

Super Summer Sizzler Sale Ends 9-15-85

Prices will go back to regular sale prices

FLOPPY DISKS SALE *69¢ ea.

Economy Model or Cadillac Quality

We have the lowest prices!

*ECONOMY DISKS

Summer Sale Prices Only

Good quality 5¼" single sided single density with hub rings.

Bulk Pac

100 Qty.

69¢ ea.

Total Price

\$69.00

10 Qty.

89¢ ea.

Total Price

8.90

CADILLAC QUALITY (double density)

• Each disk certified

• Free replacement lifetime warranty

• Automatic dust remover

For those who want cadillac quality we have the Loran Floppy Disk. Used by professionals because they can rely on Loran Disks to store important data and programs without fear of loss! Each Loran disk is 100% certified (an exclusive process) plus each disk carries an exclusive FREE REPLACEMENT LIFETIME WARRANTY. With Loran disks you can have the peace of mind without the frustration of program loss after hours spent in program development.

100% CERTIFICATION TEST

Some floppy disk manufactures only sample test on a batch basis the disks they sell, and then claim they are certified. Each Loran disk is individually checked so you will never experience data or program loss during your lifetime!

FREE REPLACEMENT LIFETIME WARRANTY

We are so sure of Loran Disks that we give you a free replacement warranty against failure to perform due to faulty materials or workmanship for as long as you own your Loran disk.

AUTOMATIC DUST REMOVER

Just like a record needle, disk drive heads must travel hundreds of miles over disk surfaces. Unlike other floppy disks the Loran smooth surface finish saves disk drive head wear during the life of the disk. (A rough surface will grind your disk drive head like sandpaper). The lint free automatic CLEANING LINER makes sure the disk-killers (dust & dirt) are being constantly cleaned while the disk is being operated. PLUS the Loran Disk has the highest probability rate of any other disk in the industry for storing and retaining data without loss for the life of the disk.

Loran is definitely the Cadillac disk in the world

Just to prove it even further, we are offering these super LOW INTRODUCTORY PRICES
List \$4.99 ea. INTRODUCTORY SALE PRICE \$2.49 ea. (Box of 10 only) Total price \$24.90
\$3.33 ea. (3 quantity) Total price \$9.99

All LORAN disks come with hub rings and sleeves in an attractive package.

DISK DRIVE CLEANER \$19.95

Everyone Needs A Disk Drive Doctor

FACTS

- 60% of all drive downtime is directly related to poorly maintained drives.
- Drives should be cleaned each week regardless of use.
- Drives are sensitive to smoke, dust and all micro particles.
- Systematic operator performed maintenance is the best way of ensuring error free use of your computer system.

The Verifin disk drive cleaner can be used with single or double sided 5¼" disk drives. The Verifin is an easy to use fast method of maintaining efficient floppy diskette drive operation. The Verifin cleaner comes with 2 disks and is packed in a protective plastic folder to prevent contamination. List \$29.95. **Sale \$19.95.** * Coupon \$14.95.

Add \$3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

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Fulfill All Your Personal & Business Needs "NOW"

S'MORE Cartridge Sale \$49.95

57% More Memory For BASIC

C128 Programming on your Commodore 64

For the first time, the Commodore 64 computer owners can make use of the full memory that came inside their Commodore 64 without having to learn sophisticated assembly or machine language programming. The new S'more BASIC Cartridge allows BASIC programmers to use over 60K of RAM for BASIC programs. This 57% gain in available memory is not restricted in any way, it can be used for arrays, variables and BASIC programs which would over-load the capacity of an un-expanded Commodore 64. List \$69.95 **Sale \$49.95**

S'MORE (for Super Memory Optimized RAM/ROM Expansion) is a powerful cartridge-based program which provides...

- * 61,183 bytes of C-64 RAM memory freed for BASIC programming (57% more than the 38,911 now free). This gain is not restricted in any way, and can be used for arrays, variables, and BASIC programs which would overload the un-expanded C-64's capacity
- * Over 60 new and enhanced BASIC commands & functions
- * Full error trapping, and an automatic error help which lists the error line and places a flashing cursor at the beginning of the program statement containing the error
- * No peeks or pokes because S'MORE provides direct access to normally peeked/poked items
- * Full up-down scrolling through program listings for easier program editing

Relative File Commands: DOPEN# & RECORD#. **Print Using And Other Formatting Tools:** PRINT USING, PUDEF (define format for the PRINT USING function), & PRINT AT (row, col.). **Full Error Trapping:** TRAP, EL (returns error line #), ER (returns error #), ERR\$ (returns error description), RESUME, & RESUME NEXT. **Structured Programming Commands:** DO, LOOP, EXIT, UNTIL, & WHILE. **Formatted Input Commands:** GETKEY, INLINE, INPUT (improved), INPUT AT (row, col.), INFORM (limits allowed response keys and length of response). **Peeks & Pokes Not Needed:** Direct access to normally peeked/poked items is provided with commands like BORDER, PAPER, INK, VID(x) (x=screen memory location), COL(x) (x=column memory location), VIC(x), SID(x), CIA(x), NORM, UPPER, & LOWER.

A BRIDGE TO THE C-128: Commodore 64 owners get immediate memory expansion from S'MORE. S'MORE's command structure is similar to the C-128, allowing programmers to make use of advanced programming techniques available on the C-128's new BASIC 7.0 so that programs written on S'MORE BASIC may be more easily converted to run on the C-128.

Write Now! — Word Processor Sale \$34.95

Easy To Use Cartridge Based Word Processor for the C-64, With Full 80 Column On-Screen In Color View Mode

The WRITE NOW! word processor provides you with the easiest to use, fastest to learn format available for your Commodore 64 computer. It will give you all the features you would expect in a professional word processor and some features not found in any other Commodore 64 word processor.

(Cartridge) List \$49.95. **Sale \$34.95. Coupon \$29.95.**

- Program is on cartridge and loads instantly so there is no waste of time loading from unreliable tapes or disks.
- Built in 80 column display allows you to see exactly what you will print including headers, footers, justification, page numbers and page breaks.
- Can send all special codes to any printer, even in the middle of a line without losing proper justification.
- Page numbering in standard numbers or upper or lower case Roman numerals.
- Full string search and search/replace functions.
- Direct unlimited use of previously stored text from tape or disk called from within text during the print out so it uses no memory space and allows creation of unlimited length documents.
- Full scrolling up and down through text.
- No complicated editing modes or commands.
- Multiple line headers and footers.
- Justification and text centering.
- Block copy and delete commands.
- Save text to tape or disk.
- Easy full screen editing.
- Works with any printer.
- Easy to understand instruction booklet.
- 4 help screens included.

Spell Now — Spell Checker Sale \$19.95

"Spell Now" is a disk based professional spelling checker that interfaces with the "Write Now" word processor for the C-64. Use "Spell Now" to check the spelling in your "Write Now" files. It includes all features of the most expensive spelling checkers on the market. (Disk) List \$39.95. **Sale \$19.95.**

Graph Now / Paint Now — Graphic/Logo Generator Sale \$19.95

A full graphics package capable of generating line, bar graphs and graphic art designs such as logos and pictures to be used with "Write Now" for the C-64. Save your graph or logo in a "Write Now" compatible file and print it out along with your "Write Now" text file. (Disk) List \$39.95. **Sale \$19.95.**

Add \$3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APQ-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, EXCEPT CANADA.

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Ultimate Arcade Quality Model

**Commodore 64
VIC 20
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Machines**

**Coin Controls
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2 Year Warranty**

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5200 Joystick

Allows keypad hook-up

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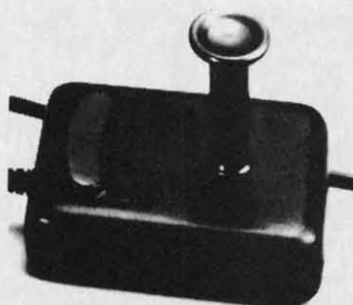
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*Single Button Economy Model



List \$12.95

**Sale
\$8.95**

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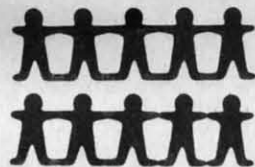
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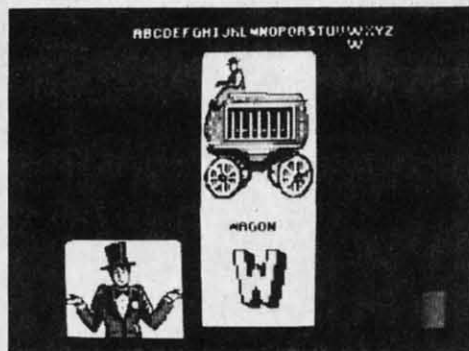
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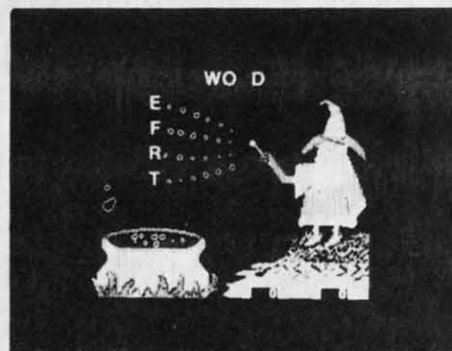
DLM



Makes your Computer into a Fun Classroom



Alphabet Circus. All the color and excitement of the big top are here, along with play-and-learn activities that enhance letter recognition, alphabet order, and text creation. The six games for one or two players are: Alphabet Circus, Meet the Circus, Alphabet Parade, Secret Letter, Juggler, and Marquee Maker. (Disk) List \$29.95. **Sale \$17.95.**



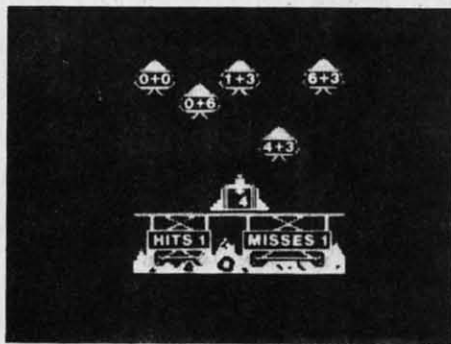
Spelling Wiz. A colorful wizard who uses his magic wand to zap missing letters into words, assists players in spelling more than 300 words commonly misspelled. (Disk) List \$34.00. **Sale \$19.95.**



Number Farm. Here's a bumper crop of activities design to develop recognition of numbers and number words and an understanding of the concept of numbers. The six games for one or two players are: Number Farm, Old McDonald, Hen House, Animal Quackers, Horseshoes, and Crop Count. (Disk) List \$29.95. **Sale \$17.95.**

Commodore 64 Sale

Alien Addition. The fast action and colorful graphics of arcade games motivate players of all ages to learn fundamental math skills. Alien addition provides practice in basic addition facts using an "Alien invasion" theme complete with spaceships and laser cannons. (Disk) List \$34.00. **Sale \$19.95.**



\$17⁹⁵ - \$19⁹⁵ Early Christmas Sale

Alligator Mix. Players build skills in addition and subtraction as they feed hungry alligators. Very challenging, with great graphics. (Disk) List \$34.00. **Sale \$19.95.**



Commodore 64 Sale

Meteor Multiplication. Have fun blasting meteors, while learning basic multiplication facts. Requires motivation as players practice and are drilled in multiplication skills. Fast action and colorful graphics keep interest of all ages. (Disk) List \$34.00. **Sale \$19.95.**



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Commodore 64

Computer Learning Pad

- Makes Graphic Tablets Obsolete
- Includes Special Printer Feature

Sale! **\$37⁹⁵**

Hi-Resolution!

Now you get this **Fantastic Tech Sketch Computer Light Pen Program** with a **Professional Light Pen Free!** (\$39.95 value) plus the **Micro Illustrated Graphics Pen Program** that allows you to draw on your T.V. or monitor screen (better than Gibsons \$99 light pen). Whatever you can draw on the screen you can print on your printer (A Tech Sketch Exclusive.) (Disk) List \$59.95 **Sale \$37.95.**



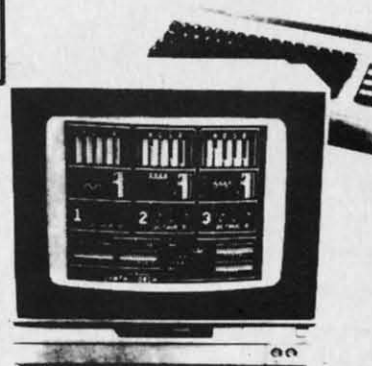
Also available is **Lite Sprite**, a light pen driven sprite builder (List \$39.95 **Sale \$29.95**).

MUSIC PORT

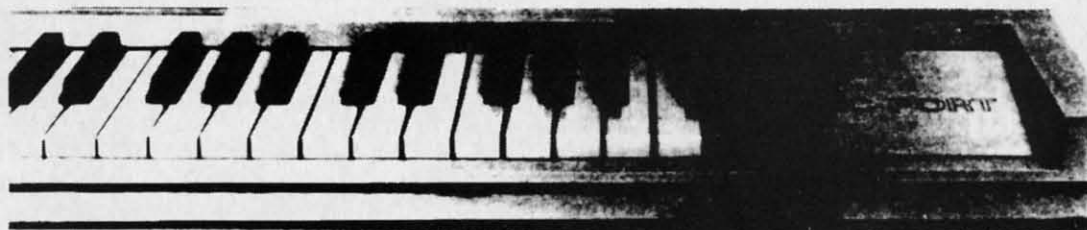
The ultimate music synthesizer and multi-track recording system for the Commodore 64. A **Full-sized REAL Keyboard** and all software including preprogrammed songs are included. (Disk) List \$149.95 **Sale \$99.00.**

Fully Responsive
"MUSICIANS" Keyboard

Sale! **\$99⁰⁰**



No
Extra
Software
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Commodore 64

**BEST
VALUE****EPYX™**

Commodore 64

**BEST
VALUE**

The Best Arcade Games Around

Winter Games — Experience the challenge of six winter sporting events. In the Bobsled, you're right in the tube careening along the walls. At the SkiJump, you control your form in take-off, flight and landing. In Figure Skating, timing counts for the transitions, the jumps and landings. Choreograph your own routine in Free Style Skating. Hot Dog Aerials push your agility to new heights. The Biathlon challenges your endurance in cross-country skiing. There's even an opening ceremony, complete with national anthems. One to Eight Players. (Disk) List \$39.95. **Sale \$22.95.**



The World's Greatest Football Game — This one has it all — strategy, action, three views of the field. It's in a class all its own! Finally, a football game that not only puts you on the field, but also on the sidelines in the coach's shoes. Use the "Playbook" or design your own offensive and defensive plays. Then, grab the joystick and put your strategy to the test. You control key players to run a sweep, make a tackle, throw a pass and even kick a fieldgoal. All the action and all the strategy make this your favorite football game. (Disk) List \$39.95. **Sale \$22.95.**



Jet Combat Simulation. Flight simulation programs are the most requested in the country. The key to a good one is realism, the sensation of being in the cockpit — guiding the plane through take-offs, landings and air to air — air to ground combat. You are an Air Force pilot and your mission is critical. Your success in completing your orders depends on how quickly and accurately you react. Very Intense — Fantastic Graphics, animation and control elements. (Disk) List \$39.95. **Sale \$22.95.**

Barbie — The biggest name in dolls. Browse through Barbie's closet full of beautiful clothing and dress her for the party. You can cut her hair or make it longer and color it or change the style. Buy new clothing at the boutique or any of the six other specialty shops, or even go to the dress shop and create Barbie's designer clothes with the help of the computer. The combinations are endless and so is the fun. One or two players. (Disk) List \$39.95. **Sale \$24.95.**

Ballblazer — Unique split-screen, 3-D graphics give you and your opponent a first person view of the field of play. You race across the playfield in your Rotofoil trying to capture the ball and fire it through the goal before your opponent. The winner is the player with the most points at the end of the timed competition. Hold onto your joystick and keep that finger on the fire button, this is the type of two player head-to-head action you've been waiting for. Two Players. (Disk) List \$29.95. **Sale \$24.95.**

Summer Games II — The original Summer Games was last Summer's No. 1 seller. Carry on the tradition with another chance to "Go for the Gold!" Introducing Summer Games II with 8 new Olympic events including Kayaking, cycling, fencing, diving, track & field, gymnastics and equestrian. The excitement of Olympic competition is present in this new version as it was in the original. Great graphics and sound effects. This one's a winner! (1 to 8 players). (Disk) List \$39.95. **Sale \$24.95.**

