CC=16
700 GOTO 650
710 IF K$="1"THEN C1=CC
    :ELSE IF K$="2"THEN C2=CC
    :ELSE IF K$="3"THEN C3=CC
    :ELSE IF K$="4"THEN BK=CC
    :ELSE IF K$="5"THEN BO=CC
720 PRINT"[CLEAR]":RETURN
730 REM ***************************
731 REM *** SAVE & LOAD ROUTINE ***
732 REM ***************************
740 IF FL$=""THEN 830
750 POKE 1,116
760 IF K$="[SHFT S]"THEN OPEN 2,8,2,
    "$":CLOSE 2:ELSE IF K$="[SHFT L]
    "THEN OPEN 2,8,2,"SC/"+FL$:CLOSE 2
    :GOTO 780
770 IF K$="[SHFT S]"THEN OPEN 2,8,2,
    "SC/"+FL$:CLOSE 2:IF DS=0 THEN
    1920:ELSE IF DS=62 THEN 790
780 IF DS<>0 THEN 840
790 IF K$="[SHFT S]"THEN SV$="SC/"+FL$
    :BSAVE (SV$),B0,P7168 TO P16383
    :SV$="CL/"+FL$:BSAVE (SV$),B15,
    P55296 TO P56295:SV$="BC/"+FL$
    :BSAVE(SV$),B15,P53280 TO P53282
800 REM LINE 640 SAVES SCREEN AND
    COLORS
810 IF K$="[SHFT L]"THEN LD$="SC/"+FL$
    :BLOAD (LD$),B0,P7168
    :LD$="CL/"+FL$:BLOAD (LD$),B15,
    P55296:LD$="BC/"+FL$
    :BLOAD (LD$),B15,P53280
820 REM LINE 660 LOADS SCREEN AND
    COLORS
830 PRINT"[CLEAR]":SLOW:POKE 1,115
    :GOTO 90
840 SLOW:PRINT"[CLEAR]":COLOR 5,C3
    :GOSUB 1830:GET KEY QO$
    :GRAPHIC 4,0:GOTO 1800
850 REM ********************
851 REM *** PAINT ROUTINE ***
852 REM ********************
860 PRINT"[CLEAR,SHFT T]
    O PAINT AN AREA, MOVE THE CURSOR
    INSIDEOF THE FIGURE AND PRESS THE
    BUTTON.":DD=1:SS=SP:SP=3
870 IF JOY(2)=128 THEN 890
    :ELSE IF PEEK(212)=72 THEN 910
880 GOTO 130
890 PRINT"[CLEAR,SHFT F]
    ILL WITH COLOR NUMBER:";
    :WINDOW 23,22,24,22,1:OPEN 9,0,0
    :INPUT#9,C9$:CLOSE 9
    :WINDOW 0,22,39,24,1
    :IF C9$>"3"OR C9$<"1"THEN 890
900 PAINT VAL(C9$),X/2-2,Y-30,1
910 SP=SS:DD=0:PRINT"[CLEAR]":GOTO 90
920 REM ********************
921 REM *** TEXT ROUTINE ***
922 REM ********************
930 PRINT"[CLEAR,SHFT T]O ADD TEXT,
     MOVE CURSOR TO DESIRED AREAAND
    PRESS THE BUTTON.":DD=2:SS=SP:SP=8
    :X=5:Y=30
940 IF JOY(2)=128 THEN 960
    :ELSE IF PEEK(212)=72 THEN 910
950 GOTO 130
960 PRINT"[CLEAR,SHFT M]ESSAGE:";
    :WINDOW 8,22,28,22,1:OPEN 9,0,0
    :INPUT#9,MS$:CLOSE 9
970 WINDOW 0,23,23,23,1
```

```
    :PRINT"[RVOFF,SPACE2,SHFT C]OLOR
    :";:WINDOW 8,23,9,23,1:OPEN 9,0,0
    :INPUT#9,C8$:CLOSE 9
    :WINDOW 0,22,39,24,0
980 IF C8$>"3"OR C8$<"0"THEN 970
990 IF DD=4 OR DD=6 OR DD=9 THEN
    RETURN
1000 RV=0:IF LEFT$(MS$,1)="[CMDR +]
     "THEN MS$=RIGHT$(MS$,LEN(MS$)-1)
     :RV=1
1010 CHAR VAL(C8$),INT(X/8)+1-1,
     INT(Y/8)-3,MS$,RV
1020 X=X-1:GOTO 910
1030 REM ********************
1031 REM *** LINE ROUTINE ***
1032 REM ********************
1040 PRINT"[CLEAR,SHFT T]O DRAW LINES,
      MOVE CURSOR TO A
     STARTINGPOSITION AND PRESS THE
     BUTTON.":DD=3:SS=SP:SP=1
1050 IF JOY(2)=128 THEN 1070
     :ELSE IF PEEK(212)=72 THEN 910
1060 GOTO 130
1070 XX=X:YY=Y:PRINT"[CLEAR] [SHFT N]
     OW SELECT A POINT TO DRAW THE
     LINE TO.":DD=4:CE=RDOT(2)
     :IF CE=0 THEN CE=2
1080 DRAW CE-1,XX/2-2,YY-30:SLEEP 1
1090 IF JOY(2)=128 THEN 1100:ELSE 130
1100 PRINT"[CLEAR]":GOSUB 970
     :DRAW VAL(C8$),XX/2-2,
     YY-30 TO X/2-2,Y-30:GOTO 910
1110 REM *******************
1111 REM *** BOX ROUTINE ***
1112 REM *******************
1120 PRINT"[CLEAR,SHFT T]O DRAW A BOX,
      MOVE CURSOR TO TOP-LEFT[SPACE2]
     POSITION OF THE BOX AND PRESS
     THE BUTTON":DD=5:SS=SP:SP=1
1130 IF JOY(2)=128 THEN 1150
     :ELSE IF PEEK(212)=72 THEN 910
1140 GOTO 130
1150 XX=X:YY=Y:PRINT"[CLEAR,SHFT N]
     OW SELECT THE BOTTOM-RIGHT
     POSITION OF THE BOX.":DD=6
     :CE=RDOT(2):IF CE=0 THEN DRAW 3,
     XX/2-2,YY-30:SLEEP 1:GOTO 1170
1160 DRAW CE-1,XX/2-2,YY-30:SLEEP 1
1170 IF JOY(2)=128 THEN 1180:ELSE 130
1180 DRAW CE,XX/2-2,YY-30
1190 RT=0:PRINT"[CLEAR]":GOSUB 970
     :PRINT"[CLEAR,SHFT R]
     OTATE THE BOX? ([SHFT Y]/[SHFT N]
     )":GET KEY B$:IF B$="Y"THEN
     GOSUB 1220
1200 FB=0:PRINT"[CLEAR,SHFT F]
     ILL THE BOX? ([SHFT Y]/[SHFT N])"
     :GET KEY F$:IF F$="Y"THEN FB=1
     :ELSE FB=0
1210 BOX VAL(C8$),XX/2-2,YY-30,X/2-2,
     Y-30,RT,FB:GOTO 910
1220 PRINT"[CLEAR,SHFT D]EGREES:"
     :WINDOW 8,22,11,22,1
1230 OPEN 9,0,0:INPUT#9,RT$:CLOSE 9
     :RT=VAL(RT$):IF RT>360 OR RT<0
     THEN PRINT"[CLEAR]":GOTO 1230
1240 PRINT"[HOME2]":WINDOW 0,22,39,24,
     1:PRINT"[CLEAR]":SLEEP 1:RETURN
1250 REM ***************************
1251 REM *** DOS COMMAND ROUTINE ***
1252 REM ***************************
1260 PRINT"[CLEAR,SPACE7,RVS,SHFT C,
     RVOFF]OLLECT DISK[SPACE2,RVS,
     SHFT F,RVOFF]ORMAT DISK"
     :PRINT"[SPACE7,RVS,SHFT R,RVOFF]
     ENAME FILE[SPACE3,RVS,SHFT S,
     RVOFF]CRATCH FILE"
1270 GET KEY K$:IF K$<>"C"AND
     K$<>"F"AND K$<>"R"AND K$<>"S"AND
     PEEK(212)<>72 THEN 1270
1280 IF PEEK(212)=72 THEN 1340
1290 IF K$<>"C"THEN PRINT"[CLEAR,
     SHFT N]AME:";:WINDOW 5,22,38,22,1
     :OPEN 9,0,0:INPUT#9,NM$:CLOSE 9
     :PRINT:WINDOW 0,22,39,24,1
1300 COLOR 5,C3:PRINT "[SPACE10,
     SHFT A]RE YOU SURE? ([SHFT Y]/
     [SHFT N])[HOME]"
1310 GET KEY C$:IF C$="Y"THEN 1320
     :ELSE 1340
1320 IF K$="C"THEN MD$="V0"
     :ELSE IF K$="F"THEN MD$="N0:"
     :ELSE IF K$="R"THEN MD$="R0:"
     :ELSE IF K$="S"THEN MD$="S0:"
1330 FAST:CM$=MD$+NM$:OPEN 15,8,15,CM$
     :CLOSE 15:SLOW:IF DS<>0 THEN 840
1340 PRINT"[CLEAR]":GOTO 90
1350 REM **********************
1351 REM *** CIRCLE ROUTINE ***
1352 REM **********************
1360 PRINT"[CLEAR,SHFT T]
     O DRAW A CIRCLE, MOVE THE CURSOR
     TO THECENTER OF THE CIRCLE AND
     PRESS BUTTON.":DD=7:SS=SP:SP=1
1370 IF JOY(2)=128 THEN 1390
     :ELSE IF PEEK(212)=72 THEN 910
1380 GOTO 130
1390 XX=X:YY=Y:PRINT"[CLEAR] [SHFT N]
     OW SELECT THE [SHFT Y]-[SHFT R]
     ADIUS OF THE CIRCLE.":DD=8
     :CE=RDOT(2):IF CE=0 THEN DRAW 3,
     XX/2-2,YY-30:SLEEP 1:GOTO 1410
1400 DRAW CE-1,XX/2-2,YY-30:SLEEP 1
1410 IF JOY(2)=128 THEN 1420:ELSE 130
1420 LOCATE XX/2-2,Y-30:CF=RDOT(2)
     :IF CF=0 THEN DRAW 3,XX/2-2,Y-30
     :GOTO 1440
1430 DRAW CF-1,XX/2-2,Y-30
1440 Y1=Y:PRINT"[SPACE3,SHFT S]
     ELECT THE [SHFT X]-[SHFT R]
     ADIUS OF THE CIRCLE.[SPACE3]"
     :DD=9:SLEEP 1
1450 IF JOY(2)=128 THEN 1460:ELSE 130
1460 DRAW CE,XX/2-2,YY-30
     :LOCATE X/2-2,YY-30:CG=RDOT(2)
     :IF CG=0 THEN DRAW 3,X/2-2,YY-30
```

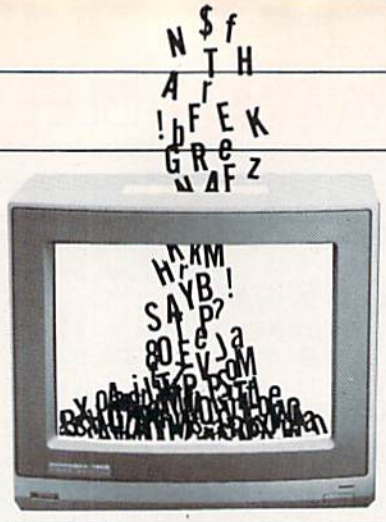
```
     :GOTO 1480
1470 DRAW CG-1,X/2-2,YY-30
1480 X1=X:PRINT"[CLEAR,SHFT S]
     TARTING ARC ANGLE:0"
     :WINDOW 19,22,22,22,0:OPEN 9,0,0
     :INPUT#9,SA$:CLOSE 9:SA=VAL(SA$)
     :IF SA<0 OR SA>360 THEN 1470
1490 WINDOW 0,22,39,24,1
     :PRINT"[SHFT E]NDING ARC ANGLE
     :360":WINDOW 17,22,20,22,0
     :OPEN 9,0,0:INPUT#9,EA$:CLOSE 9
     :EA=VAL(EA$):IF EA<0 OR EA>360
     THEN 1490
1500 RT=0:WINDOW 0,22,39,24,1
     :PRINT"[CLEAR,SHFT R]
     OTATE THE CIRCLE? ([SHFT Y]/
     [SHFT N])":GET KEY C$
     :IF C$="Y"THEN GOSUB 1220
1510 WINDOW 0,22,39,24,1
     :PRINT"[CLEAR,SHFT S]
     EGMENT DEGREES:2":WINDOW 16,22,
     19,22,0:OPEN 9,0,0:INPUT#9,SD$
     :CLOSE 9:SD=VAL(SD$)
     :IF SD<0 OR SD>255 THEN 1510
1520 GOSUB 970:DRAW CG,X1/2-2,YY-30
1530 DRAW CF,XX/2-2,Y1-30
1540 XX=XX/2-2:YY=YY-30:X1=(X1/2-XX)-2
     :Y1=(Y1-YY)-30
1550 CIRCLE VAL(C8$),XX,YY,ABS(X1),
     ABS(Y1),SA,EA,RT,SD:GOTO 910
1560 REM ********************
1561 REM *** HELP ROUTINE ***
1562 REM ********************
1570 PRINT"[CLEAR]";:RESTORE
1580 FOR H9=1 TO 3:READ H$
     :IF H$="[BACK ARROW]"THEN 90
     :ELSE PRINT H$:NEXT
1590 IF PEEK(212)=64 OR PEEK(212)=88
     THEN 1590:ELSE PRINT"[CLEAR]";
     :GOTO 1580
1600 DATA "[RVS,SHFT B,RVOFF]
     OX - DRAW BOXES"
1610 DATA "[RVS,SHFT C,RVOFF]
     IRCLE - DRAW CIRCLES AND OTHER
     OBJECTS"
1620 DATA "[RVS,SHFT L,RVOFF]
     INE - DRAW LINES[HOME]"
1630 DATA "[RVS,SHFT P,RVOFF]
     AINT - FILL AN AREA"
1640 DATA "[RVS,SHFT T,RVOFF]
     EXT - PRINT TEXT ON SCREEN[HOME]"
1650 DATA "[HOME]"
1660 DATA "[RVS] [SHFT S]HIFT [RVOFF]
      [RVS,SHFT L,RVOFF]
     OAD - LOAD A PICTURE"
1670 DATA "[RVS] [SHFT S]HIFT [RVOFF]
      [RVS,SHFT S,RVOFF]
     AVE - SAVE A PICTURE"
1680 DATA "[HOME]"
1690 DATA "[RVS] [SHFT S]HIFT [RVOFF]
      [RVS,SHFT D,RVOFF]
     IRECTORY - LIST FILES ON DISK"
1700 DATA "[RVS] [SHFT S]HIFT [RVOFF]
      [RVS,SHFT W,RVOFF]EDGE -
     [SHFT D,SHFT O,SHFT S] COMMANDS"
1710 DATA "[HOME]"
1720 DATA "[RVS] [SHFT S]HIFT [RVOFF]
      [RVS,SHFT C]LR/[SHFT H]OME
     [RVOFF] - CLEAR SCREEN"
1730 DATA "[SPACE8,RVS,SHFT C]LR/
     [SHFT H]OME[RVOFF] - SET COLORS"
1740 DATA "[RVS,SHFT E,SHFT S,SHFT C,
     RVOFF] - ESCAPE MODE[SPACE2,RVS,
     SHFT S,SHFT P,SHFT A,SHFT C,
     SHFT E,RVOFF] - TOGGLE [SHFT B,
     SHFT U,SHFT R,SHFT S,SHFT T,HOME]
     "
1750 DATA "[BACK ARROW]"
1760 REM ****************************
     **
1761 REM *** DISK DIRECTORY ROUTINE
     ***
1762 REM ****************************
     **
1770 FAST:POKE 1,116:FOR LO=55296 TO
     56096:CM(LO-55296)=PEEK(LO):NEXT
     :POKE 1,115:SLOW
1775 SOUND 1,0,0:GRAPHIC 0,0
     :PRINT"[HOME2,CLEAR,TAB2,SHFT D]
     IRECTORY":PRINT"[TAB2,CMDR T9]"
     :SPRITE 1,0:WINDOW 7,3,33,24,1
     :DIRECTORY:IF DS<>0 THEN GOSUB
     1830
1780 FOR KB=842 TO 851:POKE KB,0:NEXT
     :COLOR 5,C3:PRINT:PRINT"[TAB,
     SPACE7,SHFT P]RESS A KEY"
1790 K$="":GET KEY K$:SPRITE 1,1:FAST
     :POKE 1,116:FOR LO=55296 TO 56096
     :POKE LO,CM(LO-55296):NEXT
     :POKE 1,115:SLOW:GRAPHIC 4,0
1800 PRINT"[HOME2,DOWN20]";:GOSUB 1880
     :PRINT"2[LOWER CASE,SPACE6,
     SHFT C]OMMODORE 128 [SHFT D]
     RAWING [SHFT T]ABLET"
     :PRINT"[CMDR T40]"
1810 IF RG=1 THEN RG=0:RETURN
1820 WINDOW 0,22,39,24,1:GOTO 90
1830 COLOR 5,C3:PRINT"[BELL,RVS]
     * * * [SHFT D]ISK [SHFT E]
     RROR * * *":CLOSE 15
1840 PRINT DS$:POKE 208,1:RETURN
1850 GET KEY Q$:IF Q$="Y"THEN GRAPHIC
     0,0:PRINT"[HOME2,CLEAR,L. GREEN]
     ";CHR$(142);:SPRITE 1,0
     :COLOR 0,12:COLOR 4,14:END
1860 IF Q$="N"THEN PRINT"[CLEAR]"
     :GOTO 90
1870 GOTO 1850
1880 IF C=1 THEN COLOR 5,C1
1890 IF C=2 THEN COLOR 5,C2
1900 IF C=3 THEN COLOR 5,C3
1910 RETURN
1920 SLOW:PRINT"[CLEAR,BELL,TAB2,
     SHFT F]ILE [SHFT E]XISTS."
     :GET KEY NO$:GRAPHIC 4,0
     :GOTO 1800
```

END

BY MARK JORDAN

ArcheType A Word Processor

for the Commodore 128



ArcheType is a lively word processing program for your Commodore 128 which you can tailor to your own needs. It is also an excellent medium for demonstrating the gold mine of features buried inside your 128's off-white case. Best of all, it's 80 (count 'em) columns wide.

I wrote ArcheType without any memory maps or reference material other than the system guide that was shipped with the computer. If you're thinking that a word processor written in BASIC just couldn't be fast enough to do any hardcore writing, you're in for a pleasant surprise.

ArcheType will come to you in two installments. The starter set in this issue includes all the features necessary for your typing needs, including fast and convenient cursor manipulation, inserts and deletes, wordwrap, and screen previewing of exact copy.

The second installment will add the enhancements you've come to expect in a quality word processor: block deletes and moves, search and replace, headers, footers, special printer codes, help screens and more.

How to Use ArcheType

The first order of business is to explain how to use ArcheType. Many features, such as the use of the cursors, the home key, the insert and delete key, and the tab, operate pretty much as you would expect them to.

Other features aren't so obvious. For example, by pressing the control key with any of the four cursor keys, you can make special cursor moves. Control-right sends the cursor to the end of the line, control-left to the beginning of the line, control-down takes you to the bottom of the screen, and control-up to the top of the screen. Pressing CLR/HOME also puts the cursor at the top left corner of the screen. SHIFT-CLR/HOME sends you to the top of the document, and pressing control-B gets you to the end of your text.

You have four options for moving from screen to screen. Control-E will move your cursor to the next screen. Control-W calls forth the previous screen. Control-G lets you choose what screen you want to go to. Finally, you

Quick Reference Command Chart for ArcheType
(*Indicates features reserved for Installment 2)

Cursor Keys	— move cursor directionally, one character
Clr/Home	— move cursor to top of screen
Shift Clr/Home	— move cursor to top of document
Inst/Del	— delete character to left of cursor
Shift Inst/Del	— insert space
English pound	— play tune
Tab	— move 5 spaces to the right
Shift Tab	— move 5 spaces to the left
Escape	— allows output of chr$(x)
*Shift-Return	— re-pastes one-line deletes
*Help	— get help screen

CONTROL +:

Cursor Keys	— move cursor to directional extremes
B	— move cursor to end of text
W	— move cursor to previous screen
E	— move cursor to next screen
P	— begin printing subroutine
D	— delete all characters to right of cursor
F	— set position marker
G	— goto screen number (of "f" to former position)
C	— center line
English Pound	— clear all text

FUNCTION KEYS:

1	— Insert mode
2	— Insert 5 lines
3	— Reformat paragraph from cursor
4	— Reformat entire document
5	— Load program
6	— Save program
*7	— Range block, delete and copy
*8	— Paste block

Up-arrow + control character. Follow with:

* lm(xx)	— left margin
* rm(xx)	— right margin
* tm(xx)	— top margin
* bm(xx)	— bottom margin
* mr(xx)	— margin release
* in(xx)	— indent
* ss(xx)	— spacing
* jy/jn	— justify on/off
* nx	— force page
* h.(le/re/ce)	— header aligned left, right, or centered
* f.(le/re/ce)	— footer " " " '
* pn	— print page number (use with header or footers)

Commodore key +: *S = Search *R = Replace D = Directory

can save your place on the screen at any time by pressing control-F (F for former position). Then, when you're ready to return, use the control-G command, but instead of answering with a screen number, type "F."

You have a second alternative for deleting besides the delete key (next installment more will be added). Control-D will delete everything on the line to the right of the cursor. If your cursor is on the first column in a screen line, control-D will completely eliminate that line from the document. Worry not if you realize too late that you wanted that line. All one-line deletes are stored in a buffer which can be retrieved by typing SHIFT-RETURN.

To delete the entire document, press control and the British pound sign. This dangerous command won't perform until you follow up with "Y" to confirm that you're sure you want to clear the memory.

The tab key moves your cursor forward five spaces. By combining tab with SHIFT, the cursor will go five spaces rearward. Tap it when you want it to tab properly. Press and hold it when you want to move quickly through the document.

Function keys 1 through 6 have been defined in this starter set of ArcheType. (Keys 7 and 8 will be added in the enhanced version.) Function key 1 toggles insert mode on/off. When it's off, pressing turns it on and causes anything to the right of the cursor to be hacked off the line your cursor is on and placed on the line below. When you type through to the next line, space will automatically open up for you. The title bar will always tell you if insert mode is on or off. When it's off, you will overtype what's on the screen.

Type and save this 80-column word processor, with all the features you've come to expect—including cursor manipulations, inserts and deletes, wordwrap, and screen previewing.

Function key 2 inserts five blank lines and shuts off the insert mode. This is an easier and faster method for inserting large amounts of text than using F1.

Once you've finished inserting (or deleting, for that matter), you may have several lines that are no longer formatted properly. Press F3 and they will reformat. If you decide you'd like to reformat the entire document, you may do so by pressing function key 4.

Installment two will provide a feature that lets you reset your margins any way you choose, but in this starter version, you'll have to do this manually. The default values are found in line 45. You may change them to whatever you like. One of the nicest features of the 128 is that it allows you to break a program (by pressing RUN/STOP), edit it, check the variables, then either CONT or GOTO any line in the program, with the variables intact. Thus, you can change the defaults any time, even after the program is fired up. Just type "GOTO70" to get things going again. In fact, if you preserve your cursor with a control-F before breaking, you can get back to exactly where you left off when you re-enter the program with the control-G command.

Function keys 5 and 6 pertain to disk files. F5 allows you to load any file. Your file will load from wherever the cursor is, so if you want to append, put the cursor at the end of the existing file. F6 lets you save your work.

Of course, it's hard to load a file if you can't remember its name. To get the directory, press the Commodore key and D simultaneously.

When you're finished editing your document, press control-P to print it. Here you'll first be given the option of viewing your document on the screen to see exactly how it will print.

Finally, this installment allows you to send special codes to your printer. Just press the escape key (a checkerboard character will print) then follow with the ASCII value of the character you want sent to the printer. For example, press ESC 27 to send CHR$(27). If you follow it with an upper-case E, many printers will then go into emphasize-print mode. These characters will be visible in your document, but not when you print it. More on this and other printing goodies in article two.

The second installment of ArcheType will appear in the June/July issue of Commodore Power/Play. C

Before typing these programs, read "How to Enter Programs." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

ArcheType