G.I. Joe — The best selling toy soldier is now available as an activity toy on the home computer. Select the battle situation then choose the equipment you think you will need to get the job done. Choose from a number of uniforms and weapons in your well stock arsenal and get ready for the action. Play alone or with a friend, if you plan the right strategy you will complete the mission if not you will have to try again. One or two players. (Disk) List \$39.95. **Sale \$24.95.**

Rescue On Fractalus! — Your mission is to fly your Valkyrie Fighter through the Jaggi defenses and rescue the downed Ethercorps pilots. Sounds easy, but don't let it fool you. It's tough enough just to navigate the mountains and canyons of Fractalus, but try doing it while destroying enemy gun emplacements or dodging suicide saucers. We supply the Long Range Scanner, Dirac Mirror Shield and Anti-Matter Bubble Torpedoes ... YOU supply the skill and guts! One Player. (Disk) List \$29.95. **Sale \$24.95.**

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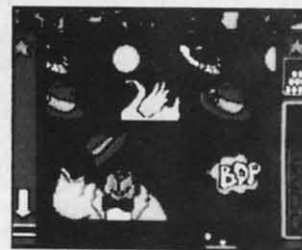
Weekly Reader

Commodore 64
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XEROX Educational Programs

Stickybear Bop

Rack up points by bopping all kinds of objects — planets, stars, ducks, and more... First, you'll flip balls at an animated shooting gallery of whizzing targets that appear. Bop as many as you can. Bop more, score more!... To pile up points in succeeding rounds, you must bop the assorted objects Mr. and Mrs. Stickybear are juggling...don't get bopped by the sandbags Stickybear drops when he sails across the top of the screen in his balloon... and watch out for a pair of silly birds who will try to steal the little balls you need to play with. The game continues with more shooting galleries, sandbags, a bigger flock of silly birds, and more of everything to be bopped. (Disk) List \$34.95. **Sale \$24.95.**

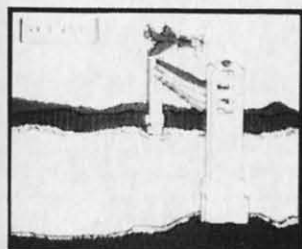


Stickybear Numbers

There are colorful groups of big moving objects, such as ducks, birds and bears, that reinforce numbers and counting skills. You can use the space bar to learn to count up and down. The many possible picture combinations work to captivate youngsters with an endless variety of picture shows and give them plenty of hands on computer experience. (32 page book, disk, colorful Stickybear poster, Stickybear stickers.) (Disk) List \$34.95. **Sale \$24.95.**

Stickybear Basketbounce

Your goal is to win as many points as you can by catching colorful, bouncing, falling objects — including bricks, donuts, and stars — before running out of baskets. While trying to accumulate points, Stickybear must duck falling objects and dodge moving ground obstacles that try to trip you. Keep score on the computer to see which player's on top. New obstacles and falling objects in each successive round require more and more skill in order to score. The rounds increase in difficulty as you progress through each level, making Stickybear Basketbounce a game that is fun and challenging for all ages. (Disk) List \$34.95. **Sale \$24.95.**



Stickybear Opposites *Award Winner!*

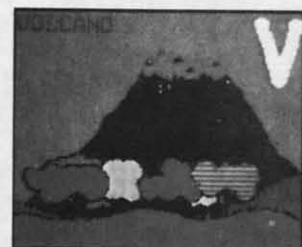
Stickybear floats across the screen on unicycles, in cars, on hot air balloons and other delightful vehicles to teach beginners about opposites and build reasoning skills. Such concepts as up/down, full/empty, in front/behind and more soon become crystal clear as Stickybear does his stuff with fun activities and eye-popping animation. A colorful book and a poster provide additional opposites for 3- to 6-year-olds to learn. (Disk) List \$34.95. **Sale \$24.95.**

Outstanding Software Award — Preschool Education — Creative Computing.

Stickybear ABC *Award Winner!*

Beautifully animated pictures help children learn their ABC's and become familiar with computers. Two full-screen, full-color pictures with sound represent each letter in the alphabet. Besides helping boys and girls become familiar with computers, Stickybear ABC teaches younger children to recognize and name the letters. Older children begin to recognize words on sight. (Disk) List \$34.95. **Sale \$24.95.**

Best Software of the Year — Learning Magazine Parents' Choice Award — Parents' Choice.



Stickybear Shapes

Three delightful, full-color games help 3- to 6-year-olds identify circles, squares, triangles, rectangles and diamonds. When the youngster makes a correct choice, a big, bright picture comes alive with colorful animation! Even older children who have already learned these shapes will enjoy experimenting with Stickybear Shapes!

A special book and poster that accompany the disk provide additional activities for building shapes recognition, an essential school skill. (Disk) List \$34.95. **Sale \$24.95.**

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LOW AS
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Program Your Commodore 64 In Plain English (No need to know Basic) **CodeWriter**

**New
Program
Generators!!**

FileWriter — lets you control information so you can enter it, find it and change it, just the way you'd like. Simply draw any kind of screen you want to handle your data whether its information about bills, taxes, recipes, club memberships, stamp collections or your new home business. It will calculate automatically, hold grand totals, test for bad information for one form or hundreds. There is no need to "program" or know anything about computers. Most of the instructions you'll need are right on the screen for you. (Disk) List \$39.95. **Sale \$29.95. Coupon \$24.95.**



ReportWriter — Lets you make 'data' into information that can be reorganized and presented to help you make decisions. You need invoices turned into commission reports, customer leads tuned into mailing labels, accounts receivable turned into letters to your customers. ReportWriter can handle all of these requests. You create your own report ideas with ReportWriter. A report can be simple columns of figures, a memo, a check, a label, whatever you need. You may create as many reports as you like from the same files; it will report to the computer screen or to your printer. (Disk) List \$39.95. **Sale \$29.95. Coupon \$24.95.**



MenuWriter — MenuWriter links programs together so the user can select the program he needs by pressing just one key. Where good program design calls for several different files or reports to load smoothly and quickly, MenuWriter does the job. You set up screen after screen (up to 21) of simple clear menu formats to link your programs together. Menus can call programs to auto-load or simply call other menus. You control the whole process - from color selection to screen layout, to key choice. Whether you're working with CodeWriter programs or your own, MenuWriter will give you professional menu results the first time. (Disk) List \$39.95. **Sale \$29.95. Coupon \$24.95.**



SpeedWriter — What do you do with a BASIC program that you wrote (or bought, or typed) that is nice, does what you wanted it to do, but is just too slow to suit your needs? SpeedWriter makes BASIC FLY! A must for the sophisticated programmer, yet easy enough for the novice. Reduces program size up to 50%, in addition to speeding up your program to run 10-30 times faster. Couldn't be simpler! (Disk) List \$49.95. **Sale \$39.95. Coupon \$34.95.**

AdventureWriter — You think playing computer adventure games is exciting? How about the thrill of creating your own? It's all in this package. Your own heroes and villains, monsters and magicians, castles and coffins. You create complete adventure games without programming, which run on your disks. As many adventures as you can dream up - your treasures, your own fiendish riddles, and your treacherous plots for your friends to figure out! You control locations, treasures, hazards, characters, all descriptions and the plot. Computer adventures are one of the fastest growing hobbies around. Send them in for evaluation, we could market them for you. * graphics included in Commodore. **Com-64 Version** (Disk) List \$49.95. **Sale \$39.95. Coupon \$34.95. Atari Version** (Disk) List \$39.95. **Sale \$29.95.**



Dialog — You can create all the EDUCATIONAL programs you can imagine without programming with the DIALOG program.

Dialog is a simple on-screen process which allows you to create the first time you try, programs to educate children, inform adults, or just to entertain. Everything from simple tests to training manuals to complete novels. You control all the text, questions and answers. Any presentation is made more alive with the human give and take of real questions and answers. The Dialog system writes all the computer code onto your disk - to distribute any way to like. Graphics included. (Disk) List \$49.95. **Sale \$39.95. Coupon \$34.95.**

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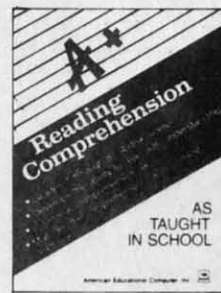
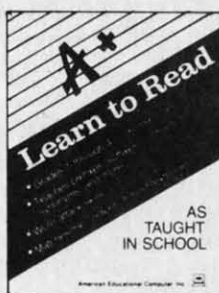
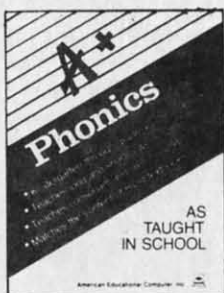
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All programs were written by teachers and have been classroom validated. These programs teach in a standard classroom format with rewards as the user gets through the various lessons.

Atari & Commodore 64

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Atari & Commodore 64



(Disk)

AEC Spelling — A series of seven educational software programs for grades 2 through 8. It teaches the spelling of 4,000 words most commonly used in writing (98% of most people's writing vocabulary). The word lists used are the result of over 25 years of research into the writing/spelling needs of children and adults. Each grade level consists of one two-sided disk with word lists on one side and study activities on the other. The activities are designed to develop mastery in spelling utilizing a Test/Teach/Test approach. A pre-test is used to find out which words a user cannot spell correctly. These are recorded on a "Words To Study" list. The activities for learning these words are provided. Finally, a post-test is taken by the learner to measure progress. The approach is simple and rewards are built in. (Grades 1-8) List \$39.95. **Special Sale — 8 programs/4 disks \$24.95.**



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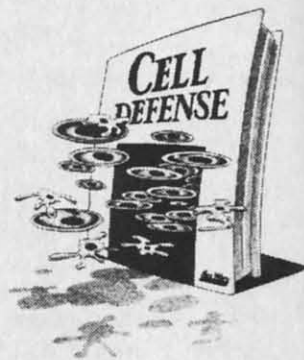
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Commodore 64

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Typing Tutor — Give your children an education they'll never get in school. Just think how much a child could learn if they had their very own private teacher at home. That kind of specialized help is now available through educational software programs from HesWare. There's Type 'N' Write, for the Commodore 64, that introduces your children to keyboard skills. Touch typing. And even word processing, for creating and editing up to eight pages. (Disk) List \$29.95. **Early Christmas Sale \$9.95.**



Christmas



Turtle Graphics II (LOGO) — An exciting and fun way to discover computer programming concepts. Turtle Graphics II is an easy-to-learn computer language that enables the beginning programmer to master the computer in just a few minutes. By telling an imaginary turtle how to roam about on the screen, the Turtle Graphics II programmer can create colorful and artistic pictures. As one becomes more and more adept at teaching the turtle to paint, he or she is painlessly learning all of the basics of computer programming. This not only develops computer awareness but enriches one's math, logic, communication and artistic skills as well. List \$29.95. **Early Christmas Sale \$9.95.**

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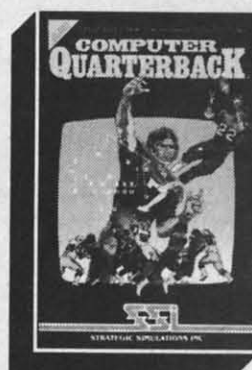
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BroadSides — A tactical simulation of ship-to-ship combat between sailing ships of the Napoleonic era. You will match yourself against another ship commanded by the computer or by a human opponent. To be victorious you may use various types of ammunition for your cannons, or you may attempt to board the other ship and engage in close combat using swords and muskets. (Disk)
List \$39.95. **Sale \$24.95.**



Computer Quarterback — This game offers true realism in a very playable format! Two players compete by selecting plays and then watching the animated action of their teams clash on the gridiron. The use of the game paddles allows each team to enter their plays in secret (as if in their respective huddles) until the offense "hikes" the ball. Fantastic Action. (Disk)
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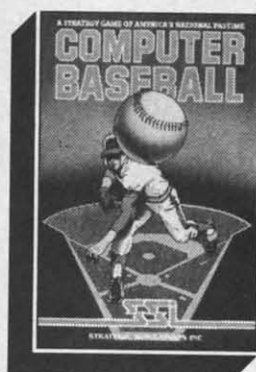
Field of Fire — World War II combat that allows you to direct fire, order assault and movement of fireteams on a scrolling hi-res. screen. Lead Easy Company of the First Infantry Division through eight historical battles in North Africa and Europe. (Disk).
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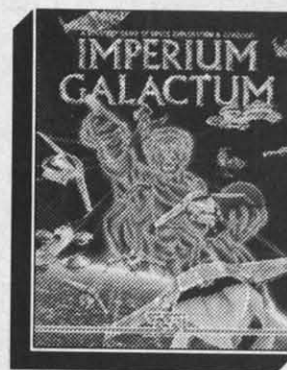
Computer Ambush — A simulation of squad versus squad (man to man) combat in France during World War II. Uncertainty factors are applied to all movement to create a realism unsurpassed by other wargames. By playing the game many times, you will begin to get a feel for what to expect, but you will never know for sure. Thus, we have here a game that truly creates the "fog of war". Fantastic Realism. (Disk) List \$59.95. **Sale \$39.95.**



Computer Baseball — Allows you to manage some of baseball's greatest teams, and make key managerial decisions yourself. Manipulate pinch hitters, infield positions, relief pitchers and base runners, trying to obtain that small statistical edge which can mean the difference between victory and defeat. (Disk)
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Author of Assembly Language For Kids

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SHADEYDUMP

for the C-64 and Gemini Printer

BY MICHAEL SCHELL

Some of the most popular software packages for the Commodore 64 are graphics programs. Using these, one can produce remarkable color pictures on the screen. Unfortunately, few screen dumps can account for color. By printing a different 4x4 dot pattern for each of the 16 colors, *ShadeyDump* produces a gray scale printout of any bitmapped hi-res (or multicolored) screen consisting of over a million dots.

Written in 100% machine language to be used with the Gemini 10X double-density, double-speed graphics mode, *ShadeyDump* can print either standard bit-mapped screens or multicolor bit-mapped screens. *ShadeyDump* can print a mirror image of the screen. *ShadeyDump* can be used with any hardware printer interface, or with a user port software driven interface. *ShadeyDump* even includes

built-in BLOCKLOAD and BLOCKSAVE commands to simplify loading of hi-res screens.

USING SHADEYDUMP

When loaded, *ShadeyDump* assumes several things. The first is that your picture is a standard hi-res image located at 24576 and the color information is stored at 23552. This format is compatible with pictures created with the *DOODLE!* graphics package. Second, *ShadeyDump* assumes that you are using a printer interface which responds to device number 4, and in transparent mode with secondary address 5. If either of these assumptions are wrong you will need to change some of *ShadeyDump*'s pointers.

To *ShadeyDump* a *DOODLE!*-compatible picture, sim-

SHADEYDUMP SOURCE CODE LISTING

LOC LINE

```
0000 ;*****
0000 ;*
0000 ;*      SHADEYDUMP      *
0000 ;*      VERSION  2.0    *
0000 ;*
0000 ;* (A GRAY SCALE SCREEN DUMP) *
0000 ;*
0000 ;* (C) 1985 BY MICHAEL SCHELL *
0000 ;*
0000 ;*****
0000 ;*
0000 ;*      = SC000
0000 ;*****
0000 ;*
0000 ;*      EQUATES
0000 ;*
0000 ;*****
0000 ;*
0000 BASE = $57
0000 COLPTR = $59
0000 COLUMN = $5B
0000 DOTS = $5C
0000 COLHLF = $5D
0000 DBLSTR = $5E
0000 ROW = $5F
0000 CBYTE = $60
0000 FAC1 = $61
0000 FAC2 = $69
0000 COLOR = $FB
0000 ;*
0000 CIAIOR = $DD01
0000 CIADDR = $DD03
0000 CIAICR = $DD0D
0000 ;*
0000 ICHROT = $326
0000 SETLFS = $FFBA
0000 SETNAM = $FFBD
0000 OPEN = $FFC0
0000 KCLOSE = $FFC3
0000 CHKOUT = $FFC9
0000 CLRCHN = $FFCC
0000 CHROUT = $FFD2
0000 ;*****
0000 SCRNDP JSR CONECT
0003 LDX #0
0005 LOOP1 STX COLUMN
0007 LDX #1
0009 LOOP2 STX COLHLF
000B JSR NXTCOL
000E LDX #0
0010 LOOP3 STX DBLSTR
0012 JSR INTLIN
0015 LDA RVSLG

C018 BEQ RVS1
C01A LDX #24
C01C .BYTE $2C ;BIT
C01D LDX #0
C01F LOOP4 STX ROW
C021 JSR SETCOL
C024 LDA RVSLG
C027 BEQ RVS2
C029 LDX #7
C02B .BYTE $2C ;BIT
C02C RVS2 LDX #0
C02E LOOP5 STX CBYTE
C030 JSR PRCHR
C033 LDA RVSLG
C036 BEQ RVS3
C038 LDX CBYTE
C03A DEX
C03B BPL LOOP5
C03D LDX ROW
C03F DEX
C040 BPL LOOP4
C042 BMI SKIP1
C044 RVS3 LDX CBYTE
C046 INX
C047 CPX #8
C049 BNE LOOP5
C04B LDX ROW
C04D INX
C04E CPX #25
C050 BNE LOOP4
C052 SKIP1 LDX DBLSTR
C054 INX
C055 CPX #2
C057 BNE LOOP3
C059 LDX COLHLF
C05B DEX
C05C BPL LOOP2
C05E LDX COLUMN
C060 INX
C061 CPX #40
C063 BNE LOOP1
C065 JMP CLOSE
C068 ;*
C068 ;*****
C068 ;*      PRINTER ROUTINES
C068 ;*
C068 ;*****
C068 ;*
C068 CONECT LDA INTMOD
C06B BEQ SERIAL
C06D PARALL LDA $FF

C06F STA CIADDR
C072 LDA ICHROT
C075 STA VECTOR
C078 LDA ICHROT+1
C07B STA VECTOR+1
C07E LDA #<PRTOUT
C080 STA ICHROT
C083 LDA #>PRTOUT
C085 STA ICHROT+1
C088 BNE SETLF
C08A ;*****
C08A SERIAL LDA #4
C08C LDX DEVNUM
C08F LDY SECADD
C092 JSR SETLFS
C095 LDA #0
C097 JSR SETNAM
C09A JSR OPEN
C09D LDX #4
C09F JSR CHKOUT
C0A2 ;* * * * *
C0A2 SETLF JSR ESCAPE
C0A5 LDA #51
C0A7 JSR CHRROT
C0AA LDA #1
C0AC ;* * * * *
C0AC CRRT1 JSR CHRROT
C0AF ;* * * * *
C0AF CRRT LDA #13
C0B1 JSR CHRROT
C0B4 LDA #10
C0B6 JMP CHRROT
C0B9 ;*****
C0B9 ESCAPE LDA #27
C0BB JMP CHRROT
C0BE ;*****
C0BE PRTOUT PHA
C0BF STA CIAIOR
C0C2 LDA #510
C0C4 ACKCHR BIT CIAICR
C0C7 BEQ ACKCHR
C0C9 PLA
C0CA RTS
C0CB ;*****
C0CB NXTCOL JSR ESCAPE
C0CE LDA #74
C0D0 JSR CHRROT
C0D3 LDA #13
C0D5 JMP CRRT1
C0D8 ;*****
C0D8 INTLIN JSR CRRT
C0DB JSR ESCAPE
```


ply load the picture using:

LOAD "(NAME)",8,1

After loading your picture run *ShadeyDump* with:

SYS 49152

If you wish to print a hi-res image located somewhere else in memory you will have to change two pointers. You can POKE 49704 and 49705 with the proper address of the bit-map in standard low-byte/high-byte format and change the pointer to the video matrix at 49706 and 49707, but *ShadeyDump* can do this for you. Simply use the following *ShadeyDump* SYS command:

SYS 49936, (ADDRESS OF BIT MAP),(ADDRESS OF VIDEO MATRIX)

Example: to *ShadeyDump* a *DOODLE!* image enter this line:

SYS 49936,24576,23552

ShadeyDump will automatically POKE all the proper locations to print your picture.

Printing a multicolor picture requires changing four pointers, the pointer to the bit map at 49704, the pointer to the video matrix at 49706, the pointer to color memory at 49708, and the pointer to the screen color at 49710, and toggling setting one flag at 49703 to zero. You can

use POKES to set these pointers, or you can again use a *ShadeyDump* SYS command:

SYS 49960, (ADDRESS OF BIT MAP),(VIDEO MATRIX),(COLOR MEMORY),(SCREEN COLOR)

Example: to *ShadeyDump* a *Koala* image enter this line:

SYS 49960,24576,32576,33576,34576

Again *ShadeyDump* will automatically POKE all the proper locations.

Most users of *ShadeyDump* will use a serial port interface such as those made by Cardco. *ShadeyDump* defaults to this type of interface with a device number of 4 and secondary address of 5. To change the device number POKE 49716 with the proper number, and to change the secondary address POKE 49717 with the proper value.

Some users will prefer to use a parallel interface connected through the user port. *ShadeyDump* has a built-in driver routine to use this type of interface. To access this feature POKE 49713 with a one to toggle the interface flag.

ADVANCED SHADEYDUMP TOPICS

If the standard version of *ShadeyDump* defaults to values that are not optimal for your use, you can easily save a custom version of *ShadeyDump* using *ShadeyDump's* built-in BLOCKSAVE SYS command. After changing *ShadeyDump's* pointers and flags, save your new version of *ShadeyDump* with:

```
CODE      LDA #121          C130      CLC                C193      STA FAC2+1
C0E0      JSR CHROUT        C131      ADC FAC2          C195      LDA BASE
C0E3      LDA #32          C133      STA FAC2          C197      STA FAC2
C0E5      JSR CHROUT        C135      BCC SKIP2         C199      LDX #03
C0E8      LDA #3           C137      INC FAC2+1       C19B      LOOP8  ASL FAC2
C0EA      JMP CHROUT        C139      LDA FAC2          C19D      ROL FAC2+1
C0ED      ;*****          C13B      STA BASE          C19F      DEX
C0ED      CLOSE LDA INTMOD  C13D      LDA FAC2+1       C1A0      BNE LOOP8
C0F0      BEQ SCLOSE        C13F      STA BASE+1       C1A2      LDA HIRES
C0F2      PCLOSE LDA VECTOR C141      LDA SCREEN        C1A5      CLC
C0F5      STA ICHROT        C144      CLC                C1A6      ADC FAC2
C0F8      LDA VECTOR+1      C145      ADC FAC2          C1A8      STA FAC2
C0FB      STA ICHROT+1      C147      STA FAC2          C1AA      LDA HIRES+1
C0FE      RTS              C149      STA COLPTR        C1AD      ADC FAC2+1
C0FF      SCLOSE JSR CLRCHN C14B      LDA SCREEN+1     C1AF      STA FAC2+1
C102      LDA #4           C14E      ADC FAC2+1       C1B1      RTS
C104      JMP KCLOSE        C150      STA FAC2+1       C1B2      ;*****
C107      ;*                C152      STA COLPTR+1     C1B2      PRTCHR LDY CBYTE
C107      ;*****          C154      LDY #0           C1B4      LDA (FAC2),Y
C107      ;*                C156      LDA (COLPTR),Y      C1B6      STA FAC2+2
C107      ;*                C158      AND #15          C1B8      LDA COLHLF
C107      ;*                C15A      STA COLOR+1       C1BA      BNE SKIP4
C107      ;*****          C15C      LDA (COLPTR),Y      C1BC      LDX #4
C107      ;*                C15E      LSR A            C1BE      LOOPA  ASL FAC2+2
C107      ;*                C15F      LSR A            C1C0      DEX
C107      ;*                C160      LSR A            C1C1      BNE LOOPA
C107      ;*                C161      LSR A            C1C3      SKIP4  LDY #3
C107      ;*                C162      STA COLOR+2       C1C5      LOOPB  STY DOTS
C107      ;*                C164      LDA BASE+1         C1C7      LDA MCMODE
C107      ;*                C166      STA FAC2+1         C1CA      BEQ MCDMP
C107      ;*                C168      LDA BASE          C1CC      HIRDMF LDY #4
C107      ;*                C16A      STA FAC2          C1CE      LDA FAC2+2
C107      ;*                C16C      CLC                C1D0      STA FAC2+3
C107      ;*                C16D      ADC COLMEM        C1D2      HLOOPC ASL FAC2+3
C107      ;*                C16D      STA FAC2          C1D4      LDA #00
C107      ;*                C170      LDA BASE+1         C1D6      ROL A
C107      ;*                C172      LDA BASE+1         C1D7      TAX
C107      ;*                C174      ADC COLMEM+1       C1D8      INX
C107      ;*                C177      STA FAC2+1         C1D9      BNE SKIP12
C107      ;*                C179      LDY #00           C1DB      MCDMP LDY #2
C107      ;*                C17B      LDA (FAC2),Y      C1DD      LDA FAC2+2
C107      ;*                C17D      AND #15          C1DF      STA FAC2+3
C107      ;*                C17F      STA COLOR        C1E1      MLOOPC ASL FAC2+3
C107      ;*                C181      LDA BCKGRN        C1E3      LDA #00
C107      ;*                C184      STA FAC2          C1E5      ROL A
C107      ;*                C186      LDA BCKGRN+1       C1E6      ASL FAC2+3
C107      ;*                C188      STA FAC2+1         C1E8      ROL A
C107      ;*                C189      LDA (FAC2),Y      C1E9      EOR #3
C107      ;*                C18B      LDA (FAC2),Y      C1EB      TAX
C107      ;*                C18D      AND #15          C1EC      SKIP12 LDA COLOR,X
C107      ;*                C18F      STA COLOR+4       C191      LDA BASE+1
```


SYS 49876,49152,50010,"(NAME)",(DEV. NO.)

Using this feature it is possible to have a different version of *ShadeyDump* for every graphic package that you own.

The proper syntax for the BLOCKSAVE command is:

SYS 49876, (STARTING ADDRESS),(ENDING ADDRESS+1),"(FILE NAME)",(DEV. NO.)

ShadeyDump also includes a BLOCKLOAD SYS command to allow you to load files to non-standard locations. The proper syntax is:

SYS 49909, (LOAD ADDRESS),"(NAME)",(DEV. NO.)

ShadeyDump's dot matrix is stored in memory starting at 49734 and running to 49861. The dot matrix runs from lightest color to darkest. Each color is represented by eight bytes, four for the first strike and four for the second strike. *ShadeyDump* only uses the two least significant bits of each byte in printing the dot pattern. Using a monitor or simply POKEing values (0-3) into these locations you can change, and improve, the dot patterns *ShadeyDump* uses to print gray scales. You can save your new improved version of *ShadeyDump* with the BLOCKSAVE command.

Finally, *ShadeyDump* can produce mirror images of the pictures it dumps. To print a mirror image simply POKE 49712 with a zero. □

SEE PROGRAM LISTING ON PAGE 139

SHADEYDUMP MULTICOLOR FILE POINTERS By Morton Kovelson

ShadeyDump can generate a gray scale printout for any multicolor image, not just *Koala* files. Here is a list of file parameters for some popular multicolor drawing packages for the C-64. The table lists the parameters in the proper format for the *ShadeyDump* SYS command:

SYS 49960,BMP,VM,CM,SC

Where: BMP = bit map

VM = video matrix

CM = color memory

SC = screen color

	NOTE	BMP	VM	CM	SC
Koala Printer	1	24576	32576	33576	34576
Peripheral Vision	2	24576	23552	32768	24575
Paint Magic	3	16384	24576	25576	24384
Flying Colors		8192	7168	6144	8191
Blazing Paddles	4	24576	32768	33792	32640
Micro Illustrator	5	8384	6384	7384	6383

Notes:

All files should be LOAded using a nonrelocating LOAD "filename",8,1 except as noted below.

1. The only thing unusual about *Koala* files is the structure of the file name. The first character is always shifted reverse "A" (CHRS(129)). The file name is always exactly 15 characters long. If the text of the name is not long enough it is padded with spaces (CHRS(32)). If you are having trouble LOAding a *Koala* file then try using the DOS wild card characters; for example, "?PIC A NAME*".

2. *Peripheral Vision* stores its multicolor images in two files, one for the bit map and video matrix and the other for color memory. The first character of the bit map file name is the British

```

C1EE      TAX                      C23B      C26C
C1EF      LDA SHADE,X              C23C      C26D
C1F2      ASL A                    C23D      C26E      .BYTE 0,3,0,0,3,0,0,0
C1F3      CLC                      C23E      C26F
C1F4      ADC DBLSTR               C23F      C270
C1F6      ASL A                    C240      C271
C1F7      ASL A                    C241      C272
C1F8      ADC DOTS                 C242      C273
C1FA      TAX ;X=((SHADE*2)+DBLSTR)*4 C243      C274
C1FB      LDA MCMODE               C244      C275
C1FE      BNE SKIP13              C245      C276      .BYTE 3,0,0,0,0,3,0,0
C200      LDA MATRIX,X             C246      C277
C203      LSR A                    C246      MATRIX .BYTE 0,0,0,0,0,0,0,0
C204      ROL FAC2+4               C247      C278
C206      LSR A                    C248      C279
C207      ROL FAC2+4               C249      C27A
C209      SKIP13 LDA MATRIX,X       C24A      C27B
C20C      LSR A                    C24B      C27C
C20D      ROL FAC2+4               C24C      C27D
C20F      LSR A                    C24D      C27E      .BYTE 1,0,2,0,2,0,2,0
C210      ROL FAC2+4               C24E      C27F
C212      DEY                      C24F      C280
C213      BEQ SKIP14              C250      C281
C215      LDA MCMODE               C251      C282
C218      BEQ MLOOPC               C252      C283
C21A      BNE HLOOPC               C253      C284
C21C      SKIP14 LDA FAC2+4         C254      C285
C21E      JSR CHROUT               C255      C286      .BYTE 0,2,0,2,0,2,0,1
C221      LDY DOTS                 C256      C287
C223      DEY                      C257      C288
C224      BPL LOOPB               C258      C289
C226      RTS                      C259      C28A
C227      ;*****                  C25A      C28B
C227      MCMODE .BYTE 255          C25B      C28C
C228      SCREEN .WORD $5C00        C25C      C28D
C22A      HIRES .WORD $6000          C25D      C28E      .BYTE 1,0,2,1,2,1,0,2
C22C      COLMEM .WORD $8000         C25E      C28F
C22E      BCKGRN .WORD $D021         C25F      C290
C230      RVSFLG .BYTE 255          C260      C291
C231      INTMOD .BYTE 0             C261      C292
C232      VECTOR .BYTE 0,0          C262      C293
C233      C263                      C263      C294
C234      DEVNUM .BYTE 4             C264      C295
C235      SECADD .BYTE 5             C265      C296      .BYTE 1,2,0,1,2,0,1,2
C236      ;*****                  C266      C297
C236      SHADE .BYTE 15,0,11,4,10,6,14,1 C267      C298
C237      C268                      C268      C299
C238      C269                      C269      C29A
C239      C26A                      C26A      C29B
C23A      C26B                      C26B      C29C
C23A      C26B                      C26B      C29D

```


Pound (£) symbol (CHR\$(92)). The last four characters are ".BMP". The rest of the file name can contain up to 11 user assigned characters. The last four characters of the color memory file are ".CMM". The remaining characters of the file name are the same 11 user assigned characters as above. The color memory file must not be LOADED using a nonrelocating LOAD. It normally occupies the same memory as *ShadeyDump*. Instead use *ShadeyDump*'s BLOCKLOAD SYS command to relocate the color memory to a safe location:

```
SYS 49909,32768,"FILENAME.CMM",8
```

Peripheral Vision does not save the screen background color byte. It is always assumed to be white. Before executing *ShadeyDump* you must POKE 24575,1 in order to assign the proper screen background color.