```
10 FAST:DIM A$(999),B$(999),K(255),
   ST$(60)
15 FOR T=32 TO 127:K(T)=1:K(T+128)=1
   :NEXT:FOR T=2 TO 35:READ A:K(A)=T
   :NEXT:FOR T=1 TO 8:KEY T,
   CHR$(T+132):NEXT:POKE 4105,1
   :POKE 4123,143
20 K(178)=28
25 DATA 145,17,157,29,9,24,147,133,19,
   20,137,138,134,13,2,23,5,136,148,4,
   16,135,92,28,139,140,174,3,27,6,
   172,7,143,141
30 L$=CHR$(13):E$=CHR$(27):O$=E$+"O"
   :CU$=O$+CHR$(15)+"[RVS,YELLOW]
   [RVOFF,LEFT,GRAY3]"+CHR$(143)
   :Y$=O$+CHR$(15)+"[RVS,YELLOW]"
   :G$=O$+"[RVOFF,GRAY3,LEFT]"
   :QU$=CHR$(34):CM$="[CMDR *]":DD=1
35 CR$="[SHFT @]":R$=E$+"J":J$=O$+R$
   :K$=E$+"K":IL$=E$+"I":HA$=E$+"Q"
   :W$=E$+"W":V$=E$+"V":Q$=E$+"Q"+L$
   :N$="[RVS,L. BLUE]":CE$=CHR$(123)
   :N1$=E$+"M":N2$=E$+"L":DE$=E$+"D"
40 PL$="V3O4T9U15IEAO5CO4BEBO5DQCEO4#
   GO5WEV12"
45 TM=5:BM=5:LM=10:RM=70:JY$="NO":SS=1
   :LC=RM-LM:U1=0:U2=1:B1=79:B2=24
50 FOR T=1 TO 20:N$=N$+"[SPACE2]"
   :DH$=DH$+"----":NEXT
55 CL$="[HOME2,RVS,L. BLUE] [SHFT A]
   RCHE[SHFT T]YPE[SPACE54]BY [SHFT M]
```

```
   ARK [SHFT J]ORDAN [GRAY3]"
60 PRINT CHR$(14)CL$:WINDOW 0,1,79,24,
   1:PLAY PL$:PRINT CU$;:TRAP 1830
65 REM ------
   KEYBOARD INPUT
70 DO:GET KEY A$:A=ASC(A$):A1$=A$
   :PC=PEEK(212)
75 ON K(A) GOSUB 95,275,255,475,490,
   550,565,370,600,345,200,670,675,
   595,155,390,405,405,775,575,225,
   910,780,1040,455,1060,1340,1380,
   1505,90,430,755,435,1705,245
80 LOOP
85 REM ------
   CHARACTER PRINTING
90 A$=CM$
95 W=0:CP=POS(0):IF CP<LC-1 THEN 115
100 WW$=MID$(A$(C),AA+1)
    :A$(C)=LEFT$(A$(C),AA)
    :PRINT J$TAB(AA)Q$;
105 IF MI=1 AND MO=1 THEN GOSUB 145
    :PRINT IL$;:A$(C+1)=""
110 W=1:A$(C+1)=WW$+A$+MID$(A$(C+1),
    LEN(WW$)+2):PRINT WW$;:AA=POS(0)
    :GOSUB 180
115 PRINT A$CU$;:IF A=32 OR A=160
    THEN AA=POS(0)
120 IF C=D AND POS(0)>LEN(A$(C))THEN
    MO=0:W=1
125 IF W=1 THEN A$(C)=A$(C)+A$:C2$=" "
    :RETURN
130 M$=MID$(A$(C),CP+2)
    :C2$=LEFT$(M$,1):IF C2$=""THEN
    C2$=" "
135 PRINT Y$C2$G$;:A$(C)=LEFT$(A$(C),
    CP)+A$+M$:RETURN
140 REM -------     MOVE LINES UP
145 D=D+DD:FOR T=D TO C+2 STEP-1
    :A$(T)=A$(T-DD):NEXT:RETURN
150 REM ------      CARRIAGE RETURN
155 CP=POS(0):IF MO=1 THEN
    BF$=MID$(A$(C),CP+1)
160 A$(C)=LEFT$(A$(C),CP)+CR$
    :PRINT HA$CR$
165 C2$=LEFT$(A$(C+1),1)
    :IF C2$=""THEN C2$=" "
170 AA=1:PRINT Y$C2$G$;
175 REM ------      UPDATE SCREEN LINE
180 C=C+1:IF C=>D THEN D=C:MO=0
185 IF C>TS+23 THEN TS=C-23
190 RETURN
195 REM ------      DELETE CHARACTERS
200 CP=POS(0):IF C=TS AND CP=0 THEN
    RETURN
205 IF CP=0 THEN PRINT C2$"[UP]"K$CU$;
    :C=C-1:C2$=" ":RETURN
210 A$(C)=LEFT$(A$(C),CP-1)+MID$(A$(C)
    ,CP+1):PRINT A$;
215 RETURN
220 REM -----       DELETE AND HACK
225 CP=POS(0):BF$=MID$(A$(C),CP+1)
    :AA=CP
230 IF CP=0 THEN A$(C)="":GOTO 780
235 C2$=" ":A$(C)=LEFT$(A$(C),CP)
    :PRINT HA$CU$;:RETURN
240 REM -----       REPLACE BUFFER
245 A$(C)=LEFT$(A$(C),POS(0)+1)
    +BF$+MID$(A$(C),CP+2):GOTO 780
250 REM ------      CURSOR DOWN /
    CURSOR UP
255 IF D=C THEN RETURN
260 IF PEEK(211)<>4 THEN UD=-1
    :GOTO 280:ELSE PRINT C2$O$;
    :C=TS+23:IF C>D THEN C=D
265 C2$=LEFT$(A$(C),1):IF C2$=""THEN
    C2$=" "
270 CHAR 0,0,C-TS,"":PRINT Y$C2$G$;
    :RETURN
275 UD=1:IF PEEK(211)=4 THEN 345
280 MO=1:AA=POS(0)
285 CX=POS(0):C=C-UD:IF C<0 THEN C=0
290 IF CX=>LEN(A$(C))THEN
    CX=LEN(A$(C))-1:IF C=D THEN MO=0
295 IF CX<0 THEN CX=0
300 C1$=C2$
305 C2$=MID$(A$(C),CX+1,1)
    :IF C2$=""THEN C2$=" "
310 PRINT C1$O$"[LEFT]"A$J$TAB(CX);
315 IF C>TS+23 THEN PRINT
    J$A$(C)J$TAB(CX);:TS=C-23
320 IF C<TS THEN PRINT
    IL$A$(C)J$TAB(CX);:TS=C
325 PRINT Y$C2$G$;:AA=POS(0)
330 IF PEEK(212)=PC AND C<D THEN 280
335 POKE 208,0:RETURN
340 REM ------      HOME CURSOR
345 PRINT C2$;
350 C=TS:C2$=LEFT$(A$(C),1):MO=1:S=20
    :IN$=N$:GOSUB 650
355 IF IP$="F"THEN C=ZC:CP=ZP:C2$=CZ$
    :CHAR 0,CP-1,C-TS,"":IP$="":ZC=XC
360 PRINT Y$C2$G$;:RETURN
365 REM ------      TOP OF DOCUMENT
370 TS=0
375 BT=TS+23:PRINT N1$"[CLEAR]";
    :IF D<23 THEN BT=D
380 FOR T=TS TO BT:PRINT A$(T):NEXT
    :PRINT N2$;:GOTO 350
385 REM ------      BOTTOM DOCUMENT
390 MO=0:C2$=" ":PRINT"[CLEAR]";
    :TS=D-20:IF TS<0 THEN TS=0
395 FOR T=TS TO D-1:PRINT A$(T):NEXT
    :PRINT A$(D)CU$;:C=D:AA=POS(0)
    :RETURN
400 REM -----       PREVIOUS/NEXT
    SCREEN
405 X=-23:IF A=5 THEN X=23
410 TS=TS+X:IF TS<0 THEN TS=0
415 IF TS>D THEN TS=TS-X
420 GOTO 375
425 REM -----       SAVE/GOTO SCREEN
430 TF=TS:XP=POS(0)+1:XC=C:CX$=C2$
    :RETURN
435 PRINT"[HOME2]",,"[RVS,WHITE,
    SHFT G]OTO SCREEN #[SPACE3,LEFT2,
    GRAY3,RVOFF]";:GOSUB 1475
```

```
    :GOSUB 660:TS=VAL(IP$)*23
    :IF TS>D THEN TS=D-20
440 IF IP$="F"THEN TS=TF:ZC=XC:CZ$=CX$
    :ZP=XP
445 GOTO 375
450 REM -----       CLEAR MEMORY
455 CP=POS(0):S=26:IN$="[RVS] [SHFT A]
    RE YOU ABSOLUTELY SURE?[SPACE2,
    SHFT Y]/[SHFT N] [RVOFF]"
    :GOSUB 650
460 GET KEY A$:IF A$="Y"THEN FOR T=0
    TO D:A$(T)="":NEXT:C=0:D=0:TS=0
    :PRINT"[CLEAR]";:C2$=" ":CP=0
465 IN$=N$:S=20:GOSUB 650
    :CHAR 0,CP,C-TS,"":RETURN
470 REM ------      CURSOR LEFT /
    CURSOR RIGHT
475 IF PEEK(211)<>4 THEN 485
480 C1$=C2$:C2$=LEFT$(A$(C),1)
    :PRINT C1$J$Y$C2$G$;:AA=1:MO=1
    :RETURN
485 DO:LR=-1:IF C=0 AND POS(0)=0 THEN
    RETURN:ELSE 500
490 IF PEEK(211)=4 THEN C1$=C2$
    :C2$=" ":AA=LEN(A$(C))
    :PRINT C1$J$TAB(AA)Y$C2$G$;:RETURN
495 DO:LR=1:IF MO=0 THEN RETURN
500 MO=1:CX=POS(0)+1+TB
505 IF CX+LR>LEN(A$(C))+1 THEN BEGIN
    :IF C=D THEN MO=0:GOTO 525
510 BEND:C=C+1:CX=0:A$=CHR$(13)+" "
    :LR=1:IF C>TS+23 THEN TS=C-23
    :A$=CHR$(13)+A$(C)+J$+" "
515 IF CX+LR=<0 THEN BEGIN
    :PRINT C2$J$;:C=ABS(C-1)
    :IF C<TS THEN TS=C:PRINT W$A$(C)
520 BEND:PRINT"[UP]"K$CU$;:C2$=" "
    :GOTO 540
525 C1$=C2$:C2$=MID$(A$(C),CX+LR,1)
    :IF C2$=""THEN C2$=" "
530 PRINT C1$O$A$"[LEFT]"Y$C2$G$;
    :A$=A1$
535 LOOP WHILE PEEK(212)=PC
540 POKE 208,0:AA=CX+LR-1:TB=0
    :AA=ABS(AA):RETURN
545 REM -----       TAB
550 AA=POS(0)+5:IF AA>LEN(A$(C))THEN
    A$(C)=A$(C)+MID$(N$,4,
    AA-LEN(A$(C))):MO=1
555 A$="[RIGHT5]":A1$=A$:TB=4:GOTO 495
560 REM -----       BACK TAB
565 MO=1:A$="[LEFT5]":A1$=A$:TB=-4
    :CP=POS(0):IF CP=0 OR CP>4 THEN
    485:ELSE 480
570 REM ------      INSERT LETTER
575 IF LEN(A$(C))>79 THEN 600
580 CP=POS(0):C3$=MID$(A$(C),CP+1)
    :A$(C)=LEFT$(A$(C),CP)+" "+C3$
585 PRINT C2$"[LEFT]"A$CU$;:C2$=" "
    :RETURN
590 REM -----       INSERT MODE ON
595 DD=5:IF D<6 THEN DD=D
    :ELSE IF C<6 THEN DD=C
600 S=14:AA=POS(0)
605 IF MI=1 THEN MI=0:IN$="[RVS,
    L. BLUE]OFF":GOTO 640:ELSE MI=1
    :IN$="[RVS,L. BLUE] ON"
610 IF AA=0 THEN PRINT"[RIGHT]";
615 IF C>TS+22 THEN TS=C-22
620 WW$=MID$(A$(C),AA+1)
    :A$(C)=LEFT$(A$(C),AA):C2$=" "
625 PRINT"[BELL]"HA$L$IL$WW$;
630 GOSUB 145:IF DD=5 THEN FOR T=1 TO
    4:A$(C+T)="":PRINT IL$;:NEXT
635 A$(C+DD)=WW$:IF DD=5 THEN DD=1
    :GOTO 605
640 GOSUB 655:CHAR 0,AA,C-TS,""
    :PRINT Y$C2$G$;:S=20:RETURN
645 REM -------     WINDOW
650 U1=0:U2=1:B1=79:B2=24
655 PRINT"[HOME2]"SPC(S)IN$
660 WINDOW U1,U2,B1,B2:PRINT"[GRAY3]";
    :RETURN
665 REM ------      DISK FILES
670 IN$="[RVS,BLUE] [SHFT L]OAD
    [SHFT R]OUTINE [RVOFF,GRAY3]"
    :GOTO 680
675 IN$="[RVS,BLUE] [SHFT S]AVE
    [SHFT R]OUTINE [RVOFF,GRAY3]"
680 S=33:GOSUB 655:INPUT"[CLEAR,DOWN2,
    SHFT N]AME OF FILE[SPACE2]
    (PREFIX [RVS,SHFT A].[RVOFF]
     IMPLIED)[SPACE2]";F$
685 IF LEN(F$)>14 THEN F$=LEFT$(F$,14)
690 IF A=137 THEN 715
695 DOPEN#2,"[SHFT A]."+F$,W
    :PRINT#2,D;L$;SS;L$;TM;L$;BM;L$;
    LM;L$;RM;L$
700 FOR T=0 TO D:X$=A$(T)
705 P=INSTR(X$,QU$):IF P>0 THEN
    X$=LEFT$(X$,P-1)+"[POUND]
    "+MID$(X$,P+1):GOTO 705
710 PRINT#2,CHR$(34)+X$:NEXT:GOTO 740
715 DOPEN#2,"[SHFT A]."+F$
    :IF DS>0 THEN DCLOSE
    :IN$=CHR$(15)+"[RVS,RED] [SHFT W,
    SHFT R,SHFT O,SHFT N,SHFT G]
    [SHFT F,SHFT I,SHFT L,SHFT E]
    [SHFT N,SHFT A,SHFT M,SHFT E]
    [RVOFF,GRAY3]":GOSUB 655:PLAY PL$
    :GOTO 755
720 INPUT#2,D:INPUT#2,SS:INPUT#2,TM
    :INPUT#2,BM:INPUT#2,LM:INPUT#2,RM
725 FOR T=C TO C+D:INPUT#2,X$
730 P=INSTR(X$,"[POUND]")
    :IF P>0 THEN X$=LEFT$(X$,
    P-1)+QU$+MID$(X$,P+1):GOTO 730
735 A$(T)=X$:NEXT:LC=RM-LM
    :FOR T=D+1 TO D+67:A$(T)="":NEXT
740 DCLOSE
745 S=20:IN$=N$:GOSUB 655:GOTO 370
750 REM -----       DIRECTORY
755 ZC=C:CZ$=C2$:ZP=POS(0)+1:S=27
    :U1=27:U2=2:IN$="[RVS] [SHFT P]
    RESS ANY KEY TO CONTINUE "
    :PRINT"[CLEAR,HOME2]":GOSUB 655
```

```
760 DIRECTORY"[SHFT A].*":U1=0:U2=1
    :IF A$(C)=""THEN A$(C)=" "
765 GET KEY A$:S=20:IN$=N$:GOSUB 655
    :IP$="F":GOTO 375
770 REM -----      REFORMAT
775 RF=1:C=0:TS=C:PRINT"[CLEAR]";
    :GOTO 785
780 CHAR 0,0,C-TS,"":PRINT E$"@";
785 X$=A$(C):G=C:GG=C:H=D:CC=C
    :B$(C)=A$(C):RR=1
790 IF ASC(X$)=123 THEN GOSUB 1510
795 IF LEN(X$)>LC THEN 815
800 BF=0:IF ASC(X$)=94 THEN PR$=A$(G)
    :GOSUB 1535:BF=1
805 IF RIGHT$(X$,1)="[SHFT @]
    "OR G=D THEN B$(CC)=X$:GOTO 845
810 G=G+1:X$=X$+A$(G):GOTO 790
815 Z$="":LI=LC
820 DO UNTIL Z$=" " OR LI=1
825 Z$=MID$(X$,LI,1):LI=LI-1:LOOP
830 B$(CC)=LEFT$(X$,LI+1)
    :X$=MID$(X$,LI+2)
835 PRINT B$(CC):CC=CC+1
840 GOTO 790
845 IF RF=1 OR BF=1 THEN IF G<D THEN
    CC=CC+1:PRINT X$:X$="":GOTO 790
850 IF CC>G THEN D=D+CC-G
    :FOR T=D TO CC STEP-1
    :A$(T)=A$(T-1):NEXT
855 FOR T=C TO CC:A$(T)=B$(T):NEXT
    :C=CC
860 IF G>C THEN D=(C-G)+D
    :FOR T=C+1 TO D:A$(T)=A$(T+G-C)
    :NEXT:FOR T=D+1 TO H:A$(T)="":NEXT
865 IF C>TS+23 THEN TS=C-23
870 IF RF=1 OR C=D THEN 895
875 K=TS+23:IF K>D THEN K=D
880 IF C<K THEN FOR T=C TO K-1
    :PRINT A$(T):NEXT
885 PRINT A$(K);
890 C=GG:C2$=LEFT$(A$(C),1)
    :CHAR 0,0,C-TS,"":PRINT Y$C2$G$;
    :MO=1:GOTO 900
895 PRINT A$(D)CU$;:C2$=" ":MO=0
900 RR=0:RF=0:AA=POS(0):POKE 208,0
    :RETURN
905 REM -----      PRINTOUT
910 PRINT"[RVS,GREEN,HOME2] [SHFT P]
    RESS [YELLOW] [SHFT P] [GREEN]
     TO PRINT, [YELLOW] [SHFT S]
    [GREEN] TO PREVIEW TO SCREEN,
    [YELLOW] [SHFT R] [GREEN]
     TO REFORMAT [GRAY3]";:GOSUB 660
915 GET KEY PP$:IF PP$="R"THEN GOSUB
    775:PP$="":GOTO 910
920 IF PP$="P"THEN OPEN 4,4,7
    :ELSE OPEN 4,3,7:PRINT"[CLEAR]";
925 C=0:PR$=A$(C):IF ASC(PR$)=94 THEN
    GOSUB 1535:C=C+1
930 PN=1:SC=SS:CX=0:TE=INT((66-TM-BM)
    /SS)-1:CT=(LC/2)-2+LM
935 DO UNTIL C>D:TZ=1
940 FOR T=1 TO TM:IF T=2 AND
    HD$<>""THEN PG$=HD$:CX=HS
    :HI=INSTR(HD$,"[UP ARROW]PN")
    :IF HI>0 THEN PG$=LEFT$(PG$,
    HI-1)+STR$(PN)
945 PRINT#4,SPC(CX)PG$:PG$="":CX=0
    :NEXT:TZ=TM
950 DO:PR$=A$(C):CH=INSTR(PR$,"
    [SHFT @]"):IF CH>0 THEN
    PR$=LEFT$(PR$,CH-1)
    :IF PR$=""THEN 990
955 CH=INSTR(PR$,"[CMDR @]")
    :IF CH>0 THEN U=U+1-U*2
    :PR$=LEFT$(PR$,CH-1)+CHR$(27)
    +"-"+CHR$(U)+MID$(PR$,CH+1)
    :GOTO 955
960 CH=INSTR(PR$,"[CMDR *]",CH+1)
    :IF CH>0 AND PP$="P"THEN BEGIN
    :V$=MID$(PR$,CH+1):V=VAL(V$)
    :IF V>0 THEN V$=CHR$(V)+MID$(V$,
    LEN(STR$(V)))
965 BEND:PR$=LEFT$(PR$,
    CH-1)+CHR$(V)+V$:GOTO 960
970 IF ASC(PR$)=94 THEN GOSUB 1535
    :C=C+1:GOTO 995
975 IF ASC(PR$)=123 THEN PR$=MID$(PR$,
    2)
980 IF ASC(PR$)=32 AND MID$(PR$,2,
    1)<>" "THEN PR$=MID$(PR$,2)
985 IF JY$="Y"THEN GOSUB 1640
990 PRINT#4,SPC(ABS(LM+MR))PR$:C=C+1
    :MR=0:TZ=TZ+1
995 DO UNTIL SC=1:SC=SC-1:PRINT#4
    :TZ=TZ+1:LOOP
1000 SC=SS:LOOP UNTIL TZ=>66-BM
1005 FOR T=TZ+1 TO 66:IF T=64 AND
     FT$<>""THEN PG$=FT$
     :HI=INSTR(PG$,"[UP ARROW]PN")
     :IF HI>0 THEN PG$=LEFT$(PG$,
     HI-1)+STR$(PN):CX=FS
     :IF CX<0 THEN CX=0
1010 PRINT#4,SPC(CX)PG$:PG$="":CX=0
     :NEXT
1015 IF PP$="S"THEN BEGIN
     :PRINT DH$"[HOME2,RVS,GRAY1,
     SPACE8,SHFT P]RESS [SHFT X]
      TO EXIT, [SHFT P]
      TO BEGIN PRINTING,
      ANY OTHER KEY TO CONTINUE
     [SPACE8,GRAY3]":GOSUB 660
     :CHAR 0,0,23,""
1020 GET KEY PX$:IF PX$="X"THEN EXIT
1025 BEND:IF PX$="P"THEN CLOSE 4
     :OPEN 4,4,7
1030 PN=PN+1:LOOP
1035 PRINT#4,;:CLOSE 4:PRINT"[CLEAR,
     HOME2]"CL$:GOSUB 660:S=20
     :POKE 208,0:GOTO 370
1040 PLAY PL$:RETURN
1830 IF ER=30 THEN STOP
     :ELSE PRINT"[CLEAR]"ERR$(ER);EL
1835 PRINT"[SHFT P]ROGRAM WILL
     CONTINUE.[SPACE2,SHFT P]RESS
     [SHFT S]HIFT-HOME":RESUME 70
```

END

BY BENNETT COOKSON, JR.

In Search of Perfect INPUT *for the Commodore 64*

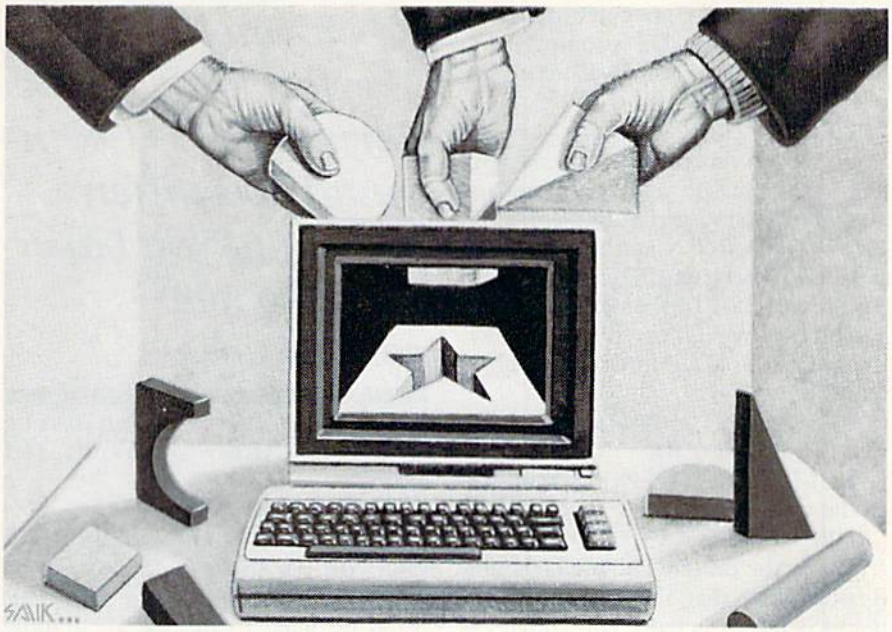
Many programs have been written to try to improve BASIC's INPUT statement. I have written many myself, at first using GET loops and then some machine-language routines. Now, I would like to share with you the routines I have developed in my search for perfect INPUT.

Features of Perfect INPUT

- Full cursor movement within a set range
- No "?" prompt (unless you want one)
- Commas and colons accepted as normal characters
- Total control over which characters can be typed
- A unique command that allows you to redefine the keyboard
- A special escape key to exit an INPUT statement
- Ability to position the cursor anywhere on the screen
- All this with easy-to-use commands (no PEEKs or POKEs)

The accompanying "Perfect INPUT" program adds commands to BASIC that help you overcome the INPUT statement's limitations and achieve these features. Type it in according to the "How to Enter Programs" instructions in the back of this magazine and save it. Then run it. Now that it is resident in the computer's memory, you can use its additional BASIC commands as you create your own programs. But keep in mind that after you create programs that use the "Perfect INPUT" command set, you must always load and run "Perfect INPUT" before you load and run the programs that use its commands.

To help you understand more clearly how the "Perfect INPUT" program works, I've included a demo program at the end of this article. Type it in and save it. Next, load the "Perfect INPUT" program and run it. Then type NEW (this makes room to load the demo, but leaves "Perfect INPUT" in memory), and load and run the demo program.



The accompanying program adds commands to BASIC that help you overcome the INPUT command's limitations.

How Commands in "Perfect INPUT" Work

When you are using "Perfect INPUT," the normal INPUT command acts differently, and you have access to new commands that make the programs you create more flexible and user friendly. Here is a list of INPUT commands you can use with the help of the program, and explanations of what each of them does.

INPUT A$
INPUT"prompt";B$

When the INPUT statement is used in its normal way, the usual "?" prompt is gone, commas and colons are allowed, and cursor movement is limited to a 79-character range.

A comma or colon that normally would have caused an ?EXTRA IGNORED message is now accepted just like any other character. However, commas and colons are accepted only into string variables, not numeric variables. Of course, you probably wouldn't want commas or colons in numbers, anyway. This also means that you cannot use "INPUT A$,B$", but you can use "INPUT A,B".

Cursor movement is now limited to the 79 characters allowed by the INPUT statement. Note that the user still has full cursor movement, but the cursor will seem to hit a wall before it gets out of range.

INPUT £ 10,A$
INPUT £ 20,"prompt";X$

This syntax allows the programmer to set the cursor range and, thus, the number of characters the user can type in. The "£" (English pound sign) can be read as "limit." The limit can range from 1 to 79; any number greater than 79 will cause an ILLEGAL QUANTITY error.

INPUT 200,A$

This syntax provides an exit from INPUT. When the user types a certain key (definable to any key), BASIC will jump out of the INPUT routine and GOTO the line specified in the INPUT statement. This powerful command could allow the user to escape from an INPUT and back to a menu without affecting any variables. The escape key is defined with the DEFine key command, which is explained later.

INPUT £ 15,400,"prompt";N

The above features can be used together; the limit comes first, then the exit line number. The prompt string (if any) is always last, just before the variable.

AT x,y

The AT command allows you to position the cursor anywhere on the screen by giving the X and Y coordinates. The letter X is the horizontal position (0-39), and Y is the vertical position (0-24). The values of X and Y can be expressed in any form. Following are examples of how the AT command is used:

AT 5,7:PRINT"position 5,7"
AT X,Y:INPUT B$
AT J-5+G,INT(W):PRINT"x marks the spot"

DEF "A=B,R=13,133=F"

This is the unique DEFine key command. (Note that the DEF FN command is not affected.) The above example statement changes the "A" key to a "B," the "R" key to CHR$(13), and CHR$(133) to an "F." The DEF key command allows you to redefine any of the keys on the keyboard (except the SHIFT, CTRL, Commodore logo, RUN/STOP and RESTORE keys). The DEFine key routine works deep inside the operating system of the computer. Thus, if you changed "R" to a RETURN key it will act just like the RETURN key in all cases.

The DEFinition list must be written as a string in quotes or a string variable. All characters except numbers, apostrophe, and back arrow are considered literally as the character to DEFine. Numbers, however, are considered to be ASCII values. To specify a number as a literal character, place an apostrophe just before it like so: '5. Thus, 5 would mean CHR$(5), while '5 means the character "5."

When you are using "Perfect INPUT," the normal INPUT command acts differently, and you have access to new commands.

A range of characters can also be used with this command. For example:

DEF"91-255=0"

will set all characters with an ASCII value of 91 through 255 to zero which will disable all those keys. This could be used to disable all graphic keys.

Another form of the command can look like this:

DEF"1-255=0,A-Z=←"

The first part of the above line disables all keys. The second part restores the A to Z keys to normal. The left arrow key means "restore to normal" (think of the arrow pointing back to the characters being defined).

The escape key to exit from an INPUT statement can be any key defined as CHR$(1). Thus, DEF"133=1" will define F1 as the escape key.

Also, any key defined as CHR$(2) will act as an erase key which simply erases the character under the cursor (examples in demo).

Using the DEF command by itself will reset the keyboard to normal. You can also use RUN/STOP-RESTORE to reset the keyboard to normal, but RUN/STOP-RESTORE will not disable the DEFine key or other commands. As an added feature, the keyboard can also be reset with the END command if an error or break in the program occurs. This feature makes it easier to edit lines. If you don't want the keyboard to be reset, you can remove the two relevant lines from the loader program with REM's that say "reset if error" and "reset if end".

The Demo Program

Lines 70-86 in the demo program show how to create and combine present strings. For example, once you set NUMKEY$ to define a numeric keypad (line 80) you can now use DEF NUMKEY$ which is much easier than defining keys one by one.

In line 72 NOKEY$ will disable all keys. With this method you can disable all keys and then enable only the keys you want. (Notice how the comma is used in line 80 when concatenating strings.)

Lines 100-150 print a box on the screen and allow the user to fill in the box, but you cannot move the cursor out of the box. Notice that the delete key has been disabled. It is a good idea to disable the quote mark key because quote mode can cause big problems in an INPUT statement.

Lines 450-460 show that the DEF command can be used just as easily with the GET statement.

Lines 500-680 show how the DEF key command makes it easy to use function keys. Notice how the function keys are converted to numbers (see line 82) that can be used with an ON GOSUB command.

Lines 800-850 show how the escape key can be used to cause BASIC to jump out of an INPUT statement. C

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Perfect INPUT