3. *Paint Magic* files can be LOADED in two ways. The first, as a BASIC LOAD, allows the *Paint Magic* file to be viewed by simply RUNNING it. The other is a nonrelocating LOAD. Use only the nonrelocating LOAD "file name",8,1 for *Paint Magic* with *ShadeyDump*. *Paint Magic* saves only a single byte which is used to fill the entire 1000 bytes of color memory. The color value for color memory is stored in location 24387. Since *ShadeyDump* expects a complete 1,000 byte color memory for a multicolor file, you will have to provide it. After LOADING the paint magic file and before executing *ShadeyDump* simply RUN the following brief program.

```
10 A=PEEK(24387)
20 FOR I=25576 TO 26575
30 POKE I,A
40 NEXT I
```

This will set up the contents of color memory.

```
C29E .BYTE 3,0,0,0,0,3,0
C29F
C2A0
C2A1
C2A2
C2A3
C2A4
C2A5
C2A6 .BYTE 0,3,0,0,0,0,3
C2A7
C2A8
C2A9
C2AA
C2AB
C2AC
C2AD
C2AE .BYTE 2,1,2,1,0,0,0,0
C2AF
C2B0
C2B1
C2B2
C2B3
C2B4
C2B5
C2B6 .BYTE 3,3,3,3,0,0,0,0
C2B7
C2B8
C2B9
C2BA
C2BB
C2BC
C2BD
C2BE .BYTE 3,3,3,3,3,3,3,3
C2BF
C2C0
C2C1
C2C2
C2C3
C2C4
C2C5
C2C6 ;*****
C2C6 ;*
C2C6 ;*****
C2C6 ;*
C2C6 ;* BSAVE & BLOAD
C2C6 ;*
C2C6 ;*****
C2C6 ;*
C2C6 ;* BSAVE EQUATES **
C2C6 ;*
```

```
C2C6 FRMNUM = $AD8A
C2C6 GETADR = $B7F7
C2C6 CHKCOM = $AEFD
C2C6 BSSAVE = $E15F
C2C6 SETPAR = $E1D4
C2C6 BSLOAD = $E175
C2C6 ;*
C2C6 LINNUM = $14
C2C6 ;*
C2C6 GETPAR JSR CHKCOM
C2C9 JSR FRMNUM
C2CC JSR GETADR
C2CF LDA LINNUM
C2D1 LDX LINNUM+1
C2D3 RTS
C2D4 ;*
C2D4 BSAVE JSR GETPAR
C2D7 PHA
C2D8 TXA
C2D9 PHA
C2DA JSR GETPAR
C2DD PHA
C2DE TXA
C2DF PHA
C2E0 JSR CHKCOM
C2E3 JSR SETPAR
C2E6 PLA
C2E7 TAY
C2E8 PLA
C2E9 TAX
C2EA PLA
C2EB STA LINNUM+1
C2ED PLA
C2EE STA LINNUM
C2F0 LDA #LINNUM
C2F2 JMP BSSAVE
C2F5 ;*
C2F5 BLOAD JSR GETPAR
C2F8 PHA
C2F9 TXA
C2FA PHA
C2FB JSR CHKCOM
C2FE JSR SETPAR
C301 PLA
C302 TAY
C303 PLA
C304 TAX
C305 LDA #0
C307 STA $A
C309 JMP BSLOAD
```

4. Most of the *Blazing Paddles* multicolor image file is located in the RAM hidden beneath the BASIC ROM. The video matrix and color memory information LOADS into the \$C000 block which is occupied by *ShadeyDump*. Use the *ShadeyDump* BLOCKLOAD SYS command to relocate the *Blazing Paddles* file to 24576 by entering

```
SYS 49909,24576,"FILE NAME",8
```

The original *Blazing Paddles* file parameters are:

```
40960-48959 Bit Map
49023 Border Color (low nybble)
49024 Background Color (low nybble)
49152-50151 Video Matrix
50176-51175 Color Memory
```

Suncom's Animation Station uses a customized version of the *Blazing Paddles* software. Multicolor image files created with the Animation Station should be treated exactly as *Blazing Paddles* files.

5. The *Micro-Illustrator* multicolor files are brought in with a nonrelocating LOAD. The screen background color is assumed to be white. You will have to POKE 6383,1 before executing *ShadeyDump*.

Although both *Peripheral Vision* and *Blazing Paddles* have built-in gray scale printer dumps, you will still find *ShadeyDump* useful. As a stand-alone routine it may be readily incorporated into your own programs. Having access to the source code will allow you to customize *ShadeyDump* to your own needs. Most notably the gray scale can be adjusted to accommodate varying image densities. *ShadeyDump* images are proportioned very close to the original screen dimensions and slightly different from those produced by *Blazing Paddles*. This could be desirable in many situations. □

```
0000 ;*****
0000 ;*
0000 ;* ADDENDUM: SHADEYDUMP
0000 ;* VERSION 2.0
0000 ;*
0000 ;* (C) 1985 MICHAEL SCHELL
0000 ;*
0000 ;*****
0000 ;*
0000 ;* = $C310
C310 ;*
C310 GETPAR = $C2C6
C310 MCMODE = $C227
C310 SCREEN = $C228
C310 HIRES = $C22A
C310 COLMEM = $C22C
C310 BCKGRN = $C22E
C310 RVSLFG = $C230
C310 INTMOD = $C231
C310 DEVNUM = $C234
C310 SECADD = $C235
C310 ;*
C310 STROUT = $AB1E
C310 ;*
C310 SETHRS JSR GETPAR
C313 STA HIRES
C316 STX HIRES+1
C319 JSR GETPAR
C31C STA SCREEN
C31F STX SCREEN+1
C322 LDA #255
C324 STA MCMODE
C327 RTS
C328 ;*
C328 SETMC JSR GETPAR
C32B STA HIRES
C32E STX HIRES+1
C331 JSR GETPAR
C334 STA SCREEN
C337 STX SCREEN+1
C33A JSR GETPAR
C33D STA COLMEM
C340 STX COLMEM+1
C343 JSR GETPAR
C346 STA BCKGRN
C349 STX BCKGRN+1
C34C LDA #00
C34E STA MCMODE
C351 RTS
C352 ;*
```


SHOTGUN

A Rapid-Fire Diskkeeping Utility for the 64

By R. Harold Droid

Disk housekeeping is a chore best reserved for rainy days when the basement floods, giving you an excuse to get out of mopping. It's not that a clean, neat, orderly file box repulses me; it's the aggravation it takes to get there. You've probably amassed a collection of neat little programs that do tidy little organizing jobs on disks, like copying files, printing out master directories, renaming and locking files. But many neat and tidy little programs don't make file box rejuvenation a neat and tidy little job. I don't really need any more practice typing "LOAD" and "RUN."

Obviously what I need is a user-definable, menu-driven, auto-loading and running, multi-BASIC program-booting piece of weaponry which is always available so I can get a new program into memory with a flick of my itchy trigger finger. I call it *Shotgun*. Although it is designed with diskkeeping in mind, it's going to be useful any time you have a collection of programs with complementary functions that you have to continually interchange to get your job done.

Using *Shotgun* is as easy as LOADING it with an "8,1" appended and typing NEW and SYS51200. Press the SHIFT and RESTORE keys simultaneously to see your menu. From the menu, you can load and run one of up to 26 files, or press the space bar to run the currently resident BASIC program. There are two other functions available. Space/RESTORE instantly reruns the BASIC program in memory (even while it's still running) and Commodore/RESTORE does a BASIC warm start which leaves *Shotgun* available. RUN-STOP/RESTORE disables *Shotgun*. You can get it back with SYS51200.

Shotgun is a customized menu program which you create by specifying which files you wish to include. To get a *Shotgun* for a particular disk, use the program *Shotgun Shell* and *Shotgun Loader*. The loader program loads the shell into memory and reads a disk directory. Simply press 'Y' or 'N' when a file name is displayed. At the end of the directory, you are prompted for a file name for your new rapid-repeating, auto-load/run menu program, with the default name *Shotgun*. The loader program then saves it for you.

Shotgun runs off of the NMI interrupt of the 64. This interrupt is generated whenever the RESTORE key is pressed. When you SYS51200, the vector which points to the NMI interrupt routine is changed to point to *Shotgun*. Then every time you hit RESTORE, the SHIFT, Commodore, and space bar keys are checked. If one of these isn't

pressed, control reverts to the normal NMI interrupt routine. At this point, if the RUN/STOP key isn't pressed, or if you don't have a cartridge plugged in, nothing happens and the computer continues on its merry way.

If one of the programs you load messes with the NMI vector, you're in for some strange results. None of the programs I'm using do. Note also that *Shotgun* sits in an area of memory that's heavily trafficked when BASIC needs machine language support. Most of the time programmers put such routines at 49152, which leaves eight free blocks before they overwrite *Shotgun*. Four blocks above are also open, so if you use the DOS wedge for doing disk chores, *Shotgun* is compatible. If you're as tired of practicing your spelling on "LOAD" and "RUN" as I am, this program should be compatible with you, too. □

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The publisher cannot assume responsibility for errors in the above listing.

SCUTTLEBUTT

Continued from page 16
view of the non-MIDI version of *The Music Shop* on page 65.)

Passport Designs, Inc., 625 Miramontes St. Half Moon Bay, CA 94019 (phone: 415-726-0280).

Two new C-64-compatible programs from Dr. T Music Software:

The *Echo Plus* MIDI delay program, in addition to performing the standard digital-delay functions, will make the C-64 "listen" to one MIDI keyboard and send MIDI commands on up to four channels to any keyboards connected to the computer's MIDI output. Effects that can be created include keyboard splitting, doubling, echoing, one-finger and arpeggiated chords, and infinite loops. The \$90 program runs with a Sequential, Passport, Korg, Yamaha, or Music-Data MIDI interface.

The *CZ Patch Librarian* is for use in creating, editing, and storing patches on the Casio CZ-101, CZ-10000, and CZ-5000 synthesizers.

Dr. T Music Software, 190 Washington Ave., Brooklyn, NY 11205 (phone: 718-625-7283).

RolandCorp US has released the *MUSE* (MIDI Users Sequencer/Editor) software system for the C-64, requiring RolandCorp's MPU-401 MIDI Processing Unit and a MIDI instrument. It allows the C-64 to perform 8-track recording and overdubbing, time correction of any tracks, full editing by measure, and more.

RolandCorp US, 7200 Dominion Circle, Los Angeles, CA 90040-3647 (phone: 213-685-5141).

COMPUSERVE CHANGES

The financial, demographic, and editorial subject areas of the CompuServe Information Service, previously available only to Executive Information Service subscribers, are now accessible to all 225,000 subscribers through an Executive Service Option. Price of a CIS subscription kit will remain \$39.95; a onetime fee of \$10 (\$5 for new customers) will be charged for the Executive Service Option (there will be a \$10 monthly usage minimum).

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Reader Service No. 239

The CompuServe Information Service has been further restructured to include "tour" and "find" options, article paging (fits articles to user's screen size), a more detailed, easier to use top menu, and a list of quick reference words.

CompuServe Incorporated, 5000 Arlington Centre Boulevard, P.O. Box 20212, Columbus, OH 43220 (phone: 614-457-8600).

PRICE REDUCTIONS

The price of the *Deluxe COMAL 2.0 Cartridge Pak* has been reduced almost \$40 to \$89.95. Included is the cartridge, a 320-page tutorial guide, and five demo disks.

COMAL Users Group, USA, Ltd., 6041 Monona Dr., Madison, WI 53716 (phone: 608-222-4432).

The price of the *Printmaster/+G* interface has been reduced to \$99.95.

Omnitronix Incorporated, P.O. Box 434, Mercer Island, WA 98040 (phone: 206-236-2983).

As this is being written, I am in New York State for a brief visit. I picked up a copy of *Ahoy!* today to pass the evenings. I use a Commodore 64 at home in Sacramento.

I am writing to counter the view expressed by one John W. Carino in the July issue. There is nothing offensive or dangerous to children in the advertisements of CVC Online.

On the other hand, there is a great deal of danger in the idea that a magazine should limit its advertisements to suit prudes, moralists, and others who believe children should be raised in barrels and fed through the bung-hole until they are old enough to have the Real World sprung on them in all its glory and anti-glory.

Mr. Carino claims he is not a prude or a moralist. Well, if it walks like a duck, quacks like a duck, and deposits fertilizer like a duck, then one is safe in assuming the creature is a duck. Only a prude, moralist, or —worse—would request you to remove an ad as inoffensive as CVC Online's ad. I say to Mr. Carino: Sex is here to stay. Do you want your children prepared to deal with the real world, or do you want them prepared to live in a fantasy world? If you answer is the latter, then growing up is going to be a very painful process when they get out from under your thumb.

—Donald L. Cline
Sacramento, CA

P.S.: If you *do not* cancel CVC's ad, i.e., if you do not knuckle under to prudes and moralists, my subscription order will be in the mail when I return home.

Let me begin by saying that I, too, have been an enthusiastic reader of your magazine from the beginning.

However, I must raise a serious objection to the opinion expressed by John W. Carino in his letter published in issue #19. He complained about the ad from CVC Online, calling it an "advertisement of that type," warning of decreased circulation, expressing concern for the effect on children, etc. Although Mr. Carino says he is "not a prude or moralist," I searched his letter in vain for any *other* grounds for his complaint.

Please don't misunderstand me. I do think an editor has an obligation to his readers concerning his advertisers. If, for example, you receive complaints regarding one of your accounts (that they misrepresent their product or service, that they overcharge, etc.), then by all means drop them. But to drop an advertisement simply because one reader finds it offensive is to set a dangerous precedent.

Although I have never personally used CVC Online, they seem to be a reputable company offering a legitimate service at a reasonable cost. Nor do I find the ad offensive. What I *do* find offensive is the concept of censorship, that someone I don't even know would presume to influence what ad I may see.

I sincerely hope that it will not be the editorial policy of *Ahoy!* to cave in to this kind of pressure. So far, you have an excellent publication. Keep it that way.

—Mike Nichols
Kansas City, MO

Thank you very much for your excellent article in the May '85 issue, *Install a Reset Switch on Your VIC/64* by Tom Benford. I followed the well-written instructions and the set-up works fine.

I would like to offer a couple of suggestions, however. First, the sug-

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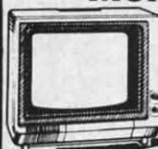
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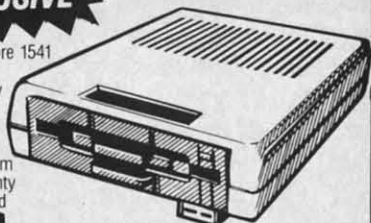
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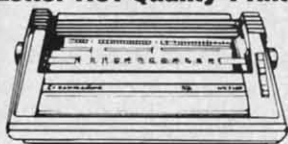
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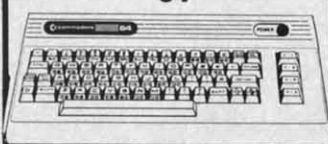
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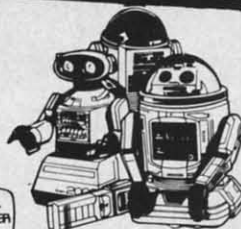


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gested location of the switch on top of the computer to the right of the power LED is somewhat vulnerable to inadvertent contact during operation. Given the purpose of the switch to erase all memory, it would be disastrous for it to be pushed while the memory was full of important data. I have placed my button on the right side of the computer just above the main power switch. Second, while shopping for the switches recommended by the article, I found a smaller, less likely to be accidentally tripped switch which comes two to a package at \$1.59 (Radio Shack #275-1571).

Thanks again for this excellent article and magazine! Keep up the good work.

—Joseph Bradley
Ossipee, NH

In the August issue of *Ahoy!* there were two items that raised my interest enough to write to you.

The first had to do with Dale Rupert's article on calculating pi by using the random number generator. His method is an interesting one, but there is an even simpler way. Many years ago, when I was learning FORTRAN, I wrote a program to calculate pi which is rewritten below in BASIC:

```
10 FOR I=1 TO N
20 X=RND(1):Y=RND(1)
30 IF X2 + Y2 >1 THEN 50
40 CC=CC + 1
50 NEXT I
60 PRINT 4*CC/I
```

The x and y represent coordinates of a point within a rectangular area 1 unit x 1 unit. In line 30 we check to see if the point lies within a quadrant of a circle with a radius of 1. The ratio of the area of the quadrant to the area of the square is $\pi/4$, and, therefore, the ratio of randomly generated points within the quadrant to the points within the square should also be $\pi/4$. Running the program above with the $N=231,878$ that Mr. Rupert mentions, produced $\pi=3.12792448$ on my machine, which does indicate a certain lack of true randomness. Perhaps it might be of

interest to the readers for you to publish an article on the workings of the random number generator. I know that I would be interested.

The second item I noticed was the reply to Sean Flynn in the *S.O.S.* column concerning improving the performance of a monitor. I also use a TV/monitor (Panasonic CT-1112) and found that I could improve the clarity greatly by mixing the luminance signal with the video signal before it enters the monitor. In order to control the amount of luminance signal being mixed with the video, I first ran the luminance through a potentiometer and then, by means of a Y-connector, merged the two signals into the video input of my monitor. This has worked wonders, as the quality rivals that of the 1702 monitors I have seen. I can even read the 80-column output *PaperClip* produces! Since it is so easy and cheap to do, I would highly recommend it to anyone.

I hope this is of use.

—Theodore V. Brown
Hyde Park, NY

For Christmas I received a computer with a datasette. This computer happens to be a Commodore 16. You know the one I'm talking about, it's the one with the number 16 on it.

The Commodore 128 is also new, and merited a big feature in the August issue. What about the 16? Haven't your programmers heard of it? I think there are enough programs for the VIC and 64. What about the Commodore 16 owners of the free world?

—Larry Wedekind
Nashville, TN

It's true that we've neglected the C-16, and must regretfully report that the situation is not likely to improve. Running one C-16 program means running one less C-64, C-128, or VIC 20 program—and it's the C-64, C-128, and VIC 20 owners that make up the vast majority of our readership and potential readership. We hope you and the other "Commodore 16 owners of the free world" understand. Fortunately, there probably aren't enough of you to beat us up.

COMMODORE ROOTS

PROGRAMMING BIT BY BIT

Performing Single Bit Manipulations on Binary Numbers

BY MARK ANDREWS

Why is assembly language different from all other programming languages? There are many answers to that question. Readers of this column know by now that assembly language is the fastest-running and most memory-efficient of all programming languages. But it has another feature that we haven't examined yet. More than any other language, it gives the programmer direct and complete control over every individual bit in a computer's memory. That may not mean much to you now, but by the end of this column it will mean quite a bit. Before we begin, I'd like to throw some figures around.

There are 65,536 bytes of memory in a Commodore 64, and 131,072 in a Commodore 128. Since there are eight bits in a byte, this means that there are 524,288 *bits* in a 64, and up to 1,048,576 bits in a 128. And if you can control each of those bits individually—as easily as programmers in most other languages can handle bytes—you can wield a tremendous amount of power over your computer.

PROGRAMMING AN 8-BIT COMPUTER

Both the C-64 and the C-128 are 8-bit computers, so-called because each is built around an 8-bit microprocessor chip. The 64's main microprocessor is an 8-bit 6510 chip, and the 128's is an 8-bit chip called the 8502.

These are called 8-bit chips because the largest number they can process in one operation is 255—written 11111111 in binary notation, and therefore called an 8-bit number. To perform operations on a number larger than 255, an 8-bit computer must split the number up into 8-bit chunks, then perform the requested operation on each piece. Then, if the result of the calculation is larger than 255, it must be reassembled into a complete number.

Assembly language programmers use many tools to help them out with all this electronic cutting and pasting. And one of their most important tools is the carry bit, or carry flag, of the processor status register.

SHIFTING AND ROTATING INSTRUCTIONS

The processor status register (or P register) is one of several internal registers in the 6510/8502 microprocessor. The P register consists of eight bits, and seven of them are used as flags in various kinds of 6510/8502 operations. (The eighth bit is not used.)

The carry flag, or C flag, is one of the busiest flags in the P register. When the 6510/8502 performs arithmetic op-

erations on numbers larger than 255, the carry flag is the flag used to keep track of carrying and borrowing operations. Also, the C flag is often used with four specialized assembly language instructions called shifting and rotating operations: ASL (arithmetic shift left), LSR (logical shift right), ROL (rotate left), and ROR (rotate right).

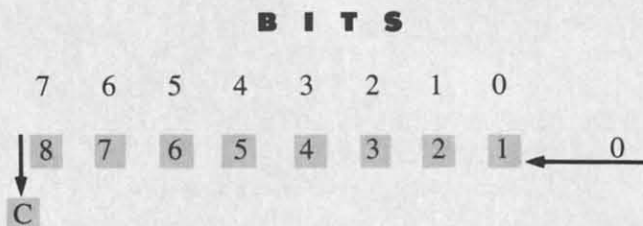
ASL (ARITHMETIC SHIFT LEFT) AND LSR (LOGICAL SHIFT RIGHT)

The instructions ASL, LSR, ROL, and ROR are often used in multiplication and division operations. With the help of these registers, it's easy to perform certain simple arithmetic operations, such as multiplying a number by 2. To double a binary number, you simply shift every bit to the left by one space, and fill in the vacated space with a zero. Take the binary number 0001, move every bit one space to the left, and you have 0010, or 2. Shift each bit to the left again, and you have 0100, or 4.

To divide a binary number by 2, shift bits in the other direction. Take the binary number 10000000 (\$80), move each bit to the right, and you have 01000000 (\$40). Shift right again, and you get 00100000 (\$20).

Now let's take a closer look at how the ASL and LSR instructions work. We'll begin with ASL:

Processor Status Register



The instruction ASL moves each bit in an 8-bit number one space to the left. If there is a remainder, it drops into the carry bit of the P register.

Following is an example of how an ASL instruction can be used to multiply a number by 2 in an assembly language program. (All the routines in this column were written using a *Commodore 64 Macro Assembler*.)

```
10 ;  
20 *=$8000  
30 ;
```



```

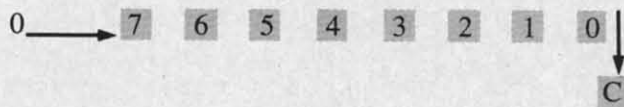
40 LDA #$40 ;REM 0100 0000
50 ASL A ;SHIFT VALUE IN ACCUMULATOR TO
  LEFT
60 STA $FB
70 .END

```

The LSR instruction is the exact opposite of the ASL instruction, as you can see from this illustration:

Processor Status Register

B I T S



As you can see, LSR can shift each bit in a number one position to the right. Bit 7, left empty by the LSR instruction, will be filled in with a zero. But Bit 0, the rightmost bit, will drop into the carry bit of the P register.

Here is an example of how the LSR instruction can be used to halve an 8-bit binary number:

```

10 ;
20 ;DIVIDING BY 2 USING LSR
30 ;
40 VALUE1=$FB
50 VALUE2=$FC
60 ;
70 *=$8000
80 ;
90 LDA #6 ;OR ANY OTHER 8-BIT NUMBER
100 STA VALUE1
110 ;
120 ;NOW WE'LL DIVIDE BY 2
130 ;
140 LDA VALUE1
150 LSR A
160 STA VALUE2
170 .END

```

ROL (ROTATE LEFT) AND ROR (ROTATE RIGHT)

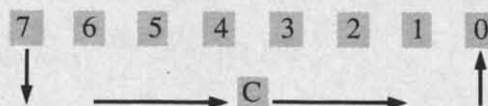
The instructions ROL (rotate left) and ROR (rotate right) use the carry bit differently from the ASL and LSR instructions.

ROL, like ASL, can shift the contents of the accumulator or a memory register one place to the left. But ROL does not place a zero in the Bit 0 position of the number being shifted. Instead, it rotates the carry bit into Bit 0, then moves every other bit one place to the left, finally dropping Bit 7 back into the carry bit. If the carry bit is set when the rotation takes place, a 1 is placed in the Bit 0 position. If the carry bit is clear, a zero goes into the Bit 0 position.

Here is an illustration of how the ROL instruction works:

The ROL ("Rotate Left") Instruction

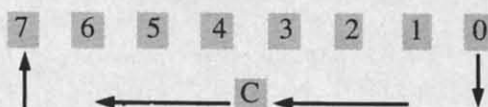
Processor Status Register



ROR works just like ROL, but in the opposite direction. It moves each bit one position to the right, rotates the carry bit into Bit 7, and moves Bit 0 into the carry bit. Here is an illustration of the ROR instruction:

The ROR ("Rotate Right") Instruction

Processor Status Register



ROL and ROR are often used in multiplication and division routines involving numbers more than 8 bits long. For example, a 16-bit number can be doubled by combining an ASL instruction with an ROL instruction. First, an ASL instruction can be used to double the low-order byte of the number. Then an ROL instruction can be used to double the number's high byte. When the ASL instruction is used on the low byte, it will drop the leftmost bit (Bit 7) of the low byte into the C flag of the P register. Then the ROL instruction will pick up that bit and rotate it into the rightmost bit (Bit 0) of the high byte. The result of this operation will be a 16-bit multiplication!

FOUR MORE SINGLE-BIT INSTRUCTIONS

Three other instructions often used in single-bit operations are AND ("and"), OR ("or"), and EOR ("exclusive or"). These are often referred to as *logical operators* because (logically enough) they're used in logical operations.

In 6510/8502 assembly language, the logical operator AND has the same meaning that the word "and" has in English. If one bit and another bit both have a value of one, the AND operator also yields a value of 1. But if any other condition exists—if one bit is true and the other is false, or if both bits are false—the AND operator returns a result of 0.

The results of logical operators are often illustrated with diagrams called truth tables. Here's a truth table for the AND operator:

TRUTH TABLE FOR "AND"

0	0	1	1
AND 0	AND 1	AND 0	AND 1
0	0	0	1

In 6510/8502 assembly language, the AND instruction

is often used in an operation called **bit masking**, the purpose of which is to clear or set specific bits of a number. The AND operator can be used, for example, to clear any number of bits by placing a zero in each bit that is to be cleared.

This is how that kind of bit-masking operation could work:

```
100 LDA #AA ;BINARY 1010 1010
110 AND #F0 ;BINARY 1111 0000
```

If your computer encountered this routine in a program, the following AND operation would take place:

```
1010 1010 (CONTENTS OF ACCUMULATOR)
AND 1111 0000
-----
1010 0000 (NEW VALUE IN ACCUMULATOR)
```

As you can see, this operation would clear the low nibble of \$AA to \$00 (with a result of \$A0). The same technique would work with any other 8-bit number. Whatever the number being passed through the mask 1111 0000, its lower nibble would always be cleared to \$00—and its upper nibble would always emerge from the AND operation unchanged.

THE "ORA" OPERATOR

When the instruction ORA ("or") is used to compare a pair of bits, the result of the comparison is 1 (true) if the value of either bit is 1. This is the truth table for ORA:

TRUTH TABLE FOR "ORA"

0	0	1	1
ORA 0	ORA 1	ORA 0	ORA 1
0	1	1	1

ORA is also used in bit-masking operations. Here is an example of a masking routine using ORA:

```
LDA VALUE
ORA #$0F
STA DEST
```

Suppose that the number in VALUE were \$22 (binary 0010 0010). This is the masking operation that would then take place:

```
0010 0010 (IN ACCUMULATOR)
ORA 0000 1111 ($0F)
-----
0010 1111 (NEW VALUE IN ACCUMULATOR)
```

THE "EOR" OPERATOR

The instruction EOR ("exclusive or") will return a true value (1) if one—and *only* one—of the bits in the pair being tested is a 1.

This is the truth table for the EOR operator:

TRUTH TABLE FOR "EOR"

0	0	1	1
EOR 0	EOR 1	EOR 0	EOR 1
0	1	1	0

The EOR instruction is often used for comparing bytes to determine if they are identical, since if any bit in two bytes is different, the result of a comparison will be non-zero. Here is an illustration:

EXAMPLE 1

```
1011 0110
EOR 1011 0110
```

```
0000 0000
```

EXAMPLE 2

```
1011 0110
EOR 1011 0111
```

```
0000 0000
```

In Example 1, the bytes being compared are identical, so the result of the comparison is zero. In Example 2, one bit is different, so the result of the comparison is non-zero.

The EOR operator is also used to *complement* values. If an 8-bit value is EOR'd with \$FF, every bit in it that's a 1 will be complemented to a 0, and every bit that's a 0 will be complemented to a 1—like this:

```
1110 0101 (IN ACCUMULATOR)
EOR 1111 1111
```

```
0001 1010 (NEW VALUE IN ACCUMULATOR)
```

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AHOY! 105

Still another useful characteristic of the EOR instruction is that when it is performed twice on a number using the same operand, the number will first be changed to another number, then restored to its original value. For example:

```

1110 0101 (IN ACCUMULATOR)
EOR 0101 0011

1011 0110 (NEW VALUE IN ACCUMULATOR)
EOR 0101 0011 (SAME OPERAND AS ABOVE)

1110 0101 (ORIGINAL VALUE RESTORED)

```

This capability of the EOR instruction is often used in high-resolution graphics to put one image over another without destroying the one underneath. (Yes, that's how it's done!)

THE NAME GAME

Now we're ready to take a look at a program I promised you last month: *The Name Game*. You can find it in the program listings section of this issue. It was created using a *Merlin 64* assembler, but with modifications of a few directives, it can also be typed and run on a *Commodore 64* assembler. If you own a *Commodore 64* assembler, change the ORG \$8000 directive in Line 4 to "=\$8000," and change the EQU directives in Lines 6 through 12 to "=" signs. For the "TXTBUF DS 40" statement in Line 16, substitute the statements "TXTBUF

=*" AND " *=*+40". Use the .BYTE directive instead of the ASC and HEX directives in Lines 18 through 31. And, instead of using asterisks to identify comments, use semicolons. The program should then work fine.

I'll wait while you type *The Name Game*, assemble it, and run it. Then come back, and I'll explain how it works.

Finished? As you've seen, *The Name Game* makes use of two operating system (or "kernal") subroutines that are built into the Commodore 64 and 128. One of these, CHROUT, is often used in C-64 programs to print characters on a computer screen. The other routine, called CHRIN, can read characters that are typed in on a computer keyboard. The call address of CHROUT is \$FFD2, and the call address of CHRIN is \$FFCF. In the *Name Game* program, the CHROUT routine is used in a loop that extends from Line 42 to Line 55, and the CHRIN routine is used in a loop that extends from Line 90 to Line 97.

Before the *Name Game* program begins, some space is set aside for a text buffer (in Line 16), and the lines of the text that will be used in *The Name Game* are listed as strings of data in Lines 18 through 31. Next there are two subroutines that will be used later on in the program. One, labeled FILL, will clear the text buffer whenever it's called. The other subroutine, called PRINT, uses the Commodore 64 CHROUT routine to print messages on the screen.

As you type, assemble, and run *The Name Game*, you may notice that it uses its text buffer for lines that are typed in at the keyboard, not for lines that are called from RAM. Some kind of buffer is obviously needed for typed-in lines, since the computer must hold them in its memory long enough to do some comparison and printing operations. Another text buffer could have been set up for the lines stored in RAM, but it would have accomplished no real purpose except consume more memory and take up more processing time.

RUNNING THE PROGRAM

The main section of the *Name Game* program starts at Line 57 with a routine that prints the program's title on the screen. The next two routines print the line "Hello, what is your name?"

After this question is asked, the program clears the text buffer and waits for the player to type in a response. As he does, each character is placed in the text buffer. That's all that happens until the player stops typing characters and hits a carriage return.

Once a carriage return is typed, the program examines the characters that have been stored in the text buffer to see whether they spell the name GEORGE. If the player has not typed in the name GEORGE, the computer prints "GO AWAY, [NAME], BRING ME GEORGE!" Then the game starts again. Computers are very patient, so this process will continue until the player weakens and types the name GEORGE. Then the computer will print "HI, GEORGE," and the game will end.

That's all there is to *The Name Game*. 'Bye, George! □

SEE PROGRAM LISTING ON PAGE 137

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THE 1541 DISK DRIVE CLEANING UTILITY

By John DeRosa

When was the last time I cleaned my disk drive? How many times have I used my cleaning disk? Is it time to throw out that disk and buy a new one? How do I spin the cleaning disk without causing an error that results in chattering my drive? This utility program will answer these questions, as well as help you keep your 1541 drive head clean. The program is for use with any cleaning kit that requires spinning a special cleaning disk.

The program begins by inputting the date (variable DT\$), the amount of time the disk is to spin while cleaning (SC), the number of times the cleaning disk was used (NC), and the maximum time the disk can be used (NM). This information comes with the cleaning disk instructions. The input can be from either a data file stored on the program disk, or the program will assume values. You can change the input data and save it on a disk prior to cleaning. If the number of times the cleaning disk was used exceeds the maximum, a warning is displayed and you are asked to buy a new cleaning disk.

After the input is read, the drive head will be moved to a different track from the last cleaning to assure that the same part of the cleaning disk is not used over and

over. You are then prompted to insert the cleaning disk. The disk will spin for the desired amount of time, and a tone is played while it is spinning. The drive motor is turned on by setting the third bit of location \$1C00 (hexadecimal) in the disk drive memory using the Memory-Write command. (See lines 1800 to 1840 of the program listing.) The motor is turned off by resetting this bit. Since the disk operating system is not accessed to turn the drive on and off, the drive will not chatter. When cleaning is complete the drive stops spinning and the program ends by asking you to insert a data disk if you want to update the input information (new date, increment number of times cleaning disk was used, etc.) and store it on the disk so it can be accessed the next time you clean your drive.