```
105 I=49152:CK=0'CKTD
110 READ A:IF A=256 THEN 130'EJMA
120 CK=CK+A:POKE I,A:I=I+1:GOTO 110'GRME
130 SYS 49152'BFMY
140 POKE 1,53 :REM SWITCH BASIC &
    KERNAL TO RAM'CDPH
150 I=49408'BGEC
160 READ A:IF A=256 THEN 200'EJKF
165 PRINT".";'BBDH
170 CK=CK+A:POKE I,A:I=I+1:GOTO 160'GRRJ
200 IF CK<>87267 THEN PRINT
    :PRINT"ERROR IN DATA":END'HJVF
209 REM INPUT[POUND]'BGWH
210 POKE 58827,46:POKE 58828,194'CSDB
220 POKE 40982,250:POKE 40983,194'CTED
230 POKE 44029,76:POKE 44030,47
    :POKE 44031,195'DCUG
236 POKE 58882,76'BIMH
237 POKE 58883,98 :POKE 58884,195'CSPK
250 REM DEFKEY'BGUD
260 POKE 46052,16:POKE 46053,193'CSXG
270 POKE 60279,0:POKE 60280,193'CRXH
280 DEF :REM RESET KEYBOARD'COAJ
290 POKE 40962,13:POKE 40963,194
    :REM RESET IF RUN/STOP-RESTORE'DR
    XR
```

```
293 POKE 58255,22 :POKE 58256,194
    :REM RESET IF ERROR'DGHR
294 POKE 43060,76:POKE 43061,31
    :POKE 43062,194:REM RESET IF END
    OR BREAK'EUVV
295 POKE 64982,53 :REM LOCK SO
    RUN/STOP-RESTORE WILL NOT DISABLE
    COMMANDS'CDUA
330 REM AT'BCKB
340 POKE 43029,76'BIYD
345 POKE 43030,136:POKE 43031,195'CTMK
360 REM CHANGE "GO" TO "AT"'BIHH
365 POKE 41371,65'BIUK
370 POKE 41372,212'BJNG
400 REM ML ROUTINE TO DUMP BASIC &
    KERNAL TO RAM'BHNH
405 DATA 169,160,32,7,192,169,224,
    133'BDTI
410 DATA 254,169,0,133,253,162,50,
    160'BDGE
415 DATA 0,177,253,145,253,200,208,
    249'BEFK
420 DATA 230,254,202,208,244,96,
    256'BBRF
425 REM MAIN OBJECT CODE'BOIJ
430 DATA 164,203,177,245,170,189,0,
    192'BENH
435 DATA 240,3,76,228,234,76,66,
    235'BBXL
440 DATA 160,0,209,122,208,3,76,
    115'BBBH
445 DATA 0,104,104,104,104,32,121,
    0'BBYM
450 DATA 208,3,76,171,193,32,158,
    173'BCVI
455 DATA 32,143,173,165,122,166,123,
    133'BFXO
460 DATA 54,134,53,32,163,182,141,
    7'BBJJ
465 DATA 194,142,8,194,140,9,194,
    134'BCWO
470 DATA 122,132,123,172,7,194,177,
    122'BEBL
475 DATA 141,10,194,169,58,145,122,
    173'BEJQ
480 DATA 0,3,141,11,194,169,218,
    141'BBDL
485 DATA 0,3,173,1,3,141,12,194'BWAP
490 DATA 169,193,141,1,3,32,193,
    193'BBPM
495 DATA 133,20,133,21,32,115,0,
    201'BBER
500 DATA 45,208,12,32,190,193,197,
    20'BCME
505 DATA 144,65,133,21,32,115,0,
    201'BBPJ
510 DATA 61,208,56,32,115,0,201,
    95'BAEF
515 DATA 240,26,32,193,193,164,20,
    153'BDIK
520 DATA 0,192,196,21,176,3,200,
    208'BBFG
525 DATA 246,32,115,0,240,66,32,
    253'BBCL
530 DATA 174,76,101,193,164,20,32,
    176'BDNH
535 DATA 193,176,238,160,255,132,21,
    200'BFBN
540 DATA 152,153,0,192,196,21,176,
    33'BCLI
545 DATA 200,208,245,76,8,175,32,
    115'BCMN
550 DATA 0,32,121,0,144,7,201,39'BXWI
555 DATA 208,15,76,115,0,32,158,
    183'BBMO
560 DATA 165,122,208,2,198,123,198,
    122'BEJL
565 DATA 138,96,169,166,72,169,22,
    72'BCMP
570 DATA 173,8,194,172,9,194,133,
    122'BCVL
575 DATA 132,123,172,7,194,173,10,
    194'BDKQ
580 DATA 145,122,165,54,164,53,133,
    122'BEAN
585 DATA 132,123,173,11,194,141,0,
    3'BBSR
590 DATA 173,12,194,141,1,3,96,5'BXPM
595 DATA 242,14,34,139,227,32,171,
    193'BDMS
600 DATA 32,92,195,76,123,227,32,
    171'BCSF
605 DATA 193,32,92,195,76,58,164,
    8'BALK
610 DATA 32,171,193,32,92,195,165,
    122'BDQG
615 DATA 164,123,40,76,56,168,72,
    169'BCDL
620 DATA 0,240,67,104,72,201,17,
    240'BBUH
625 DATA 47,201,145,240,73,201,157,
    240'BEVN
630 DATA 61,201,20,240,57,201,19,
    240'BCRI
635 DATA 72,201,147,240,88,201,1,
    240'BCYN
640 DATA 126,201,2,208,3,76,234,
    194'BBIJ
645 DATA 165,211,201,79,176,30,201,
    39'BDIO
650 DATA 208,20,104,201,29,208,16,
    72'BCAK
655 DATA 138,72,166,214,201,24,240,
    10'BDXP
660 DATA 181,218,48,6,104,170,104,
    76'BCNL
665 DATA 22,231,104,170,104,96,165,
    202'BESR
670 DATA 197,211,144,242,176,246,165,
    211'BGJN
675 DATA 229,202,201,40,176,232,104,
    96'BEYS
680 DATA 72,165,211,201,40,144,8,
    165'BCEN
685 DATA 202,201,40,176,2,198,214,
    165'BDFS
```

```
690 DATA 202,133,211,104,96,138,72,
    32'BDCO
695 DATA 144,194,174,91,194,165,211,
    201'BFJU
700 DATA 39,208,15,142,193,194,166,
    214'BEPH
705 DATA 224,24,240,14,181,218,48,
    10'BCCL
710 DATA 162,0,169,32,32,52,194,
    202'BBFH
715 DATA 208,227,104,170,76,145,194,
    165'BFON
720 DATA 20,208,4,165,21,240,165,
    104'BCWI
725 DATA 104,104,104,104,104,104,104,
    104'BGTO
730 DATA 104,104,104,104,32,92,195,
    76'BDFJ
735 DATA 163,168,152,72,164,211,169,
    32'BELP
740 DATA 145,209,104,168,169,157,32,
    52'BEPL
745 DATA 194,104,96,162,1,142,48,
    194'BCUP
750 DATA 162,0,134,20,134,21,201,
    92'BBOL
755 DATA 208,26,32,155,183,138,240,
    28'BDPQ
760 DATA 224,80,176,24,32,253,174,
    134'BDMM
765 DATA 18,176,6,32,107,169,32,
    253'BBSR
770 DATA 174,76,191,171,162,79,32,
    121'BDUN
775 DATA 0,76,23,195,76,72,178,
    165'BAFS
780 DATA 211,24,101,18,201,80,144,
    2'BBNO
785 DATA 169,79,141,91,194,165,122,
    72'BDET
790 DATA 165,123,72,32,139,176,104,
    133'BEEQ
795 DATA 123,104,133,122,162,0,165,
    13'BDOU
800 DATA 240,7,162,34,142,0,2,162'BYWH
805 DATA 1,32,98,165,169,0,141,48'BYSM
810 DATA 194,96,172,48,194,240,26,
    172'BDAJ
815 DATA 91,194,201,71,240,19,164,
    213'BDJN
820 DATA 132,208,204,91,194,144,7,
    172'BDNJ
825 DATA 91,194,136,208,1,200,76,
    6'BANO
830 DATA 230,164,213,132,208,76,6,
    230'BDDK
835 DATA 32,158,183,224,40,176,157,
    134'BELQ
840 DATA 20,32,253,174,32,158,183,
    224'BDJL
845 DATA 25,176,145,164,20,24,76,
    240'BCMQ
850 DATA 255,256'BHGI
```

END

INPUT Demo

```
1 POKE 53280,0:POKE 53281,0'CPLD
51 C$=CHR$(147)'CHEE
55 PRINT C$:PRINT"TYPE IN
   SOMETHING"'CDSM
58 PRINT"NOTICE THE ACTION OF
   CLR/HOME[SPACE11]AND CURSOR KEYS"
   :PRINT'CBFX
59 DEF "34=0"'BAJL
60 INPUT A$'BCIC
65 :'ABHH
70 REM PREDEFINED STRINGS FOR DEF KEY
   COMMAND'BITN
72 NOKEY$="1-255=0"'BGBI
76 CRSR$="13=[BACK ARROW],17=
   [BACK ARROW],29=[BACK ARROW],145=
   [BACK ARROW],157=[BACK ARROW],
   20=20,19=19,147=[BACK ARROW],148=
   [BACK ARROW]"'BFIW
78 N$="U='4,I='5,O='6,J='1,K='2,L='3,
   32='0,.=.,+=+,-=-,'0-'9=
   [BACK ARROW]"'BCTX
80 NUMKEY$=NOKEY$+","+N$+","+CRSR$+",
   34=0"'GURO
82 F$="133='1,134='3,135='5,136='7,
   137='2,138='4,139='6,140='8"'BCWS
84 FKEY$=NOKEY$+","+F$'DNDN
86 BOX$=NOKEY$+",A-Z=[BACK ARROW],13=
   [BACK ARROW],19=[BACK ARROW],147=
   [BACK ARROW],157=[BACK ARROW],20=2,
   29=[BACK ARROW]"'CKGX
90 :'ABHF
100 PRINT C$:PRINT"JUST TRY TO GET
    OUT OF THE BOX"'CDHE
101 PRINT"NOTICE HOW THE DELETE KEY
    WORKS"'BAWF
102 PRINT"USE SHIFT-CLR/HOME TO CLEAR
    BOX"'BAWF
105 DEF BOX$'BEMB
110 GO 12,10:PRINT"[CMDR A,SHFT C12,
    CMDR S]"'CGEJ
120 GO 12,11:PRINT"[SHFT B,SPACE12,
    SHFT B]"'CGXC
130 GO 12,12:PRINT"[CMDR Z,SHFT C12,
    CMDR X]"'CGSL
150 GO 13,11:INPUT[POUND]11,X$'CMAD
180 PRINT C$:PRINT"FILL IN THE
    BLANK"'CDVJ
186 GO 5,10:PRINT"THERE ARE EIGHT
    [SPACE6]IN A BYTE"'CFDS
190 GO 21,10:INPUT[POUND]4,A$'CLEH
191 PRINT:PRINT'CBHG
194 IF A$="BITS" THEN PRINT"RIGHT
    ON!"'ECWO
195 IF A$<>"BITS" THEN PRINT"SORRY,
     THE ANSWER IS BITS"'FCSU
196 GO 14,18:INPUT[POUND]1,
    "PRESS RETURN ";X$'CMVR
199 :'ABHN
200 PRINT C$'BCAW
```

64 USERS ONLY/PERFECT INPUT

```
201 PRINT"NOTICE THAT ONLY NUMBERS
    CAN BE TYPED"'BARH
210 GO 5,5:PRINT"67+84="'CEWA
220 DEF NOKEY$+",'0-'9=[BACK ARROW],
    "+CRSR$'DLKE
230 GO 12,5:INPUT[POUND]3,N'CJLC
300 :'ABHW
400 DEF NUMKEY$'BHVA
405 GO 1,1:PRINT C$;"NOTICE NUMERICAL
    KEYPAD"'CHQM
406 PRINT"UIO JKL[SPACE3]
    SPACE BAR"'BAKJ
410 GO 5,5:INPUT[POUND]19,
    "ENTER A NUMBER ";N'CKRG
411 PRINT C$'BCAB
415 :'ABHE
450 DEF NOKEY$+",Y=Y,N=N"'CGSI
455 GO 10,10:PRINT"ANSWER Y OR N"'CGOO
460 GET K$:IF K$="" THEN 460'EIEI
490 :'ABHH
500 DEF FKEY$ :REM DEFINE FUNCTION
    KEYS'CYEG
505 PRINT C$:PRINT"PRESS FUNCTION
    KEYS"'CDHL
506 PRINT"F8 TO QUIT"'BASI
510 GET K:IF K=0 THEN 510'EHBE
511 DEF:PRINT:PRINT'DCJD
515 ON K GOSUB 610,620,630,640,650,
    660,670,680'CHMM
516 DEF "1-255=0,13=13"'BAIJ
520 INPUT"PRESS RETURN";G$'BDTF
530 GOTO 500'BDED
610 PRINT"F1 ROUTINE":RETURN'CBNF
620 PRINT"F2 ROUTINE":RETURN'CBOG
630 PRINT"F3 ROUTINE":RETURN'CBPH
640 PRINT"F4 ROUTINE":RETURN'CBQI
650 PRINT"F5 ROUTINE":RETURN'CBRJ
660 PRINT"F6 ROUTINE":RETURN'CBSK
670 PRINT"F7 ROUTINE":RETURN'CBTL
680 PRINT"F8 ROUTINE"'BABL
790 :'ABHK
800 PRINT C$;"PRESS F7 AT ANY TIME
    FOR HELP"'BDPK
805 DEF:DEF"136=1":REM DEF F7 AS HOT
    KEY'DPON
810 PRINT:PRINT'CBHE
820 INPUT 850,"ENTER SOMETHING
    : ";X$'BHKK
830 GOTO 820'BDJG
850 PRINT:PRINT:PRINT"YOU CALLED FOR
    HELP?"'DCKO
851 PRINT"NOTICE HOW F7 CAUSED BASIC
    TO JUMP OUT[SPACE2]
    OF THE INPUT STATEMENT"'BAHA
855 PRINT"THIS IS THE END OF THE
    DEMO"'BAXT
860 PRINT:PRINT"GOOD BYE"'CBFL
999 DEF'BAYV
```

END

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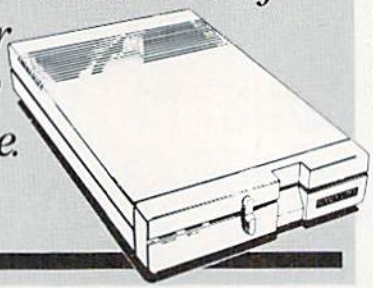
BY ROBERT W. BAKER

Inside the 1571 Disk Drive

Some general information you won't find in the 1571 user manual, plus a handy utility program to help you make better use of your new drive.



Everyone has heard about the new double-sized capacity, CP/M compatability, and high-speed burst modes of the 1571 disk drive. To help you understand the 1571 more thoroughly, here is some general information about the 1571 that you won't find in the user manual, plus an explanation of the format of disks created in double-sided mode, some of the new commands supported, and a handy utility program to help make better use of the new drive.

Double-sided Mode

The 1571 was designed primarily for use with the Commodore 128 computer system, but can also be used with the Commodore 64, VIC 20, and Plus/4 systems. When used with the Commodore 128, the 1571 will operate in either single- or double-sided mode depending on how the system is powered on. When connected to other Commodore systems, the drive will normally operate in single-sided mode unless instructed to switch to double-sided.

When the Commodore 128 is powered up in the normal 128 mode, the 1571 disk drive will operate in double-sided mode. However, if you hold down the Commodore logo key when powering on the Commodore 128, the computer will automatically enter the Commodore 64 mode of operation and the 1571 drive will switch to single-sided mode to emulate the 1541 disk drive.

Of course, the above sequences assume the disk drive is already on when the computer is switched on. Otherwise, if you turn on the disk drive after the computer has been turned on, the drive will remain in double-sided mode. Also, if you power up in Commodore 128 mode and then enter the GO 64 command to get into Commodore 64 mode, the disk drive will remain in double-sided mode.

In both single- and double-sided modes of operation, the 1571 drive can normally store a maximum of 144 files per disk, just like the 1541. The disk directory space and internal buffers have not been expanded beyond the 1541's capabilities. Only the overall storage capacity (number of blocks free) has been increased from 664 to 1328.

Since the internal buffer space of the 1571 has not been increased, you can still open only two sequential or one relative file at one time without getting into trouble. Once you open a relative file, you cannot open a sequential file at the same time. Also, the handling of relative files has not been changed. A relative file is still limited to a maximum of 167,132 bytes or 65,535 records per file.

New Commands

Whatever mode the 1571 disk drive is operating in, there are new commands that allow you to change the mode of operation under program control. The U0 command has been expanded to include several new features as outlined in Table 1. Keep in mind that these commands must be sent via the command channel, secondary address 15, using PRINT# commands once the channel has been opened.

The last command shown in Table 1 can be used to temporarily change the 1571 device number under program control. If you want to permanently change the device number, you no longer have to open up the disk case and cut traces on the printed circuit board. Instead, two tiny switches are accessible through an opening in the rear panel of the 1571 to allow easy selection of the desired device number.

Additional burst commands are also supported by the U0 command structure, but should be avoided unless you really know what you are doing. These commands allow changing the number of retries on disk operations, high speed transfers to and from the disk, numerous non-standard disk format and sector interleaving selections, plus the ability to obtain status information about the drive and disk format.

The U0>H1 command mentioned in Table 1 allows you to select the second side of a normal single-sided disk, and then format and use that side on the 1571 as if it were another single-sided disk. It's almost like having two disks in one, but the second side of a disk formatted in this way can be read only on a 1571 disk drive. You cannot flip the disk in a 1541 drive to read the second side, and there would be no indication that the second side is even being used. However, used with the 1571, the disk would have two directories (one on each side of the disk) and you could store 288 files on one disk, instead of only 144.

Disk Formats

In the 1541 single-sided mode, the 1571 will format a diskette with the same format, block availability map (BAM), and directory as used on the 1541. When operating in the double-sided mode, the 1571 will format both sides of the diskette using a new format that is somewhat compatible with the existing 1541 single-sided format. The accompanying Tables 2 to 6 show the details of the new double-sided format created by the 1571.

The second side of a double-sided disk contains a mirror image of the first side, with the same number of sectors in each relative track, as shown in Table 2. The usual block availability map (BAM) is still in track 18, sector 0, and the directory starts

in track 18, sector 1. The contents of each directory block are still the same as in 1541/4040 format disks, as shown in Tables 5 and 6. No additional directory blocks have been added to expand the number of files that can be saved on a double-sided disk.

If you compare the actual BAM contents shown in Table 3 with a normal 1541/4040 BAM block, you'll notice only two changes: the single/double-sided flag in byte 3 and the partial BAM information for the second side of the disk. Both of these areas are unused on 1541/4040 format disks, and the older drives will normally ignore this information on double-sided 1571 disks.

However, because the formats are otherwise compatible, the older single-sided disk drives can still read and display the disk name, id, and directory information from a double-sided disk. The information is identical in format, and all on the first side of the disk. However, the number of blocks free, reported with a normal DOS directory display, will be incorrect, since the block availability information for the second side will be ignored and not included in the normal block count. Remember that the older single-sided drives will treat all disks as single-sided disks!

To permanently change the device number, you simply access two tiny switches in the 1571's rear panel.

Storing and Accessing Files

Programs and files from the first side of a double-sided disk can be loaded or read on a single-sided drive, as long as the file does not cross to the second side of the disk. With a single-sided drive, attempting to use any file that accesses tracks 36 to 70 will result in a DOS error #66, "illegal track and sector." Since a normal directory display will not give you any indication of what side a file uses, you'll normally have to access it to find out.

The state of byte 3 of the track 18, sector 0 BAM block is how the 1571 disk can determine the current disk format and correctly handle both single- and double-sided disks when in the double-sided mode. Disk directories displayed for both single- and double-sided disks will indicate the correct number of free blocks for that particular disk. However, if the 1571 drive is in the 1541 single-sided mode, it will behave just like the 1541 drive and ignore the second side of double-sided disks.

Note that the additional block availability information for the second side of a double-sided disk is stored in the last 35 bytes of track 18, sector 0. However, although these bytes indicate the number of blocks free in each track, they don't indicate the location of blocks that are free. The information on the exact blocks that are free on the second side is stored in track 53, sector 0 on the second side of the disk, as shown in Table 4. You'll need a double-sided drive to access this added information, but then, you'll need a double-sided drive to use the information, anyway.

You'll also notice that the original block availability information was stored in a contiguous area, with four bytes per track. The added information for the second side, however, is split. The first byte of the original format is placed in the table at the end of track 18, sector 0. The remaining three bytes of the original format for each track are then placed in the table at the start of track 53, sector 0. This block is not linked to any other block on the disk, so the first two bytes are not needed for a pointer to the next track and sector.

When a new double-sided disk is formatted on the 1571 drive, only the first two sectors in track 18 are allocated. Track 18, sector 0 is always the BAM and sector 1 is always the first directory sector. The remainder of track 18 is reserved for the directory, but the blocks are not allocated or linked until they are needed. For some reason, all of track 53 is allocated and cannot be used, even though only the first sector is all that is really needed by the DOS. The other 18 sectors in track 53 are normally wasted.

When the single/double-sided flag in byte 3 and the partial BAM information for the second side are present in track 18, sector 0, it is possible for even a single-sided drive to determine a disk format and block allocation, plus the location of all files, if

Table 1. New 1571-Mode Commands

Command	Function
"U0>M0"	= selects 1541, single sided mode
"U0>M1"	= selects 1571, double sided mode
"U0>H0"	= selects head zero in 1541 mode (normal)
"U0>H1"	= selects head one in 1541 mode
"U0>"+CHR$(X)	= changes device number to 'x' (x = 8 to 30)

Note: above commands are issued via command channel, secondary address 15, using PRINT#.

Table 2. 1571 Block Distribution by Track

Track #	Sector Range #	Total # Sectors
1 to 17	0 to 20	17 * 21 = 357 (side one)
18 to 24	0 to 18	7 * 19 = 133
25 to 30	0 to 17	6 * 18 = 108
31 to 35	0 to 16	5 * 17 = 85
36 to 52	0 to 20	17 * 21 = 357 (side two)
53 to 59	0 to 18	7 * 19 = 133
60 to 65	0 to 17	6 * 18 = 108
66 to 70	0 to 16	5 * 17 = 85
		1366 Total

properly programmed. This is exactly what is done in the simple disk utility program that is shown in Listing 1, so let's see what it does and how it works.

Disk Utility for 1571 and 1541

This convenient disk utility program is designed for the Commodore 128 and the 1571 disk, with the computer running in either 64 or 128 mode. It will also run on the Commodore 64 and will work equally well with the 1541 disk drive. All disk commands use the disk command channel, secondary address 15, and PRINT# commands as opposed to the new disk commands found in BASIC 7.0 on the Commodore 128. This ensures the program will run on the Commodore 64 and in the 64 mode on the Commodore 128.

When the program is run, it first attempts to determine the type of disk drive that is attached to the computer as device number 8. It does this by issuing an invalid variation of the new 1571-mode select command, trying to select mode nine, which does not exist (line 260). If the drive is a 1541 disk, the command is ignored and a valid status is returned with an error code of zero. If the attached drive is a 1571 disk, the U0>M9 command is flagged as invalid and an error code of 31 is returned. This simple command provides a very convenient way to see which drive is being used.

The 1571 was designed primarily for use with the Commodore 128, but can also be used with the Commodore 64, Plus/4 and VIC 20.

If the drive is determined to be a 1571, the program next tries to find out if the drive is operating in single- or double-sided mode. It does this by issuing the U0>H0 head select command to the drive (line 280). If the drive is in double-sided mode, the command is invalid and an error code of 31 is returned, while the drive stays in double-sided mode. If the drive is in single-sided mode, head zero is selected and valid status is returned with an error code of zero. The head-select command also ensures head zero is selected when in single-sided mode, so the drive is truly 1541-compatible.

The main function menu is then displayed with a line near the top of the menu showing the current drive type, as well as the current mode if the disk is a 1571 drive. The menu then lets you select from the available functions by entering the appropriate number shown at the left of each function. After the drive completes the selected function, control always returns to this main menu.

What the Utility Does

Each function should be selected only after the appropriate diskette has been inserted in the drive. If you forget to insert a disk, the program will display an error message asking you to insert a disk and re-select the desired function. If any disk errors are encountered while the drive is performing the selected function, the error message returned by the disk will be displayed with a note to press any key to continue. The function will be aborted and control will return to the main menu when the key is pressed.

Table 3. 1571 Block Availability Map (BAM) Format
Track 18, Sector 0

Byte	Contents	Definition
0-1	18,01	Track/sector of first directory block
2	65	ASCII "A" indicating 4040/1541 format
3	0	Indicates single sided format
	1	Indicates double sided format
4-143		Bit map of available blocks on first side, tracks 1-35 Entries are 4 bytes per track: byte 0 = #avail sectors in track byte 1 = bit map for sectors 0-7 byte 2 = bit map for sectors 8-15 byte 3 = bit map for sectors 16-20 in bit maps, 1 = available (unused) 0 = unavailable (used)
144-159		Diskette name padded with shifted spaces
160-161	160	Shifted spaces
162-163		Diskette ID
164	160	Shifted space
165-166	50-65	ASCII "2A" representing DOS version (2) and format type (A = 4040/1541)
167-170	160	Shifted spaces
171-220	0	Nulls
221-255		Number of available blocks on second side, tracks 36-70 (1571 mode only) Entries are 1 byte per track, indicating the number of available sectors in each track

The first two functions are the main features of this utility. They provide an expanded disk directory that attempts to identify those files that are on the second side of a double-sided diskette. This information takes the guesswork out of knowing which files on a double-sided disk can be loaded or used on a single-sided drive.

Expanded Disk Directory

When selecting the directory functions (1 or 2), you have the option of printing or displaying the directory information. In either case, the BAM is first read from the diskette and the disk name, id, format (2A), and number of blocks free are displayed first. For added convenience, the heading will also indicate whether the diskette was formatted as a single- or double-sided disk. For long directories, this information is repeated at the top of each screen or printed page.

After the BAM information is displayed, the program examines each directory entry and follows the block linking within the file, from block to block, looking for the first block to access the second side of a double-sided disk (tracks 36-70). The program will stop following the links without actually accessing any block within tracks 36-70, so it can successfully analyze any disk, even on a single-sided drive. This process may take a while, especially with larger files on tracks 0 to 35.

Directory entries are displayed one per line, and show the number of blocks in the file along with the file name and file type (SEQ, PRG, USR or REL). The normal directory function (1) will display only active files, or those that have not been deleted. The full directory function (2) will display every directory entry in the directory blocks, including deleted files, whose file name will be labeled DEL.

If a disk directory is being printed out on a printer and you press a key on the computer, the printed output will be suspended. At that time, pressing "Q" (for Quit) will terminate the output and return you to the main function menu. However, the printed output will resume when any other key is pressed. When you are displaying directories on the screen, the same options apply at the end of each screen.

Additional information is displayed to the right of each directory entry to indicate if the file is locked (L), still open (O), or utilizes tracks 36 to 70 (2). If the lock bit is set in the file-type code of the directory entry, the letter "L" will appear within parentheses. If the file is still open, the letter "O" will appear within parentheses. If the file uses any block on the second side of a double-sided disk (tracks 36 to 70), the number two will appear within parentheses.

Changing the Lock Flag

In case you weren't aware of it, the lock flag is supported on the 1541 as

Table 4. Alternate 1571 Block Availability Map (BAM) Format
Track 53, Sector 0

Byte	Contents	Definition
0-105		Bit map of available blocks on second side, tracks 36-70 Entries are 3 bytes per track: byte 0 = bit map for sectors 0-7 byte 1 = bit map for sectors 8-15 byte 2 = bit map for sectors 16-20 in bit map, 1 = available (unused) 0 = unavailable (used) 106-255 unused
106-255		unused

Table 5. 1541/1571 Common Directory Block

Directory starts on Track 18, Sector 0

Byte	Contents
0-1	Track & sector of next directory block, track = 0 in last directory block
2-31	file entry #1
34-63	file entry #2
66-95	file entry #3
98-127	file entry #4
130-159	file entry #5
162-191	file entry #6
194-223	file entry #7
226-255	file entry #8

Table 6. 1541/1571 Common Directory Entries

Byte	Contents
0	File type flag: 0 = unused entry 128 = file deleted 1 or 129 = Sequential file 2 or 130 = Program file 3 or 131 = User file 4 or 132 = Relative file File types 1-4 indicate open files, files not properly closed Adding 64 to any file type locks that file, cannot be scratched (deleted)
1-2	Track & sector of first block in file
3-18	File name padded with shifted spaces (160)
19-20	Track & sector of first side sector block for relative files only
21	Binary record size for relative files
22-25	Unused
26-27	Track & sector of replacement file for OPEN@
28-29	Number of blocks in file (low byte, high byte)

well as the 1571 disk drive. When this special bit in the file-type field of each drectory entry is set (see Table 6), it will prohibit deleting or scratching the file. It does not have any effect on "rename" or other functions—only the scratch command.

The third function provided by this utility program allows you to change the lock flag for any file on the disk, locking an unlocked file or unlocking a locked file. When prompted, simply enter the name of the file to be updated. The program will then read and display the usual BAM information before starting to search the directory for the selected file name.

Once the file is found, the usual directory information will be displayed for that file. If the file is not properly closed, the lock flag cannot be modified, which is indicated by an error message. Otherwise, you are prompted for a confirmation to toggle the state of the lock flag for that directory entry. A (Y) response will allow the flag to be changed and the directory block re-written on the disk to complete the update. An (N) response will abort the function without changing the directory.

Changing the Disk Name

The next utility function (4) allows you to change the 16-character name of the disk. After reading and displaying the usual BAM information for the disk, the program prompts you for the new disk name. Pressing the RETURN key without entering any data will abort the function without changing the disk name. Otherwise, the new string entered is used to replace the existing disk name, as long as the string is no longer than 16 characters.

Note that only the disk name can be changed using this utility; the disk id cannot be modified. The disk id is actually encoded in every block on the disk, in portions of the block that are accessible only to the disk controller. This information must match the id that appears within the BAM in track 18, sector 0, or the disk controller can become confused. This is the reason utilities that allow modifying the disk id in the BAM should be used with caution.

Control Commands

If the disk is a 1541 drive, the last available function (5) allows you to send commands directly to the disk controller. The command will be sent to the disk command channel, secondary address 15, using a PRINT#15, "....." command. When prompted, enter the desired command, enclosed in quotes, in the appropriate command format. The command will be issued to the disk, and the returned status will be displayed.

For 1571 disks, another function is available on the main function menu. This function (6) will allow switching the mode of the drive from single- to double-sided mode or from double- to single-sided mode. When this function is selected, the appropriate mode select command (U0>Mx) is sent to the drive and the program restarts. The line at the top of the menu will indicate the updated mode of the drive.

The last selection from the main menu is the normal exit from the program. Pressing the "Q" key will terminate the program and leave the disk drive in the current mode. C

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." In C128 mode, do not type the apostrophe or four letters at the end of each line. The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Listing 1. Disk Utility