To answer the question of how often you should clean your drive, some cleaning kit manufacturers recommend once a week with heavy use. I think this is excessive, and it may even be harmful to expose the drive head to the abrasive cleaning disk this often. I average two hours a day on my C-64 and have been cleaning my 1541 disk drive once every two months without any problems. □

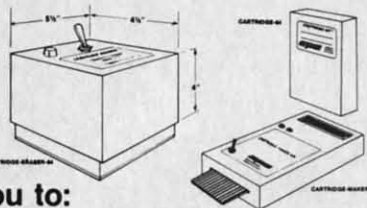
SEE PROGRAM LISTING ON PAGE 140

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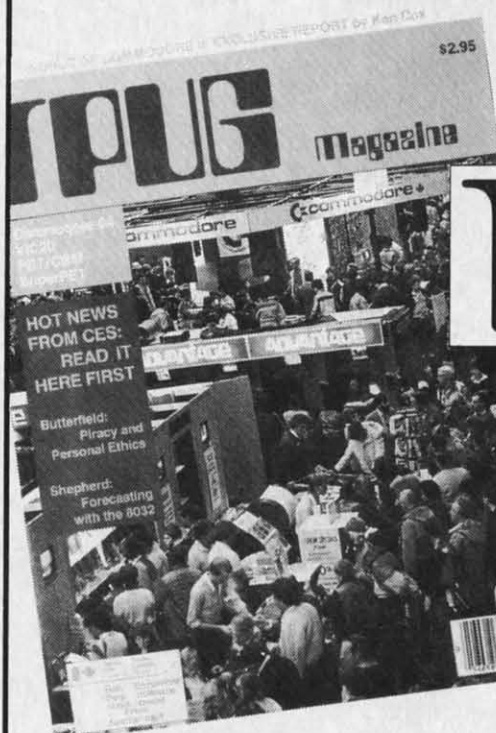
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CADET'S COLUMN

For Beginning Users of the Commodore Computers

BY CHERYL PETERSON

Last month's column covered disk drives, and I'm going to continue the subject for a while. Those of you who didn't have one went out and bought one, didn't you?

If you did, you may have run into the 1541's spurious error messages, such as "File not found" (when you know it's there!) or other general read or write errors. The reason they're spurious messages is that they only occur after the drive has been on for about fifteen minutes.

The disk seems to be fine if you use it when you first power up the system. Unfortunately, by the time the drive starts messing up, you've got 15 or 20 minutes' worth of work done and are trying to perform a SAVE.

Most folks figure there's something wrong with the disk and run to the phone to call the manufacturer and complain. The manufacturer offers to send another disk, and when it arrives it has the same problem! We're talking maximum frustration here. Especially for new owners, who frequently assume they did something wrong.

Not knowing what to try next, you usually give up and take the thing off to the repair shop, where it's impossible to duplicate the problem. Why? Once you power down and wait 15 minutes, everything appears to be fine again. The service technician gives it back, along with a bill for who knows how much. When you get it home, the same thing happens again. Sound familiar? For most people using 1541's, it already does or soon will.

KEEPING THINGS COOL

The problem is caused by overheating. Some of the chips in the 1541 are particularly heat sensitive and drop dead when they get hot. Since the damage isn't permanent, once they cool down the chips work fine once again.

There are two ways to deal with the problem: take the drive apart and replace the chips with heat resistant ones (very expensive) or buy a fan to keep the drive cool. I have a little experience with two of the several different companies that sell cooling fans. (See accompanying list.)

Uni-Kool makes a nice little fan that sits on top of the 1541 and blows the cool air directly into the drive. Though it's a little more expensive than some of the others, it has one serious advantage: a replaceable filter. If you use your drive in a room with lots of cigarette smoke or dust particles, a fan blows all those contaminants right on your disks. As far as I know, the Surgeon General hasn't re-

quired cigarette pack warnings that say "Smoking may be hazardous to computer disks!", but contaminants can mess up both drive and disks. So the changeable filters in the Uni-Kool are a wise precaution.

Innovative Organizers, Inc. markets plastic stands that cover the disk drive and will support a printer on top. A companion \$29.95 fan can be mounted inside the cover to cool the drive. I've been using the setup for a few weeks now with a drive that was having problems, and it's behaved beautifully. Being a stickler for clean drives, I rustled up an old pair of silk stockings and tied one around the air intakes for filtering purposes. (A pair of nylon panty hose would work just as well and be considerably cheaper.)

In fact, as a temporary measure, I borrowed a \$5 Archer fan that a friend had bought at Radio Shack and set that on the stocking. Except for the radio interference caused by the fan's coil, it worked fine. The interference caused the monitor's picture to waver so badly that within two minutes of sitting down in front of it, even seasoned sailboaters would be seasick. To show you how conventional we are around here, the wavering problem was solved by putting an old beat up saucepan over the fan. This left enough clearance for the air to get through and still dampened the radio signals, though I admit it looked awfully strange. An empty coffee can also worked.

What I'm trying to point out is that you don't have to spend more money than you have. These three different ways to solve the same dilemma cost from \$7 for the homemade solution to \$41.95 for the Uni-Kool fan to \$50 for the printer stand/fan combination.

QUICK FIX

Every now and then a program just won't load even though you're using a fan. Nothing you try seems to get things going again. Although your drive may have gone out of alignment, this isn't likely unless it's been fairly erratic for a while. Usually, drive alignment problems start with the drive occasionally having problems loading and things just seem to keep getting worse.

If this isn't the case and the drive just suddenly won't load at all, try taking the disk out and leaving the door open while you load thin air (thick air if you live at sea level like I do). Type your usual LOAD "*",8 and let the

drive bang around until it puts up the "FILE NOT FOUND" error message. Turn the whole system off and then back on and try to load your program. Chances are good that it will work.

This problem is caused by the head being left in an unusual position. The 1541 head usually stops itself somewhere near the directory tracks in the middle of the disk after it does a read or write. Sometimes it doesn't get set properly before you turn off the machine and the next time you power up and look for a program the head gets lost. Banging it around with a fake LOAD command will usually reset it.

WHERE TO PUT IT ALL!

I have a few more organization tips for you this month. If you've taken any of my earlier suggestions, these new ones will probably come in handy. You'll need somewhere to put the magazines, books, software, and assorted peripherals that you'll be collecting as you make full use of your computer. I recommend metal shelves that you put together yourself for \$15 to \$20. Sears, K-Mart, and many local department stores run specials on them about every two months. Because you put them together yourself, the shelves can be arranged at intervals to suit you. Being heavy duty, they can support quite a bit of weight. (Paper gets heavy if you collect enough of it.)

GETTING A DESK

One thing this will do is clear your desk of unneeded junk. What do you mean you don't have a desk? If your computer is still occupying the dining room table, you should move it. For two reasons! Disrupting the family harmony by usurping the main meeting place will not endear you to your potential computer widow/er. And

there are too many things that can get spilled on a C-64 that will kill it.

In most homes, the husband and kids use the computer and the poor mother is left bereft of a table to serve dinner on. Even in our family, where I was the one using the computer, we went through the "get that #\$%!! computer off my dining table" fight, but with a different twist. Hubbie didn't want to buy a desk; he wanted to make one. But getting him to go out and buy the materials was like trying to drain the ocean with a straw. Eventually it got done, though.

For those who want a spacious desk with plenty of drawer space, try buying a door (yes, your standard 8x3' particle board covered with plywood door will do) and a couple of 28-inch deep, 2-drawer filing cabinets. If you get them at a closeout or bankruptcy auction, they'll probably run you about \$50. For another \$20 to \$30, you can get a can of wood finisher that will make your cheap plywood look like something more expensive.

Sears typically sells "computer" desks for \$90 plus \$35 for an optional monitor stand. The desk measures 5x3' and will barely accommodate a computer, disk drive, operating manuals, and a printer. By the time you add a diskette file and a few choice software packages, you don't have enough room left for the spare telephone you'll be needing. (Besides coming in handy when you need software support from your local user group friend, the modem you'll want to use hitches into the phone. And when you are seriously involved in a project, you won't want to leave your desk every time the phone rings.)

You'll also want extra room for the midnight snacks and coffee needed to keep going on those long nights when you're debugging programs from your favorite magazines. You might be able to survive without the coffee maker on the desk, as it gives you a good reason to goof off for a few minutes.

I must admit, in addition to our door desk, I did buy a "computer" desk. (My husband stole the door for his computer.) As you can see from the photo (page 110), it was worth the \$200 I paid. The shelves hold plenty of software and diskette files and support a couple of monitors and two computers. Even so, I have my printers on a separate stand to the right. It came unassembled in a box labeled "TV stand for use with VCR, can also be used for microwave ovens or computer printers." It cost me \$40 at a SuperX drug store and holds three printers, paper, tractor feed labels, extra ribbons, and manuals. Businesses are paying office supply stores upwards of \$150 for printer stands that hold one printer and some paper.

Unless you intend to get very serious about using your Commodore, or you really need a desk anyway, or you have a lot of money to blow, I wouldn't recommend spending more than \$100 for a desk. You can get a card table with S&H Green stamps for about 15 books. This will at least allow the family to share dinners in the dining room again.

If you have your heart set on a really neat "computer" desk, I recommend checking with your local furniture

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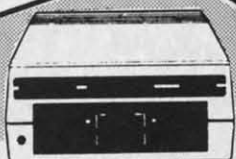
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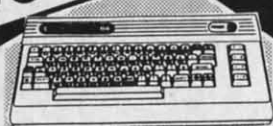


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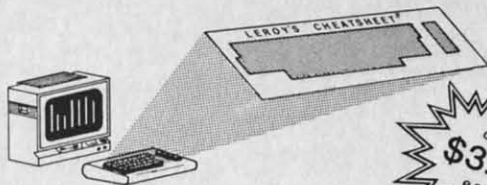
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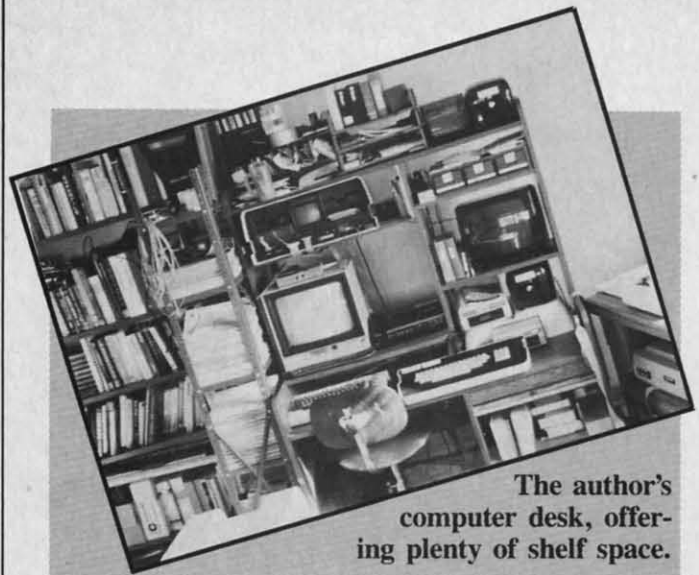
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Reader Service No. 173



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store, Service Merchandise, Best, or other bargain store not specializing in computer accessories. A local Levitz furniture store was running a sale on a computer desk very similar to mine for \$80 around Father's Day, so be sure to check ads in the local paper for non-computer stores. (I won't even mention that no one in town was featuring computer equipment or accessories in their Mother's Day ads.)

And while you're at it, don't overlook auctions. Besides filing cabinets, businesses usually have desks, shelves, comfortable chairs (sometimes with wheels), and occasionally used computer monitors.

SHORT PROGRAM FOR MONOCHROME MONITORS

This short piece is for those who haven't gotten a color monitor and are making do with a black and white television or monochrome (green or amber) monitor. If run before you boot the programs you use, it will set the background and border colors to black increasing the sharpness of contrast and making it easier to read the letters.

Many commercial programs will reset the memory locations that control these parameters, so I can't guarantee it will help in every instance. When doing programming or entering BASIC programs from books or mags, it really saves the eyes. It isn't a bad idea to run it with a color monitor, since the sharper contrast is less likely to leave you with a headache.

5 PRINT "SCREEN TO BLACK"

10 POKE 53280,0

20 POKE 53281,0

25 PRINT "DONE"

30 END

Since this is such a short program, the two middle lines, 10 and 20, can be entered directly if you want to avoid having to load and run the program. I always had trouble remembering the POKE locations. This program saw a lot of use before we switched to a color monitor. ☐

COMMODORES

PROGRAMMING CHALLENGES

BY DALE RUPERT

Each month, we'll present several challenges designed to stimulate your synapses and toggle the bits in your cerebral random access memory. We invite you to send your solutions to:

Commodores, c/o Ahoy!
P.O. Box 723
Bethel, CT 06801

We will print and discuss the cleverest, simplest, shortest, most interesting and/or most unusual solutions. Be sure to identify the *Name* and *Number* of the problems you are solving. Also show sample runs if possible, where appropriate. Be sure to tell what makes your solutions unique or interesting, if they are.

Programs on diskette are welcome, but they must be accompanied by listings. You must enclose a stamped, self-addressed envelope if you want any of your materials returned. Solutions received by the middle of the month shown on the magazine cover are most likely to be discussed, but you may send solutions and comments any time. Your original programming problems, suggestions, and ideas are equally welcome. The best ones will become *Commodores*!

PROBLEM #22-1: MAKING CHANGE

Jim Speers (Niles, MI) suggested this challenge. Given an amount of money, say \$10.00 or less, and a number of coins, find a distribution of quarters, dimes, nickels, and pennies equal in value and quantity to the specified amounts. If there is no solution, this should be stated. Five coins totaling \$1.10 would be four quarters and a dime. Two coins totaling forty cents is impossible. We will present Jim's solution in a later issue.

PROBLEM #22-2: SIMPLE COMPARISON

How simple can a problem be? The user provides two sets of ten numbers each. The computer determines whether the two sets contain the same numbers or not. The numbers for each set are contained in a DATA statement and of course may be in any order. What is the fastest way to do this?

PROBLEM #22-3: MEASURED DECIMALS

Ken Karow (Chicago, IL) suggested a problem similar to this. The user enters a decimal number of inches. The computer converts this decimal to a whole number

plus a lowest-terms fraction, rounded to the nearest sixty-fourth of an inch. For example, if the user enters 8.375, the computer responds "8 and 3/8." If the user enters 23.016, the computer responds "23 and 1/64."

PROBLEM #22-4: TERNARY TURNABOUT

The user enters a number in base ten, and the computer displays its ternary (base three) equivalent. The ternary system uses numerals 0, 1, and 2. For example, 100 in base ten is 10201 in base three.

This month we will look at readers' solutions to the June *Commodores*, from balancing billiard balls to a one line skiing game. Many variations on the theme of *Problem #18-1: Cycling Function* are listed below.

```
1 REM
2 REM VARIOUS READERS' SOLUTIONS TO
3 REM PROBLEM #18-1 : CYCLING FUNCTION
4 REM
5 DEF FNC(D)=D*SGN((99-X)/(X-1))
6 DEF FNC(D)=INT(X/100)*-105+5
7 DEF FNC(D)=D+10*(X=100)-10*(X=0)
8 DEF FNC(D)=D+10*(X>95)-10*(X<5)
9 DEF FNC(D)=D+(2*D*(X=0 OR X=100))
10 DEF FNC(D)=5+10*(X>95 OR D<5)-10*(X<5)
11 DEF FNC(D)=D+(2*D*((X<=0)OR(X>=100)))
12 DEF FNC(D)=-5*(D=5)+5*(D=-5)+10*(X=100)-10*(X=0)
13 DEF FNC(D)=D*(((X=100)+(X=0))*2)+1
14 D=5:X=0
15 S=X/5:PRINTSPC(ABS(S))X=X+D:D=FNC(D)
16 :GOTO30
```

The programmers responsible for lines 10 through 18 are Steve Kendrick (Bakersfield, CA), Don Maloney (Manchester, CT), Tim Hedrick (Canoga Park, CA), Tim Williams (Henderson, KY), Dennis McGrath (Chicago, IL), David Hoffner (Brooklyn, NY), Sheldon Wotring (Palmerton, PA), Scott Macnab (Woodburn, OR), and James Borden (Carlisle, PA) respectively. You may compare these with the general solutions from Jim Speers (Niles, MI) in the July edition of *Commodores*. Jim originally submitted the problem.