```
190 T$(0)="DEL":T$(1)="SEQ"
    :T$(2)="PRG":T$(3)="USR"
    :T$(4)="REL"'FETR
200 DM$(0)="SINGLE": DM$(1)
    ="DOUBLE"'CNWD
210 DIM A$(256): NL$=CHR$(0)
    : Q$=CHR$(34): SP$=CHR$(160)'HFNI
220 PRINT"[CLEAR,SPACE6,CMDR A,
    SHFT C25,CMDR S]"'BAMU
230 PRINT "[SPACE6,SHFT B,SPACE6]
    DISK UTILITIES[SPACE5,SHFT B]
    "'BAHH
240 PRINT "[SPACE6,CMDR Z,SHFT C25,
    CMDR X,DOWN]"'BAYV
250 CLOSE 2: CLOSE 4: CLOSE 15
    : OPEN 15,8,15'EOJG
260 PRINT#15,"U0>M9": INPUT#15,EN'CJPG
270 IF EN<>31 THEN DT=0: DM=0
    : PRINT SPC(11);"DISK DRIVE =
    1541": GOTO 300'JUYR
280 DT=1: PRINT#15,"U0>H0"
    : INPUT#15,EN: DM=0
    : IF EN=31 THEN DM=1'IAFQ
290 PRINT"DISK DRIVE = 1571, IN ";
    DM$(DM);" SIDED MODE"'BJKP
300 PRINT"[SHFT C39]"'BAQC
310 PRINT"[SPACE2]1 = NORMAL
    DIRECTORY[SPACE5](SIDE 1/2)"'BAHH
320 PRINT"[SPACE2]2 = FULL DIRECTORY
    [SPACE4](DELETED FILES)"'BAIJ
330 PRINT"[SPACE2]3 = LOCK/UNLOCK
    FILE"'BADF
340 PRINT"[SPACE2]4 = CHANGE DISK
    NAME"'BADG
350 PRINT"[SPACE2]5 = ISSUE DISK
    COMMAND"'BASI
360 ML=5: AM=(DM+1) AND 1
    : IF DT=0 THEN PRINT
    : GOTO 390'JUQN
370 PRINT"[SPACE2]6 = SWITCH DRIVE TO
    ";DM$(AM);" SIDED MODE": ML=6'CNIQ
380 PRINT SPC(22);"[CMDR T6]"'CEWK
390 PRINT"[SPACE2]Q = QUIT"'BAOI
400 PRINT"[SHFT C39]"'BAQD
410 PRINT"[DOWN]DESIRED FUNCTION
    : ";'BBME
420 GET C$: IF C$="" THEN 420'EIJE
430 IF C$="Q" THEN PRINT C$
    : GOTO 1500'FJMG
440 F=VAL(C$): IF F<1 OR F>ML THEN
    420'HOYJ
450 PRINT C$: ON F GOTO 550,550,520,
    550,470'DXXJ
460 PRINT#15,"U0>M"+CHR$(48+AM)
    : GOTO 220'FNAK
470 PRINT"[DOWN]DESIRED DISK COMMAND
    (IN QUOTES):"'BAPO
480 GOSUB 1490: IF X$=SP$ THEN
    220'ENEL
490 PRINT#15,X$: INPUT#15,EN,EM$,ET,
    ES'CVSM
```

```
500 PRINT"[DOWN]ERROR#:";EN;"[SPACE3]
    TRK/SEC:";ET;"/";ES'BLEH
510 PRINT EM$: GOSUB 1450
    : GOTO 220'DMEE
520 PRINT "[DOWN]FILENAME TO BE
    LOCKED/UNLOCKED:"'BABK
530 GOSUB 1490: IF X$=SP$ THEN
    220'ENEH
540 FL$=LEFT$(X$+"[SHFT SPACE16]",16)
    : REM (16 SHIFTED SPACES)'EDTW
550 PRINT#15,"I0": INPUT#15,EN,EM$,ET,
    ES: IF EN=0 THEN 580'FBMN
560 IF EN<>21 AND T<>18 AND S<>0 THEN
    GOSUB 1440: GOTO 220'MRIQ
570 PRINT"[DOWN]PLEASE INSERT DISK &
    RESELECT FUNCTION!"
    : GOTO 1130'CFBS
580 OPEN 2,8,2,"#0": GOSUB 1430
    : IF EN>0 THEN 220'FSXO
590 PRINT "[DOWN]OK, READING BLOCK
    AVAIL MAP (BAM)..."'BAMR
600 T=18: S=0: GOSUB 1300
    : IF EN>0 THEN 220'GSUH
610 H1$="DISK "+Q$: FOR N=144 TO 159
    : H1$=H1$+A$(N): NEXT N'ICYN
620 H1$=H1$+Q$+"[SPACE2]
    ID="+A$(162)+A$(163)+"[SPACE3]
    FMT="+A$(165)+A$(166)'ILXQ
630 C=0:FOR N=4 TO 140 STEP 4
    :IF N<>72 THEN C=C+ASC(A$(N))
640 NEXT N:IF ASC(A$(3))>0 THEN FOR
    N=221 TO 255:C=C+ASC(A$(N)):NEXT N
650 H2$=RIGHT$("[SPACE5]"+STR$(C),
    5)+" BLOCKS FREE[SPACE8]("'FKFP
660 H2$=H2$+DM$(ASC(A$(3))/128)+"
    SIDED)"'FVVP
670 PD=3: IF F>2 THEN 720'EJQL
680 PRINT"[DOWN]PRINTED OUTPUT WANTED
    (Y/N): ";'BBSQ
690 GET C$: IF C$="N" THEN 720'EIQN
700 IF C$<>"Y" THEN 690'EFUE
710 PD=4: GOSUB 1220'CIGF
720 OPEN 4,PD'BEVE
730 GOSUB 1260: IF F<>4 THEN 830'FKIJ
740 PRINT"ENTER NEW DISK NAME FOR
    THIS DISK:"'BAWO
750 GOSUB 1490: IF X$=SP$ THEN
    1200'EOBL
760 IF LEN(X$)>16 THEN PRINT"[DOWN]
    INPUT STRING IS LONGER THAN 16
    CHARS![DOWN]":GOTO 740'GKPW
770 X$=LEFT$(X$+"[SHFT SPACE16]",16)
    : REM (16 SHIFTED SPACES)'ECLC
780 PRINT#15,"B-P:2,144": GOSUB 1430
    : IF EN>0 THEN 220'FPMR
790 PRINT#2,X$;'BFWL
800 PRINT#15,"U2:2,0,";T;S: GOSUB 1430
    : IF EN>0 THEN 220'FTDK
810 PRINT#15,"I0"'BDOE
820 PRINT"[DOWN,SPACE2]
    DISK BAM UPDATED WITH NEW DISK
    NAME": GOTO 1130'CFTP
830 IF F=3 THEN PRINT"SEARCHING FOR
    FILE: ";Q$;FL$;Q$: PRINT'FNUQ
840 T=ASC(A$(0)): S=ASC(A$(1))
    : IF T>0 THEN 870'HXCP
850 IF F=3 THEN PRINT SPC(12);
    "FILE NOT FOUND"'FGJP
860 GOTO 1130'BECJ
870 GOSUB 1300: IF EN>0 THEN 220'ELVN
880 FOR N=2 TO 226 STEP 32
    : FT=ASC(A$(N)) AND 7'HSIS
890 IF FT=0 AND F<>2 THEN 1190'GJER
900 C=ASC(A$(N+28))+(ASC(A$(N+29))
    *256)'HYBM
910 IF C=0 THEN H=0:FOR X=3 TO 18
    :H=H+ASC(A$(N+X)):NEXT X
    :IF H=0 THEN 790'PDTU
920 N$="": FOR Y=3 TO 18
    : N$=N$+A$(N+Y): NEXT Y'IUQO
930 IF F=3 THEN IF FL$<>N$ THEN
    1190'HLEM
940 PRINT#4,RIGHT$("[SPACE5]"+STR$(C),
    5);" ";Q$;N$;'ERIO
950 PRINT#4,Q$;"[SPACE2]";T$(FT);"
    [SPACE2]";: IF FT=0 THEN 1010'EWEP
960 LK=0: IF (ASC(A$(N)) AND 192)=192
    THEN PRINT#4,"(L)";: LK=1
    : GOTO 990'JFNV
970 OP=0: IF (ASC(A$(N)) AND 128)=0
    THEN PRINT#4,"(O)";: OP=1
    : GOTO 1010'JEFW
980 PRINT#4,"[SPACE3]";'BDVM
990 PRINT#4,"[SPACE2]";'BDON
1000 GOSUB 1330: IF EN>0 THEN 220'ELYW
1010 PRINT#4: IF F<>3 THEN 1140'FISX
1020 IF OP=1 THEN PRINT"[DOWN]
     FILE IS NOT PROPERLY CLOSED!"
     : GOTO 1130'FIEH
1030 PRINT"[DOWN]OK TO ";
     : IF LK=1 THEN PRINT"UN";'FGVC
1040 PRINT"LOCK FILE (Y/N): ";'BBKB
1050 GET C$: IF C$="N" THEN 1210'EJJC
1060 IF C$<>"Y" THEN 1050'EGDD
1070 PRINT C$'BCAB
1080 H=(ASC(A$(N)) AND 191)
     : IF LK=0 THEN H=H+64'IVJK
1090 PRINT#15,"B-P:2,";N: GOSUB 1430
     : IF EN>0 THEN 220'FRTK
1100 PRINT#2,CHR$(H);'CGTV
1110 PRINT#15,"U2:2,0,";T;S
     : GOSUB 1430: IF EN>0 THEN
     220'FTDD
1120 PRINT"[DOWN]DIRECTORY UPDATED
     WITH NEW LOCK STATUS"'BAOH
1130 PRINT: GOSUB 1450: GOTO 220'DJDA
1140 L=L-1: IF L=0 THEN GOSUB 1240
     : IF C$="Q" THEN 220'JQBH
1150 IF PD=3 THEN 1190'DHRC
1160 GET C$: IF C$="" THEN 1190'EJME
1170 PRINT SPC(10);"[DOWN2]
     OUTPUT SUSPENDED[DOWN]"
     : GOSUB 1460: IF C$="Q" THEN
     220'GPEM
1180 GOSUB 1220'BEGD
1190 NEXT N: GOTO 840'CFVF
```

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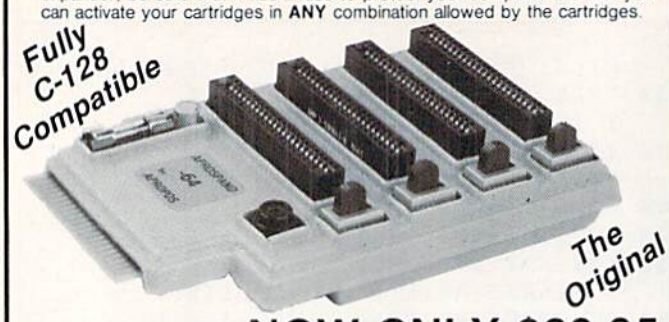

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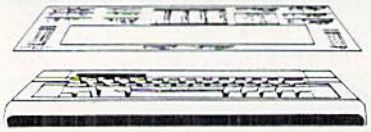

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1571 DISK UTILITY

```
1200 PRINT SPC(8);"[DOWN]
     NO CHANGE TO DISK NAME"
     : GOTO 1130'DIFE
1210 PRINT C$: PRINT SPC(8);"[DOWN]
     NO CHANGE TO DIRECTORY"
     : GOTO 1130'ELMG
1220 PRINT"[CLEAR]PRINTING DISK
     DIRECTORY[DOWN2]"'BANE
1230 PRINT"PRESS ANY KEY TO PAUSE
     OUTPUT": RETURN'CBLH
1240 IF PD=4 THEN FOR X=1 TO 10
     : PRINT#4: NEXT X: C$=""
     : GOTO 1260'KTBJ
1250 GOSUB 1460: IF C$="Q" THEN
     RETURN'FHNE
1260 L=50: IF PD=3 THEN L=16
     : PRINT"[CLEAR,DOWN]";'GMUI
1270 PRINT#4,H1$: PRINT#4
     : PRINT#4,H2$'DNGG
1280 PRINT#4: PRINT#4,"-------------
     ------------------------"'CEAM
1290 PRINT#4: RETURN'CCWF
1300 PRINT#15,"U1:2,0,";T;S
     : GOSUB 1430: IF EN>0 THEN
     RETURN'GQVE
1310 FOR N=0 TO 255: GET#2,A$(N)
     : IF A$(N)="" THEN A$(N)=NL$'IDFH
1320 NEXT N: RETURN'CCBY
1330 EN=0: IF F=3 THEN RETURN'FGDD
1340 T=ASC(A$(N+1)): S=ASC(A$(N+2))
     : GOSUB 1370'HYUJ
1350 IF (EN+H)>0 OR FT<>4 THEN
     RETURN'IJNI
1360 T=ASC(A$(N+19)): S=ASC(A$(N+20))
     'GVEK
1370 H=0: IF T>35 THEN H=1
     : PRINT#4,"(2)";: RETURN'HNHK
1380 PRINT#15,"U1:2,0,";T;S
     : GOSUB 1430: IF EN>0 THEN
     RETURN'GQVM
1390 GET#2,C$,D$: IF C$="" THEN
     C$=NL$'FQUL
1400 IF D$="" THEN D$=NL$'EHKB
1410 T=ASC(C$): S=ASC(D$)
     : IF T>0 THEN 1370'HSXG
1420 RETURN'BAQY
1430 INPUT#15,EN,EM$,ET,ES
     : IF EN=0 THEN RETURN'FTFH
1440 PRINT: PRINT"[RVS]DISK ERROR
     :[RVOFF]";EN;"[SPACE2,RVS]TRK/SEC
     :[RVOFF]";ET;"/";ES
     : PRINT EM$'DQON
1450 PRINT"[RVS,SPACE7]
     PRESS ANY KEY TO CONTINUE[SPACE7]
     ": GOTO 1470'CFTM
1460 PRINT"[DOWN,RVS]PRESS ANY KEY TO
     CONTINUE, 'Q' TO QUIT[RVOFF]";
     'BBJO
1470 GET C$: IF C$="" THEN 1470'EJNI
1480 RETURN'BAQF
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This list is compiled from groups who responded to a survey conducted by Pete Baczor, Commodore's user group coordinator. If you would like your group to appear here, or if you need information about Commodore's user group support, contact Pete at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

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AMIGA

Continued from pg. 127

very powerful tool in programming animation.

Once the OBJECT.HIT statement has been used, all you need to do is define what subroutine to call when the collision(s) occur. You use the ON COLLISION command for this:

ON COLLISION GOSUB LABEL

Here LABEL is the name of the subroutine that handles the action when the collision occurs.

Before any collision can occur, you must start the event trapping with the COLLISION ON statement:

COLLISION ON ' enable collisions
COLLISION STOP ' stop executing collisions
COLLISION OFF ' turn off collision

AmigaBasic has other very useful commands for animating objects. If you are using BOBs, you can specify which BOB has priority over another with this syntax:

OBJECT.PRIORITY object-id,value

The value can be any number from -32768 to 32767. The higher the number the higher the priority. So an object with a priority of 100 will pass over an object with a priority of 10 when they occupy the same area of the screen.

Other Commands

You can also define what area of the screen AmigaBasic will draw objects in. You set up a rectangular area defined by screen coordinates and the objects will not be visible outside it. Or you can make the area larger than the screen, and they will pass smoothly off the sides. The syntax for that procedure is:

OBJECT.CLIP (x1,y1)-(x2,y2)

And when you are finished with the object, it's best to free the memory used to define it. If you do not, this memory cannot be used for other tasks. Do this using:

OBJECT.CLOSE (object-id (,object-id...))

As you can see, much of the animation potential of the Amiga is available to the BASIC programmer. Most animation needs can be met with this large assortment of statements and functions. However, if your needs go deeper, it is possible to use the LIBRARY statement to access the library of Intuition subprograms built into the Amiga's ROM routines. But that's another story... C

ALICE

Continued from pg. 43

reality—that is, of course, by making your way through the tunnels, rooms, hills and dales, houses, rivers, palaces and gardens of Wonderland—which you must manage to do within 65 game-days. You will notice that Wonderland is full of clocks. Twelve Wonderland hours equals one game day.

I can't, and won't, give you any specifics about your adventure. After all, you really don't want me to reveal any secrets—the Queen would have my head! I will, however, give you some advice.

Make a map. I promise you'll need it. Also take notes about every character you meet. You'll be glad you did. Be curious. Examine objects for clues and explore every nook and cranny .. Wonderland is full of surprises. Thoroughly question every character and pay close attention to their replies, no matter how nonsensical they may seem at the time. The ability to change size is vital, so maintain a good supply of those weird edibles. Remember that most objects are important, certain doors only work at certain times, and most characters have at least one clue that will aid your progress.

One final admonishment. You, the game player, must take regular breaks from your adventure every now and then in order to do silly, mundane things like eat, sleep, bathe, acknowledge your family, go to work, and feed the dog and cat. If your kids are the adventurers, you may have to resort to your standard parental prerogatives, such as warnings, threats, bribery, guilt inducement, and yes, hiding the disk, in order to inflict the above breaks.

In a word, *Alice in Wonderland* is *wonderful.* Other applicable words are absorbing, enchanting, captivating—and fun. And, unlike most adventure games, *Alice in Wonderland* is as well suited to a six year-old as it is to, well, (ahem) an over-thirty year-old. In *Alice in Wonderland,* Windham Classics has built a sturdy bridge across both the generation gap and the arcade-game/text-adventure chasm.

So grab your parasol, hop down the nearest rabbit hole, take one giant step at the nearest chessboard, and find out what's really on the other side of the looking glass. C

HOW TO ENTER PROGRAMS

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN, RIGHT 2] would mean to press the cursor-down key once and then the cursor-right key twice.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The chart on this page tells you the keys to press for any word or words inside brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to each keystroke shows you what you will see on the screen.

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the 'wrong' line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88)

CHART OF SPECIAL CHARACTER COMMANDS

"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[^]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

characters on one line. You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed.

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is 'running'. Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

Send your questions to:

Commodore Microcomputers
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem **C**

HOW TO USE THE PROGRAM

The Magazine Entry Program on page 125 is a machine language program that will assist you in entering the programs in this magazine correctly. It is for use with the Commodore 64 only and was written by Mark Robin using the IEA Editor/Assembler. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 50052, and just lets you know that the program is running. If everything is ok, the program will finish running and end. Then type NEW. If there is a problem with the data statements, the program will tell you where to look to find the problem.

Once the program has run, it is in memory ready to go. To activate the program, type SYS49152 and press RETURN. When the READY prompt is displayed, type TEST and press RETURN. You are now ready to enter the programs from the magazine.

Typing the Programs

All the program listings in this magazine that are for the 64 have an apostrophe followed by four letters at the end of the line (i.e., 'ACDF). The apostrophe and letters *should* be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it *does not* enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are six error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

PARENTHESIS: This means that you forgot (or added) a parenthesis somewhere in the line. Check the line in the magazine again and correct the parenthesis.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT..) incorrectly. Check the line in the magazine again and check your spelling.

 # OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word mispelled. Check the line in the magazine again and correct the mistake. **C**