Line 30 is modified from the original problem at the suggestion of Steve Kendrick so that the cyclic nature of the numbers is more apparent. One of these solutions cycles from 0 to 100 then starts again at 0. Can you find it before you run the program? Line 18 defines FNC the first time the program is run. After you have run the program once, you may delete line 18. Run it again and line 17 will be the definition of FNC. Repeat this process until line 10 is the only DEF statement.

Tim Hedrick attempted to solve this problem using the cosine function which itself is cyclic. He wrote:

```
10 DEF FNC(D)=D+10*INT(COS(X*PI/199))
```

where PI has the value 3.14159265. This function stepped from 0 to 100 and back to 0. However, it then continued into negative numbers instead of reversing again as it should. For $X=0$, $\text{INT}(\text{COS}(X*PI/199))$ should return a value of 1, but instead it gives 0. Tim suggested a round-off error as the culprit. That's exactly what it is.

If you add $1E-9$ to the cosine function before using the INT function, everything works as expected. Try this to see for yourself:

```
10 DEF FNC(D)=D+10*INT(COS(X*PI/199)+1E-9)
```

All readers who sent solutions to *Problem #18-2: Billiard Balls* deserve a word of praise. Most of the solutions were very lengthy, but it was a very difficult problem. The two listed below from Russell Wilson (Fayette, AL) and Charles R. Goldberg (Lambertville, NJ) are significantly shorter than the others because of the additional "pre-computing" analysis performed by the writers of these programs.

```
1 REM
2 REM SOLUTION TO PROBLEM #18-2 :
3 REM BILLIARD BALLS
4 REM BY RUSSELL WILSON
5 REM
110 DIMC$(12,2),S$(3):X$="":W$(1)="HEAVY"
   :W$(2)="LIGHT"
120 FORI=1TO12:FORJ=1TO2:READC$(I,J):NEXTJ,I:FORI=1TO3:READS$(I):NEXTI
130 DATA BBR,BBL,BBL,RBR,LRB,RLB,LLB,RRB,RBL,LBR,LLL,RRR,RLR,LRL,RRL,LLR
135 DATA BRR,BLL,BLR,BRL,RBB,LBB,BRB,BLB
140 DATA 2 3 4 6 + 5 7 8 11,4 6 7 10 + 3 8 9 12,2 5 6 8 + 1 7 9 10
150 PRINTCHR$(147);"REMEMBER BALL# (1-12) AND IF IT IS HEAVY OR LIGHT.":PRINT
160 PRINT"ENTER L=LEFT HEAVY":PRINTTAB(6);"B=BALANCED"
165 PRINTTAB(6);"R=RIGHT HEAVY":PRINT
170 FORI=1TO3:PRINTS$(I):PRINTTAB(7);:INPTR$:X$=X$+R$:PRINT:NEXTI
180 FORI=1TO12:FORJ=1TO2:IFX$=C$(I,J)THEN200
```

```
190 NEXTJ,I
200 PRINTCHR$(18);I;CHR$(157);" BALL IS ";W$(J)
```

```
1 REM
2 REM SOLUTION TO PROBLEM #18-2 :
3 REM BILLIARD BALLS
4 REM BY CHARLES GOLDBERG
5 REM
10 D$="HEAVYLIGHTWHAT?":PRINT"[CLEAR][DOWN] ENTER DEFLECTION"
20 PRINT"[DOWN][DOWN] LEFT----N----RIGHT"
   "SPC(30)"O"SPC(30)"N"SPC(30)"E"
30 INPUT"[DOWN]1-2-4-5 [s Q] 7-8-10-11"
   :A$(0)
40 INPUT"4-5-7-11 [s Q] 2-3- 6-12";A$(1)
50 INPUT"6-8-9-11 [s Q] 5-7-10-12";A$(2)
60 FORU=0TO2:B=B+SGN(ASC(LEFT$(A$(U),1))-78)*3*U:A$(U)="N":NEXT:C=ABS(B)
70 E=.5+(C=10):FORU=0TO4:E=E+(C=INT(2*1.585^U)):NEXT:D=INT(C^2-ABS(C)*13)
80 PRINT"[DOWN]BALL";C;"IS ";MID$(D$,3,5+2.5*SGN(B*SGN(E)))*(D<>0)^2-11*(D=0),5)
90 B=0:GOTO 30
```

Mr. Goldberg included a discussion of the ternary (base-3) numbering system on which his solution is based. I recommend Martin Gardner's *Sixth Book of Mathematical Games from Scientific American* (Scribners, 1971) for an interesting discussion of the ternary system and this problem.

Besides Wallace Leeker (Lemay, MO) who submitted the problem and a solution, other billiard ball solutions came from Jacqueline G. Callaway (Orange Beach, AL), Steve Feld (New York, NY), Dennis McGrath (Chicago, IL), David Hoffner (Brooklyn, NY), James Borden (Carlisle, PA—a COMAL solution), Donald Maloney (Manchester, CT), and Tim Hedrick (Canoga Park, CA).

Only three people sent solutions to *Problem #18-3: Scroll Ski*. These are one or two line downhill skiing games using the scrolling feature of the screen to provide some of the animation. A brief description of each should suffice. You must type most of these programs carefully and use all possible abbreviations.

The program from Sheldon Wotring (Palmerton, PA) uses the "<" and ">" keys to move the skier. The final GOTO without an argument goes back to line 0.

```
0 PRINTTAB(T)"H":X=PEEK(197):T=T-(X=44)+(X=47)-(T<1)+(T>38):PRINTTAB(RND(1)*39)"
[DOWN][DOWN][DOWN][DOWN][DOWN]^ [UP][UP][UP][UP][UP]":GOTO
11 REM
12 REM SOLUTION TO PROBLEM #18-3 :
13 REM SKI SCROLL
14 REM BY SHELDON C. WOTRING
```


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In the program from Paul Dawson (Waitsfield, VT), the COMMODORE and SHIFT keys move the skier left and right. When the game ends, press RUN/STOP and RESTORE to end the WAIT in line 0. The CHR\$(8) in line 0 prevents the character set from changing when the COMMODORE and SHIFT keys are pressed together.

```

0 P=PEEK(653)+1:Z=Z+1:PRINT"[HOME][BLACK]
]SCORE"Z:POKE214,8:PRINTCHR$(8):PRINTTAB
(A)"[WHITE]"A$:IFPEEK(1424+A)=30THENWAIT
0,0
1 POKE214,23:PRINT:PRINT"[GREEN]^"TAB(RN
D(0)*35)"^"TAB(38)"^":A=A+(P=3)-(P=2)
:A$=MID$("[s G][s M][s N][s H]",P,1):GOT
0
11 REM
12 REM SOLUTION TO PROBLEM #18-3 :
13 REM SKI SCROLL
14 REM BY PAUL T. DAWSON
15 REM

```

The program suggested by Larry Snyder (Rapid City, SD) does not need the second line to be "scrunched." Use the two cursor keys to move the skier between the trees.

```

0 POKE53281,1:PRINT"[CLEAR][GREEN]":T=55
792:S=1520:X=500:FORI=0TO500:IFPEEK(S+J+
40)=65THENX=X-40
1 A=RND(1)*41:PRINTSPC(A)"[s A]":K=PEEK(
197):J=J+(K=7)-(K=2):POKE5+J,22:POKET+J,
0:NEXT:PRINT"SCORE="X
11 REM
12 REM SOLUTION TO PROBLEM #18-3 :

```

```

13 REM SKI SCROLL
14 REM BY LARRY SNYDER
15 REM

```

Perhaps these programs will give some of you a starting point for creating an expanded version of the game. Think what you could do with a four or even a five line program!

Finally we have the solution to *Problem #18-4: Letter Math* from Donald Maloney (Manchester, CT). His program is representative of most of the others we received.

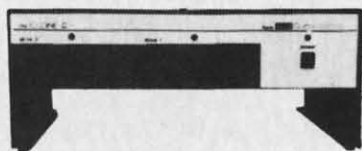
```

2 REM
3 REM SOLUTION TO PROBLEM #18-4 :
4 REM LETTER MATH
5 REM BY DON MALONEY
6 REM
10 FOR X=0TO9:FOR Y=0TO9:FOR Z=1TO9
20 IF X+X*10+Y*100=X*100+Y*10+Z*10+Y+X
THEN PRINT"X, Y, Z = ";X;Y;Z
30 NEXT Z : NEXT Y : NEXT X

```

Some readers simplified the formulas in line 20 before programming them. You might try solving other similar problems using Donald's program as an example if you had trouble with this one. Readers with solutions to this problem who haven't already been mentioned include Chip Jones (Texarkana, AR), Jim Barranti (Canonsburg, PA) and Robert G. Bailey (Rockford, IL).

Thanks also to Ted Grondski (Springfield, MA), Alain Goulet (Port Colborne, ONT), and Greg Smisek (Lonsdale, MN) for their programs. One final teaser: What is the longest one-liner (total number of characters when listed) that you can come up with? Keep those problems and solutions coming. □



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PROGRAM LISTINGS

Attention new Ahoy! readers! You must read the following information very carefully prior to typing in programs listed in Ahoy! Certain Commodore characters, commands, and strings of characters and commands will appear in a special format. Follow the instructions and listing guide on this page.

On the following pages you'll find several programs that you can enter on your Commodore computer. But before doing so, read this entire page carefully.

To insure clear reproductions, *Ahoy!*'s program listings are generated on a daisy wheel printer, incapable of printing the commands and graphic characters used in Commodore programs. These are therefore represented by various codes enclosed in brackets []. For example: the SHIFT CLR/HOME command is represented onscreen by a heart . The code we use in our listings is [CLEAR]. The chart below lists all such codes which you'll encounter in our listings, except for one other special case.

The other special case is the COMMODORE and SHIFT characters. On the front of most keys are two symbols. The symbol on the left is obtained by pressing that key while holding down the COMMODORE key; the symbol on the right, by pressing that key while holding down the SHIFT key. COMMODORE and SHIFT characters are represented in our listings by a lower-case "s" or "c" followed by the symbol of the key you must hit. COMMODORE J, for example, is represented by [c J],

and SHIFT J by [s J].
































Additionally, any character that occurs more than two times in a row will be displayed by a coded listing. For example, [3 "[LEFT]"] would be 3 CuRSor left commands in a row, [5 "[s EP]"] would be 5 SHIFTEd English Pounds, and so on. Multiple blank spaces will be noted in similar fashion: e.g., 22 spaces as [22 " "].

Sometimes you'll find a program line that's too long for the computer to accept (C-64 lines are a maximum of 80 characters, or 2 screen lines long; VIC 20 lines, a maximum of 88 characters, or 4 screen lines). To enter these lines, refer to the *BASIC Command Abbreviations Appendix* in your User Manual.

On the next page you'll find our *Bug Repellent* programs for the VIC 20 and C-64. The version appropriate for your machine will help you proofread our programs after you type them. (Please note: the *Bug Repellent* line codes that follow each program line, in the whited-out area, should *not* be typed in. See the instructions preceding each program.)

Also on the following page you will find *Flankspeed*, our ML entry program, and instructions on its use. □

Call Ahoy! at 212-239-0855 with any problems.

When You See	It Means	You Type	You Will See	When You See	It Means	You Type	You Will See
[CLEAR]	Screen Clear	SHIFT CLR/HOME		[BLACK]	Black	CNTRL 1	
[HOME]	Home	CLR/HOME		[WHITE]	White	CNTRL 2	
[UP]	Cursor Up	SHIFT ↑ CRSR ↓		[RED]	Red	CNTRL 3	
[DOWN]	Cursor Down	↑ CRSR ↓		[CYAN]	Cyan	CNTRL 4	
[LEFT]	Cursor Left	SHIFT ← CRSR →		[PURPLE]	Purple	CNTRL 5	
[RIGHT]	Cursor Right	← CRSR →		[GREEN]	Green	CNTRL 6	
[SS]	Shifted Space	SHIFT Space		[BLUE]	Blue	CNTRL 7	
[INSERT]	Insert	SHIFT INST/DEL		[YELLOW]	Yellow	CNTRL 8	
[DEL]	Delete	INST/DEL		[F1]	Function 1	F1	
[RVSON]	Reverse On	CNTRL 9		[F2]	Function 2	SHIFT F1	
[RVSOFF]	Reverse Off	CNTRL 0		[F3]	Function 3	F3	
[UPARROW]	Up Arrow	↑		[F4]	Function 4	SHIFT F3	
[BACKARROW]	Back Arrow	←		[F5]	Function 5	F5	
[PI]	PI	π		[F6]	Function 6	SHIFT F5	
[EP]	English Pound	£		[F7]	Function 7	F7	
				[F8]	Function 8	SHIFT F7	

IMPORTANT!

Letters on white background are **Bug Repellent** line codes. Do not enter them! This and the preceding explain these codes and provide other essential information on entering **Ahoy!** programs. Read these pages **before** entering programs.

BUG REPELLENT

This program will let you debug any *Ahoy!* program. Follow instructions for VIC 20 (cassette or disk) or C-64.

VIC 20 VERSION

By Michael Kleinert and David Barron

For cassette: type in and save the *Bug Repellent* program, then type RUN 63000[RETURN]SYS 828[RETURN]. If you typed the program properly, it will generate a set of two-letter line codes that will match those listed to the right of the respective program lines.

Once you've got a working *Bug Repellent*, type in the program you wish to check. Save it and type the RUN and SYS commands listed above once again, then compare the line codes generated to those listed in the magazine. If you spot a discrepancy, a typing error exists in that line. Important: you must use exactly the same spacing as the program in the magazine. Due to memory limitations on the VIC, the *Bug Repellent* will register an error if your spacing varies from what's printed.

You may type SYS 828 as many times as you wish, but if you use the cassette for anything, type RUN 63000 to restore the *Repellent*.

When your program has been disinfected you may delete all lines from 63000 on. (Be sure the program you type doesn't include lines above 63000!)

For disk: enter *Bug Repellent*, save it, and type RUN:NEW[RETURN]. Type in the program you wish to check, then SYS 828.

To pause the line codes listing, press SHIFT.

To send the list to the printer type OPEN 4.4:CMD 4:SYS 828[RETURN]. When the cursor comes back, type PRINT#4:CLOSE 4[RETURN].

```

63000 FORX=828T01023:READY:POKEX,Y:NEXT:END AC
63001 DATA169,0,133,63,133,64,165,43,133,251 JL
63002 DATA165,44,133,252,160,0,132,254,32,228 DF
63003 DATA3,234,177,251,208,3,76,208,3,230 OE
63004 DATA251,208,2,230,252,169,244,160,3,32 OH
63005 DATA30,203,160,0,177,251,170,230,251,20 KO
8
63006 DATA2,230,252,177,251,32,205,221,169,58 JJ
63007 DATA32,210,255,169,0,133,253,230,254,32 OK
63008 DATA228,3,234,165,253,160,0,170,177,251 LG
63009 DATA201,32,240,6,138,113,251,69,254,170 BP
63010 DATA138,133,253,177,251,208,226,165,253 DD
,41
63011 DATA240,74,74,74,74,24,105,65,32,210 EK
63012 DATA255,165,253,41,15,24,105,65,32,210 FO
63013 DATA255,169,13,32,210,255,173,141,2,41 PK
63014 DATA1,208,249,230,63,208,2,230,64,230 CB
63015 DATA251,208,2,230,252,76,74,3,169,236 KH
63016 DATA160,3,32,30,203,166,63,165,64,32 DP
63017 DATA205,221,169,13,32,210,255,96,230,25 EL
1
63018 DATA208,2,230,252,96,0,76,73,78,69 OI
63019 DATA83,58,32,0,76,73,78,69,32,35 FG
63020 DATA32,0,0,0,0,0 LE

```

C-64 VERSION

By Michael Kleinert and David Barron

Type in, SAVE, and RUN the *Bug Repellent*. Type NEW, then type in or LOAD the *Ahoy!* program you wish to check. When that's done, SAVE your program (don't RUN it!) and type SYS 49152[RETURN].

To pause the listing depress and hold the SHIFT key.