Magazine Entry Program

The Magazine Entry Program is available on disk, along with the other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
1 PRINT "[CLEAR]POKING-";
5 P=49152 :REM $C000
10 READ A$:IF A$="END"THEN 80
20 L=ASC(MID$(A$,2,1))
30 H=ASC(MID$(A$,1,1))
40 L=L-48:IF L>9 THEN L=L-7
50 H=H-48:IF H>9 THEN H=H-7
60 PRINT"[HOME,RIGHT12]"P;
70 B=H*16+L:POKE P,B:T=T+B:P=P+1
   :GOTO 10
80 IF T<>103233 THEN PRINT"MISTAKE IN
   DATA --> CHECK DATA STATEMENTS":END
90 PRINT"DONE":END
1000 DATA 4C,23,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,00,00,0D
1002 DATA 00,58,C1,5E,C1,66,C1,76
1003 DATA C1,83,C1,8F,C1,EA,EA,EA
1004 DATA 4C,83,C0,A2,05,BD,1D,C0
1005 DATA 95,73,CA,10,F8,60,A0,02
1006 DATA B9,00,02,D9,3C,C1,D0,0B
1007 DATA 88,10,F5,A9,01,8D,10,C0
1008 DATA 4C,1F,C1,60,A0,03,B9,00
1009 DATA 02,D9,38,C1,D0,E0,88,10
1010 DATA F5,A9,00,8D,10,C0,4C,1F
1011 DATA C1,60,A0,03,B9,00,02,D9
1012 DATA 34,C1,D0,E0,88,10,F5,A0
1013 DATA 05,B9,A2,E3,99,73,00,88
1014 DATA 10,F7,A9,00,8D,18,D4,4C
1015 DATA 1F,C1,E6,7A,D0,02,E6,7B
1016 DATA 4C,79,00,A5,9D,F0,F3,A5
1017 DATA 7A,C9,FF,D0,ED,A5,7B,C9
1018 DATA 01,D0,E7,20,5A,C0,AD,00
1019 DATA 02,20,A3,C0,90,DC,A0,00
1020 DATA 4C,EA,C1,C9,30,30,06,C9
1021 DATA 3A,10,02,38,60,18,60,C8
1022 DATA B1,7A,C9,20,D0,03,C8,D0
1023 DATA F7,B1,7A,60,18,C8,B1,7A
1024 DATA F0,35,C9,22,F0,F5,6D,05
1025 DATA C0,8D,05,C0,AD,06,C0,69
1026 DATA 00,8D,06,C0,4C,BD,C0,18
1027 DATA 6D,07,C0,8D,07,C0,90,03
1028 DATA EE,08,C0,EE,0B,C0,60,18
1029 DATA 6D,0A,C0,8D,0A,C0,90,03
1030 DATA EE,09,C0,EE,0C,C0,60,0A
1031 DATA A8,B9,11,C0,85,FB,B9,12
1032 DATA C0,85,FC,A0,00,A9,12,20
1033 DATA D2,FF,B1,FB,F0,06,20,D2
1034 DATA FF,C8,D0,F6,20,54,C3,20
1035 DATA 7E,C3,20,E4,FF,F0,FB,A0
1036 DATA 1B,B9,3F,C1,20,D2,FF,88
1037 DATA 10,F7,68,68,A9,00,8D,00
1038 DATA 02,4C,74,A4,4B,49,4C,4C
1039 DATA 54,45,53,54,41,44,44,91
1040 DATA 91,0D,20,20,20,20,20,20
1041 DATA 20,20,20,20,20,20,20,20
1042 DATA 20,20,20,20,20,20,91,0D
1043 DATA 51,55,4F,54,45,00,4B,45
1044 DATA 59,57,4F,52,44,00,23,20
1045 DATA 4F,46,20,43,48,41,52,41
1046 DATA 43,54,45,52,53,00,55,4E
1047 DATA 49,44,45,4E,54,49,46,49
1048 DATA 45,44,00,4E,4F,20,43,48
1049 DATA 45,43,4B,53,55,4D,00,50
1050 DATA 41,52,45,4E,54,48,45,53
1051 DATA 49,53,00,C8,B1,7A,D0,FB
1052 DATA 84,FD,C0,09,10,03,4C,C7
1053 DATA C1,88,88,88,88,88,B1,7A
1054 DATA C9,27,D0,13,A9,00,91,7A
1055 DATA C8,A2,00,B1,7A,9D,3C,03
1056 DATA C8,E8,E0,04,D0,F5,60,4C
1057 DATA F2,C2,A0,00,B9,00,02,99
1058 DATA 40,03,F0,F2,C8,D0,F5,A0
1059 DATA 00,B9,40,03,F0,E8,99,00
1060 DATA 02,C8,D0,F5,20,D7,C1,4C
1061 DATA 56,C2,A0,0B,A9,00,99,03
1062 DATA C0,8D,3C,03,88,10,F7,A9
1063 DATA 80,85,02,20,1B,C3,A0,00
1064 DATA 20,9B,C1,20,CA,C1,20,31
1065 DATA C2,E6,7A,E6,7B,20,7C,A5
1066 DATA A0,00,20,AF,C0,F0,CD,24
1067 DATA 02,F0,06,20,D7,C0,4C,12
1068 DATA C2,C9,22,D0,06,20,BC,C0
1069 DATA 4C,12,C2,20,E7,C0,4C,12
1070 DATA C2,A0,00,B9,00,02,20,A3
1071 DATA C0,C8,90,0A,18,6D,09,C0
1072 DATA 8D,09,C0,4C,33,C2,88,A2
1073 DATA 00,B9,00,02,9D,00,02,F0
1074 DATA 04,E8,C8,D0,F4,60,18,AD
1075 DATA 0B,C0,69,41,8D,0B,C0,38
1076 DATA AD,0C,C0,E9,19,90,06,8D
1077 DATA 0C,C0,4C,60,C2,AD,0C,C0
1078 DATA 69,41,8D,0C,C0,AD,05,C0
1079 DATA 6D,07,C0,48,AD,06,C0,6D
1080 DATA 08,C0,8D,0E,C0,68,6D,0A
1081 DATA C0,8D,0D,C0,AD,0E,C0,6D
1082 DATA 09,C0,8D,0E,C0,38,E9,19
1083 DATA 90,06,8D,0E,C0,4C,96,C2
1084 DATA AD,0E,C0,69,41,8D,0E,C0
1085 DATA AD,0D,C0,E9,19,90,06,8D
1086 DATA 0D,C0,4C,AB,C2,AD,0D,C0
1087 DATA 69,41,8D,0D,C0,A0,01,AD
1088 DATA 0B,C0,CD,3C,03,D0,20,C8
1089 DATA AD,0C,C0,CD,3D,03,D0,17
1090 DATA C8,AD,0D,C0,CD,3E,03,D0
1091 DATA 0E,AD,0E,C0,CD,3F,03,D0
1092 DATA 06,20,64,C3,4C,7A,C0,AD
1093 DATA 10,C0,D0,11,98,48,68,4C
1094 DATA F7,C0,AD,10,C0,F0,01,60
1095 DATA A9,04,4C,F7,C0,A4,FD,A9
1096 DATA 27,91,7A,A2,00,C8,BD,0B
1097 DATA C0,91,7A,C8,E8,E0,04,D0
1098 DATA F5,A9,00,91,7A,20,64,C3
1099 DATA 4C,7A,C0,A0,00,B9,00,02
1100 DATA F0,11,C9,28,D0,03,EE,03
1101 DATA C0,C9,29,D0,03,EE,04,C0
1102 DATA C8,D0,EA,AD,03,C0,CD,04
1103 DATA C0,D0,01,60,A9,05,4C,F7
1104 DATA C0,A9,20,8D,00,D4,8D,01
1105 DATA D4,A9,09,8D,05,D4,A9,0F
1106 DATA 8D,18,D4,60,20,41,C3,A9
1107 DATA 81,20,77,C3,A9,80,20,77
1108 DATA C3,4C,71,C3,20,41,C3,A9
1109 DATA 11,20,77,C3,A9,10,20,77
1110 DATA C3,A9,00,8D,04,D4,60,8D
1111 DATA 04,D4,A2,70,A0,00,88,D0
1112 DATA FD,CA,D0,FA,60,END
```

SILENT SERVICE

Continued from pg. 34

bined together. Every ship and torpedo has a "tail" on the end of it to show you in what direction each one is headed. When you find the enemy fleet and wish to examine it in more detail, press the "Z" key for the "zoom" mode and enlarge the map one level. The "X" key will shrink the map back one level. There are four levels of detail.

When in heavy combat, your submarine is destined to have damage. To check what is leaking or broken, pull back on the joystick at the Conning Tower and press the button. The screen will display your submarine, highlighting areas of damage. If there are leaks in the hull of the sub, the amount of water entering is estimated in gallons per second. Once you have estimated the damage, the repair crew will automatically begin repairs unless you specify otherwise.

Pressing the joystick toward the left while holding the button will select the Instruments and Gauges option. From here you can read gauges on the sub's battery level, speed, depth, and fuel levels, along with other instruments. Just pressing the button will return you to the Conning Tower.

The manual included with this game is extremely complete. Not only does it contain the basic loading and playing instructions, but it includes descriptions of World War II submarines, equipment used, submarine tactics, information on torpedoes and the Torpedo Data Computer, the deck gun, and hints for escape from the enemy. It is a complete and well researched manual.

The sound effects are quite realistic and the graphics are stunning. Each screen contains its own artistic detail, including shading and reflections. Even the commander has the traditional beard. *Silent Service* also has a pause, speed adjustment, and high score features. Along with a new fast-load option, you can load *Silent Service* in 20 seconds!

Silent Service is designed for older children and adults who can grasp the idea of handling a submarine during a war. And, of course, any simulation requires an amount of strategy. If you enjoy action simulations, *Silent Service* is truly an excellent program to add to your collection. C

BLACK THUNDER

Continued from pg. 28

into its non-stop kill-or-be-killed onslaught. This is a test of concentration, reaction and endurance, a demanding game that will leave your hands sore from the activity. For these reasons, it's safe to say that this is not a program that will appeal to everyone. Combatants with uncalloused trigger fingers or second-rate reflexes need not even apply. But if you're part of that arcade-loving crowd who still craves the raw video violence of a classic joystick shoot-out, you'll enjoy *Black Thunder*. C

Thunder's Enlightening

The basic strategy to a productive Crow-Ther excursion is to move quick and fire quicker. I can't be of much help there. But I might be able to share some tips on how to prepare for the onslaught of enemies by pointing out their individual attacking styles and providing some appropriate defenses.

Tanks

These pesky devils cruise along the road trying to transform your car into an inoperable subcompact by using high speed head-on collisions. You can either blast them or avoid them. Either way, they shouldn't present much of a problem, as long as you remember a few things.

Always follow the tanks' approaching route, as well as their destruction, through the bottom half of the split screen. No one can react fast enough to spot and destroy an on-coming vehicle in the smaller confines of the upper half.

Tunnels are periodically incorporated in the roadway, making tracking from above (on the lower screen) impossible. Whenever you are approaching such a tube, make sure you have at least four ammo dumps stored, so you can send out a few forward shots to annihilate any hidden tanks.

Be extra careful when firing at a tank as you approach a turn or intersection. Your missile will not follow the path of the road. So if a tank is on the other side of a corner when fired upon, there is a good chance that the missile will zip straight ahead, leaving the enemy vehicle unscathed and ready to ram.

Guided Missiles

These can *only* be attacked from behind, requiring a player to first side step the trailing attacker, and then destroy him with a rear assault. This is easier said than done, since many of the city streets have no escape routes, leaving small chance of this evasive maneuver. The successful driver will learn the roadway patterns, and use his brakes to position himself in an advantageous position when the missile draws near. Again, try to follow the guided missiles' action using the lower screen.

Helicopters

These are the most tenacious and frustratingly difficult enemy to destroy. They come in a couple of different colors, exhibiting various speeds (all fast) and tailing abilities. Their continuous up-and-down bobbing motion makes them a tough target to hit with a ground-to-air missile. This being the case, I have often found it more beneficial to avoid any confrontation by using an evasive braking maneuver. Just after the chopper becomes visible on the upper screen half, shift into top speed, and then brake to a near halt. The helicopter will most likely pass overhead without inflicting the slightest bit of damage. And since this airborne enemy has no reverse gear, you're home free until the next formation arrives.

U.F.O.'s

Believe me, you do not and should not draw the normally passive flying saucer into battle. But unfortunately, you will. Even one errant bullet will wake this sleeping giant, and with rockets and missiles whizzing about in swarms, this floating metallic jumbo ship is bound to pick up an instigating dink or two. When the inevitable occurs, the only hope for survival is another quick-stop evasive maneuver. But this time, you'll have to have impeccable timing. Wait until the saucer has almost landed on your car's roof before slamming on the brakes. There isn't much room for error, but if you time it correctly, you should be able to stop and blast the flying object, turning near disaster into a 300-point bonus. C

REVIEWED BY WALT LOUNSBERY

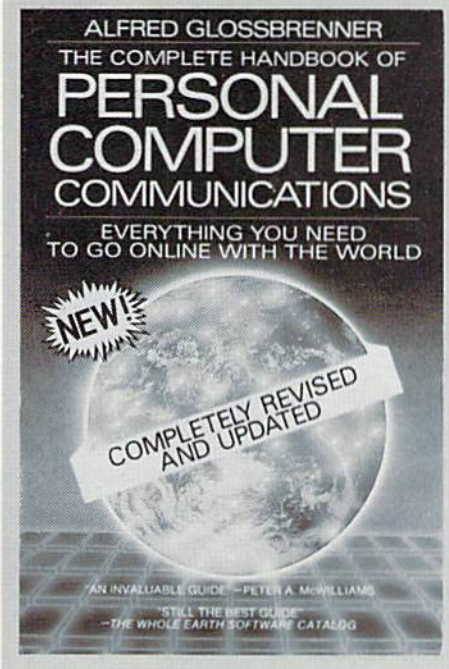
The Complete Handbook of Personal Computer Communications

Author: Alfred Glossbrenner
Publisher: St. Martin's Press
175 Fifth Avenue
New York, NY 10010
Price: $14.95

It would take a very gullible person to pick up a copy of *The Complete Handbook of Personal Computer Communications* by Alfred Glossbrenner and believe everything printed on the cover. This book cover rivals late-night television ads for hype. The first warning sign is, of course, the title. I normally dismiss anything that says "handbook," since such books rarely have the information content of even a computer-table assembly guide. And "complete" usually means that all the pages are there. The book is subtitled "Everything You Need to Go On-line with the World." My problem was that although I didn't believe a word on the cover, I nevertheless opened the book and kept reading.

What I found was astounding. Here is a book that really relates to the concerns of computer owners. This impossible task is attempted in 508 pages of text, preceded by an introduction and followed by an index. Though I've found a few technical glitches, the book covers electronic communications with personal computers quite well. Furthermore, it cuts through the complexity of telecommunications with the simple facts. This makes the book ideal for those acquiring modems and communications programs. But it is also just as ideal both for someone wanting to find out what modems have to offer, and as a reference work for the seasoned telecommunicator.

If you tackle this book, you will need patience. In fact, if your needs are few, you would do better to consult your friends, local computer club, or computer dealer. This is a point the author makes, too. But if you like to know it all, or at least reduce your on-line costs or discover other bulletin boards and services out there, then I recommend the book.



This book cuts through the complexity of telecommunications with simple facts.

Introduction

This is the only book I know that has a significant introduction. It jumps right into accessing Telenet, Tymnet, and Uninet, the major carriers for commercial data bases, information services, and electronic mail. In a few quick pages, you learn what's available on-line then how to access it. The reader is also introduced to "On-line Tips," little snatches of text outlined in a box for emphasis. The tips mention handy references, neat techniques, useful or recommended products, or interesting trivia.

Hello, Is Anybody There?

The first section is entitled "Accessing the Power." It is parceled into several chapters. The beginning chapter expands on the possibilities of electronic communications. It is also a good informal introduction to the history of telecommunications. Following chapters describe important information for starting out and making the most of your system. However, the book tends to breeze past the Commodore community. If you need to know how to hook up your equipment, I suggest other sources.

One of the best parts of this section is "Cost Busters." It has some very good hints for saving money. For example, you are advised to contact your telephone operator to see if your information service (CompuServe or some other) has established a packet switching node in your area. Since you are billed extra for linking in through Telenet or Tymnet, this one phone call could reduce your charges tremendously.

The section ends with a discussion of the technical end of computer communications, including a tutorial on serial communication, baud rate, and RS-232 hookups. There is also practical information on constructing null modem cables and sending *WordStar* files.

All the Utilities Fit to Print

Nearly 100 more pages are devoted to detailed information on CompuServe, The Source, and Delphi. This just scratches the surface, as there have been at least three telecommunications networks for Commodore owners released since the book was published. At the very least, a close examination of these three will give the reader an excellent idea of what features to expect.

Let's Get Down to Business

In the next three sections, the author describes the Dow Jones News/

Continued on pg. 174

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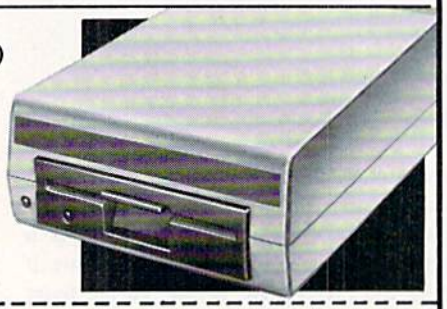

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BOOK REVIEWS

Retrieval and other data bases. The access commands are presented, as well as a sample session. Several of the custom programs for obtaining summaries and presenting data from Dow Jones News/Retrieval are also summarized and various electronic stockbroker services are described. This part of the book has the best On-line Tips of all, providing contacts for computerized investing, means to contact the American Association of Microcomputer Investors, and information on various brokerage firms accessible by computer (along with their commissions). Finally, the author introduces newsletter information services by detailing NewsNet.

Say What?

Electronic mail is an expanding segment of the telecommunications industry. Although there are over 100 services in this area, the author presents a good overview of the types. Again, the On-line Tips are effective in giving relevant sources for further information. The author manages to provide a cohesive picture of this complicated business.

Of course, electronic mail is just a slower version of computer conferencing. This gets its own chapter. This is the major method for computerized schooling, and it has been the medium for nationwide conferences.

Bringing it Home

The last section in the book addresses the personal computer at home. This information is specifically for home access, whether for fun or business. A frank discussion of on-line shopping and home banking is followed by references. The last chapter delves into bulletin boards. This information is understandably skimpy, considering the wide diversity of bulletin board systems and the fact that the book already has 477 pages at this point.

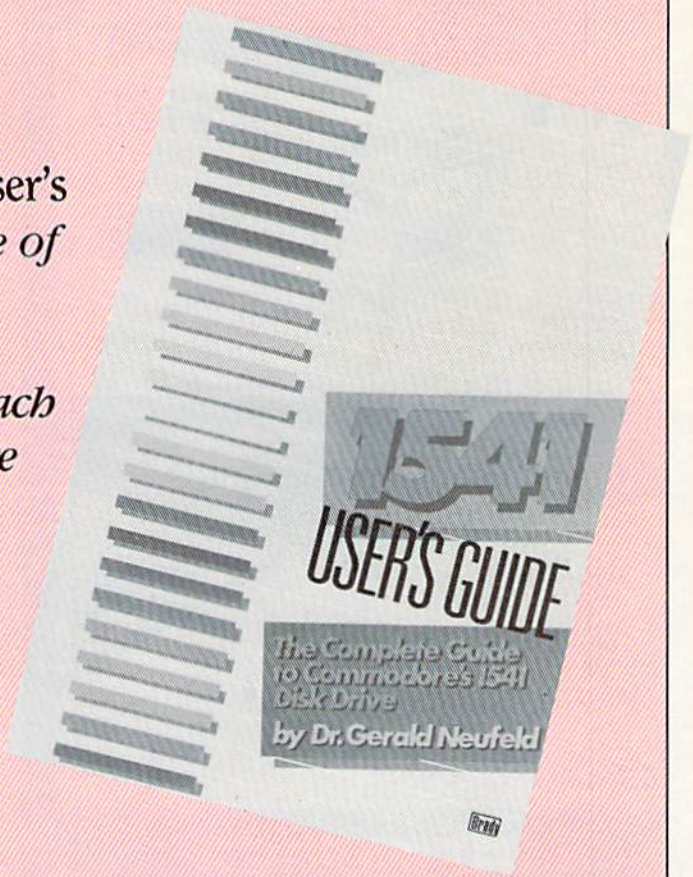
There you have it, a fine book about a complicated subject. Although there are a few flaws from a Commodore owner's point of view, the information on services, telecommunication, and general use of modems is well worth the price of the book. The book is for anyone seriously interested in using a modem with their computer. C

REVIEWED BY AL WILLEN

The 1541 User's Guide

Author: Dr. Gerald Neufeld
Publisher: Datamost
19821 Nordhoff Street
Northridge, CA 91324
Price: $19.95

The 1541 User's Guide is one of the most important books to reach Commodore 1541/4040 disk drive owners this year.



Essentially, *The 1541 User's Guide* concerns the proper operation of the 1541 disk drive, and the creation and manipulation of various types of data files which are supported by Commodore's disk operating system (DOS). But *The 1541 User's Guide* goes beyond average cut-and-dry technical manuals that fill bookstore shelves. It is a joy to read and a pleasure to use, invaluable to any serious Commodore 64 programmer.

What makes *The 1541 User's Guide* so outstanding is Dr. Neufeld's presentation. Each topic is thoroughly explained in a conversational tone. The standard form of a DOS command is shown (OPEN 15,8,15, "NEW:DISK-NAME,ID":CLOSE 15) as well as every variation on that command (OPEN 15,9,15,"N0:DISK-NAME, ID:CLOSE 15). These variations include every combination found in DOS 2.6 (native disk operating system for the 1541), DOS 5.1 (the famous 64 Wedge), and Extended DOS for PET dual drive systems (such as the 4040 disk drive). Next comes a section which documents various algorithms on any given command. Then there is a detailed explanation of the underlying principle. Finally, each section ends with notes, warnings, hints, cautions, and an application example.

Most books dealing with the 1541 offer one solution to a file-handling situation and imply, "This is the way you have to approach this problem ... period!" *The 1541 User's Guide,* on the other hand, says, "These are the various ways you can approach this file-handling situation. You choose the one you feel is most advantageous in your specific programming situation."

The 1541 User's Guide is so well written and so informative that if it were possible, I would enroll to hear author Neufeld (who is a university professor) lecture in person. This book is vital to beginners, as well as more advanced programmers. Every DOS subject, with the exception of the most expert 1541 DOS bypassing commands (Memory-Execute) are painstakingly covered. (Note: For expert programmers, a continuation of this book is found in Datamost's *Inside Commodore DOS*, co-authored by Dr. Neufeld.)

The 1541 User's Guide is also important because all the examples are both accurate and practical. Over 25 full-length application and disk-utility programs are listed and documented. A disk containing these programs—to save typing frustrations—is available for a nominal fee. As a programmer who collects utility programs, I can honestly say that these programs are some of the best I've seen in a long while. My favorite one traces through every program on a disk, and confirms the accuracy of each file via a super block availability map (BAM) printout. For any programmer who has ever lost a treasured program because of "crossed sectors," this utility will pay for itself again and again.

The 1541 User's Guide ends with a comprehensive glossary, various reference tables, a Token Code Chart, a listing of number of sectors per track, the locations of important parts of a directory sector, a diagram of normal filing sequences, a chart of file-type bytes and their meanings, an annotated listing of all disk error messages, a summary of all disk commands, a comprehensive listing of advanced direct-access commands (U1, U2, etc.), and a listing of 20 vital disk utility programs.

The 1541 User's Guide is one of the most important books to reach Commodore 1541/4040 disk drive owners this year. It complements the standard reference manual on Commodore DOS—Abacus Software's *The Anatomy of the 1541*—perfectly. Together, both books should be in every Commodore user's home library. C

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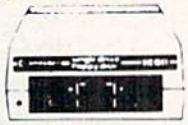

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