Compare the codes your machine generates to the codes listed to the right of the respective program lines. If you spot a difference, an error exists in that line. Jot down the number of lines where

contradictions occur. LIST each line, spot the errors, and correct them.

```

5000 FORX=49152T049488:READY:POKEX,Y:NEXT:END GJ
5001 DATA32,161,192,165,43,133,251,165,44,133 DL
5002 DATA252,160,0,132,254,32,37,193,234,177 DB
5003 DATA251,208,3,76,138,192,230,251,208,2 OF
5004 DATA230,252,76,43,192,76,73,78,69,32 KN
5005 DATA35,32,0,169,35,160,192,32,30,171 CA
5006 DATA160,0,177,251,170,230,251,208,2,230 CE
5007 DATA252,177,251,32,205,189,169,58,32,210 JE
5008 DATA255,169,0,133,253,230,254,32,37,193 CL
5009 DATA234,165,253,160,0,76,13,193,133,253 NB
5010 DATA177,251,208,237,165,253,41,240,74,74 MB
5011 DATA74,74,24,105,65,32,210,255,165,253 EP
5012 DATA41,15,24,105,65,32,210,255,169,13 GH
5013 DATA32,220,192,230,63,208,2,230,64,230 AN
5014 DATA251,208,2,230,252,76,11,192,169,153 NG
5015 DATA160,192,32,30,171,166,63,165,64,76 BF
5016 DATA231,192,96,76,73,78,69,83,58,32 EP
5017 DATA0,169,247,160,192,32,30,171,169,3 PJ
5018 DATA133,254,32,228,255,201,83,240,6,201 FK
5019 DATA80,208,245,230,254,32,210,255,169,4 FL
5020 DATA166,254,160,255,32,186,255,169,0,133 CL
5021 DATA63,133,64,133,2,32,189,255,32,192 GC
5022 DATA255,166,254,32,201,255,76,73,193,96 NN
5023 DATA32,210,255,173,141,2,41,1,208,249 NH
5024 DATA96,32,205,189,169,13,32,210,255,32 IM
5025 DATA204,255,169,4,76,195,255,147,83,67 KC
5026 DATA82,69,69,78,32,79,82,32,80,82 DC
5027 DATA73,78,84,69,82,32,63,32,0,76 ML
5028 DATA44,193,234,177,251,201,32,240,6,138 GN
5029 DATA113,251,69,254,170,138,76,88,192,0 JK
5030 DATA0,0,0,230,251,208,2,230,252,96 NA
5031 DATA170,177,251,201,34,208,6,165,2,73 DM
5032 DATA255,133,2,165,2,208,218,177,251,201 JA
5033 DATA32,208,212,198,254,76,29,193,0,169 FM
5034 DATA13,76,210,255,0,0,0 PA

```

FLANKSPEED FOR THE C-64

By Gordon F. Wheat

Flankspeed will allow you to enter machine language *Ahoy!* programs without any mistakes. Once you have typed the program in, save it for future use. While entering an ML program with *Flankspeed* there is no need to enter spaces or hit the carriage return.

This is all done automatically. If you make an error in a line a bell will ring and you will be asked to enter it again. To LOAD in a program Saved with *Flankspeed* use LOAD "name".1.1 for tape, or LOAD "name".8.1 for disk. The function keys may be used after the starting and ending addresses have been entered.

f1—SAVES what you have entered so far.

f3—LOADs in a program worked-on previously.

f5—To continue on a line you stopped on after LOADING in the previously saved work.

f7—Scans through the program to locate a particular line, or to find out where you stopped the last time you entered the program. f7 temporarily freezes the output as well.

```

5 POKES3280,12:POKE53281,11 LL
6 PRINT"[CLEAR][c 8][RVSON][15" "]FLANKSPEED[ ED
15" "];
10 PRINT"[RVSON][5" "][MISTAKEPROOF ML ENTRY P MC
ROGRAM[6" "];
15 PRINT"[RVSON][9" "][CREATED BY G. F. WHEAT[ DM
9" "];
20 PRINT"[RVSON][3" "][COPR. 1984, ION INTERNA

```


these rams. rect	TIONAL INC.[3" "]	DH	•1060 PRINT"?ERROR IN SAVE":GOTO1100	EI
	30 FORA=54272TO54296:POKEA,0:NEXT	IM	•1070 PRINT"?ERROR IN LOAD":GOTO1100	GL
	40 POKE54272,4:POKE54273,48:POKE54277,0:POKE5	NH	•1080 PRINT:PRINT:PRINT"END OF ML AREA":PRINT	PG
	4278,249:POKE54296,15	KO	•1100 POKE54276,17:POKE54276,16:RETURN	BH
END GJ	70 FORA=680TO699:READB:POKEA,B:NEXT	HJ	•1200 OPEN15,8,15:INPUT#15,A,A\$:CLOSE15:PRINTA	IM
133 DL	75 DATA169,251,166,253,164,254,32,216,255,96	JB	\$:RETURN	PC
177 DB	76 DATA169,0,166,251,164,252,32,213,255,96	HC	•2000 REM GET FOUR DIGIT HEX	GM
2 OF	80 B\$="STARTING ADDRESS IN HEX":GOSUB2010:AD=	FO	•2010 PRINT:PRINTB\$;:INPUTT\$	II
KN	B:SR=B	KE	•2020 IFLEN(T\$)<>4THENGOSUB1020:GOTO2010	AD
CA	85 GOSUB2520:IFB=0THEN80	IF	•2040 FORA=1TO4:A\$=MID\$(T\$,A,1):GOSUB2060:IFT(	GF
230 CE	86 POKE251,T(4)+T(3)*16:POKE252,T(2)+T(1)*16	FP	A)=16THENGOSUB1020:GOTO2010	EH
210 JE	90 B\$="ENDING ADDRESS IN HEX":GOSUB2010:EN=B	MN	•2050 NEXT B=(T(1)*4096)+(T(2)*256)+(T(3)*16)+	KP
193 CL	95 GOSUB2510:IFB=0THEN80	GE	T(4):RETURN	NP
253 NB	96 POKE254,T(2)+T(1)*16:B=T(4)+1+T(3)*16	HN	•2060 IFA\$>"@ANDAS<"G"THENT(A)=ASC(A\$)-55:RET	LI
4,74 MB	97 IFB>255THENB=B-255:POKE254,PEEK(254)+1	IL	URN	MI
53 EP	98 POKE253,B:PRINT	FG	•2070 IFA\$>"/ANDAS<:"THENT(A)=ASC(A\$)-48:RET	MG
3 GH	100 REM GET HEX LINE	MD	URN	MI
30 AN	110 GOSUB3010:PRINT": [c P][LEFT]";:FORA=0TO8	ME	•2080 T(A)=16:RETURN	IM
153 NG	120 FORB=0TO1:GOTO210	LH	•2500 REM ADDRESS CHECK	EB
76 BF	125 NEXTB	IK	•2510 IFAD>ENTHEN1030	HG
EP	130 A\$(A)=T(1)+T(0)*16:IFAD+A-1=ENTHEN310	PD	•2515 IFB<SRORB>ENTHEN1040	CE
3 PJ	135 PRINT" [c P][LEFT]";	LK	•2520 IFB<256OR(B>40960ANDB<49152)ORB>53247THE	PN
201 FK	140 NEXTA:T=AD-(INT(AD/256)*256):PRINT" "	IA	N1050	MJ
4 FL	150 FORA=0TO7:T=T+A\$(A):IFT>255THENT=T-255	FK	•2530 RETURN	IM
133 CL	160 NEXT	AB	•3000 REM ADDRESS TO HEX	EB
GC	170 IFA\$(8)<>TTHENGOSUB1010:GOTO110	HO	•3010 AC=AD:A=4096:GOSUB3070	HG
96 NN	180 FORA=0TO7:POKEAD+A,A\$(A):NEXT:AD=AD+8:GOT	MD	•3020 A=256:GOSUB3070	CE
NH	0110	KF	•3030 A=16:GOSUB3070	PN
IM	200 REM GET HEX INPUT	GE	•3040 A=1:GOSUB3070	MJ
KC	210 GETA\$:IFA\$=""THEN210	BJ	•3060 RETURN	IM
DC	211 IFA\$=CHR\$(20)THEN270	GC	•3070 T=INT(AC/A):IFT>9THENA\$=CHR\$(T+55):GOTO3	CJ
ML	212 IFA\$=CHR\$(133)THEN4000	MD	090	JP
38 GN	213 IFA\$=CHR\$(134)THEN4100	OB	•3080 A\$=CHR\$(T+48)	AC
JK	214 IFA\$=CHR\$(135)THENPRINT" ":GOTO4500	CJ	•3090 PRINTA\$;:AC=AC-A*T:RETURN	AI
NA	215 IFA\$=CHR\$(136)THENPRINT" ":GOTO4700	HG	•4000 A\$="**SAVE**":GOSUB4200	LH
DM	220 IFA\$>"@ANDAS<"G"THENT(B)=ASC(A\$)-55:GOTO	BE	•4050 OPEN1,T,1,A\$:SYS680:CLOSE1	EO
01 JA	250	KH	•4060 IFST=0THENEND	FJ
9 FM	230 IFA\$>"/ANDAS<:"THENT(B)=ASC(A\$)-48:GOTO	AD	•4070 GOSUB1060:IFT=8THENGOSUB1200	FF
PA	250	GJ	•4080 GOTO4000	AB
	240 GOSUB1100:GOTO210	PL	•4100 A\$="**LOAD**":GOSUB4200	MF
64	250 PRINTA\$"[c P][LEFT]";	IA	•4150 OPEN1,T,0,A\$:SYS690:CLOSE1	JH
	260 GOTO125	KF	•4160 IFST=64THEN110	CM
	270 IFA>0THEN280	HN	•4170 GOSUB1070:IFT=8THENGOSUB1200	FO
	272 A=-1:IFB=1THEN290	ON	•4180 GOTO4100	FG
	274 GOTO140	FL	•4200 PRINT" ":PRINTTAB(14)A\$	OM
	280 IFB=0THENPRINTCHR\$(20);CHR\$(20);:A=A-1	DH	•4210 PRINT:A\$=""INPUT"FILENAME";A\$	GF
	285 A=A-1	JA	•4215 IFA\$=""THEN4210	DF
	290 PRINTCHR\$(20);:GOTO140	HD	•4220 PRINT:PRINT"TAPE OR DISK?":PRINT	IG
	300 REM LAST LINE	AG	•4230 GETB\$:T=1:IFB\$="D"THENT=8:A\$="@0:"+A\$:RE	FN
	310 PRINT" ":T=AD-(INT(AD/256)*256)	KN	TURN	IM
	320 FORB=0TOA-1:T=T+A\$(B):IFT>255THENT=T-255		•4240 IFB\$<>"T"THEN4230	DK
	330 NEXT		•4250 RETURN	MA
	340 IFA\$(A)<>TTHENGOSUB1010:GOTO110		•4500 B\$="CONTINUE FROM ADDRESS":GOSUB2010:AD=	OI
	350 FORB=0TOA-1:POKEAD+B,A\$(B):NEXT		B	FH
	360 PRINT:PRINT"YOU ARE FINISHED!":GOTO4000		•4510 GOSUB2515:IFB=0THEN4500	NK
	1000 REM BELL AND ERROR MESSAGES		•4520 PRINT:GOTO110	DI
	1010 PRINT:PRINT"LINE ENTERED INCORRECTLY":PR		•4700 B\$="BEGIN SCAN AT ADDRESS":GOSUB2010:AD=	BK
	INT:GOTO1100		B	EC
LL	1020 PRINT:PRINT"INPUT A 4 DIGIT HEX VALUE!":		•4705 GOSUB2515:IFB=0THEN4700	GN
ED	GOTO1100		•4706 PRINT:GOTO4740	MN
P	1030 PRINT:PRINT"ENDING IS LESS THAN STARTING		•4710 FORB=0TO7:AC=PEEK(AD+B):GOSUB3030:IFAD+B	JD
MC	!":B=0:GOTO1100		=ENTHENAD=SR:GOSUB1080:GOTO110	
T	1040 PRINT:PRINT"ADDRESS NOT WITHIN SPECIFIED		•4715 PRINT" ";:NEXTB	
DM	RANGE!":B=0:GOTO1100		•4720 PRINT:AD=AD+8	
NA	1050 PRINT:PRINT"NOT ZERO PAGE OR ROM!":B=0:G		•4730 GETB\$:IFB\$=CHR\$(136)THEN110	
	OTO1100		•4740 GOSUB3010:PRINT": ";:GOTO4710	

INFINITESIMAL INTRIGUE

FROM PAGE 51 MOLECULAR MOTION

```

.1 REM
.2 REM --- MOLECULAR MOTION ---
.3 REM RUPERT REPORT #22
.4 REM
.6 REM MOVEMENT OF MOLECULES FROM ONE
.7 REM COMPARTMENT TO ANOTHER
.8 REM
.9 :REM TOTAL # AND # ON LEFT SIDE:
.10 TTL=480 : NL=480
.15 L1$=CHR$(157):L$=" "+L1$+L1$+" "
.20 KK=1 : K1=1024 : K2=40
.30 K3=32 : K4=81 :REM BLANK & MOLECULE
.35 :REM CLEAR SCREEN AND SET COLOR:
.40 POKE 53281,0 : PRINT CHR$(147)
.50 POKE 53281,1 : PRINT CHR$(144)
.55 :REM PUT 480 MOLECULES ON LEFT:
.60 FOR Y=1 TO 24 : FOR X=0 TO 19
.70 POKE K1+X+K2*Y,K4 : NEXT : NEXT
.75 :REM ===== MAIN LOOP =====
.80 RL=NL/TTL :REM RELATIVE # ON LEFT
.90 RN=RND(0) :REM RANDOM NUMBER
.100 IF NL=480 AND KK=-1 THEN 270
.110 IF RN<RL THEN PL=K3: PR=K4:GOTO 130
.120 PL=K4 : PR=K3
.130 X=INT(RND(0)*20):Y=INT(RND(0)*24)+1
.135 REM MEMORY LOCATIONS TO POKE
.140 ML=K1+X+Y*K2
.150 MR=K1+(20+X)+Y*K2
.160 GET A$ : IF A$<>" " THEN 270
.165 REM FIND LOCATION TO 'UNPOKE'
.170 IF PEEK(ML)<>PL THEN 210
.180 Y=Y+1 : IF Y<25 THEN 140
.190 Y=1 : X=X+1 : IF X<20 THEN 140
.200 X=0 : GOTO 140
.210 IF PL=K3 THEN NL=NL-KK : GOTO 230
.220 NL=NL+KK
.230 NR=TTL-NL : T=T+1
.240 POKE ML,PL : POKE MR,PR
.250 PRINT CHR$(19);NL;TAB(17);"T=";KK*T;
L$;TAB(34);NR;L$
.260 GOTO 80
.265 REM REVERSE THE ARROW OF TIME
.270 KK=-KK : TEMP=K3 : K3=K4 : K4=TEMP
.280 T=0 : GOTO 80

```

JD
LI
OL
JD
OH
GJ
JD
JA
II
CG
JB
JB
LE
HM
GM
GA
PH
KC
BA
LP
PP
KI
II
NA
JJ
KK
PK
HI
DB
KL
HL
LE
GM
JN
FG
BN
ON
FC
AL
PA
LF
OO
GM

```

.5 REM MONTE CARLO SIMULATION OF A
.6 REM TWO-PRODUCT DECAY CHAIN
.7 REM
.10 TTL=100 :REM INITIAL NUMBER
.20 SF=22/TTL :REM PLOT SCALE FACTOR
.30 ND=2 :REM NUMBER OF DAUGHTERS
.40 DIM NUC(TTL)
.100 REM DECAY CONSTANTS
.110 DC(0)=.2
.120 DC(1)=.05 :REM FIRST DAUGHTER
.130 DC(2)=0 :REM STABLE ISOTOPE
.140 M(0)=TTL :REM INITIAL AMOUNT
.150 PRINT CHR$(147)" === RADIOACTIVE DE
CAY ==="
.160 FOR T=1 TO 20
.170 GOSUB 400 :REM <<< GOSUB 500 TO PLOT
.180 FOR N=1 TO TTL
.190 IF RND(0) > DC(NUC(N)) THEN 220
.200 K=NUC(N) : NUC(N)=K+1
.210 M(K)=M(K)-1 : M(K+1)=M(K+1)+1
.220 NEXT N
.230 NEXT T
.240 POKE 214,23 : PRINT
.250 POKE 211,12
.260 PRINT"=PRESS A KEY TO CONTINUE==>";
.270 GET A$ : IF A$="" THEN 270
.280 GOTO 150
.390 END
.395 REM ---- PRINT VALUE ROUTINE ----
.400 PRINT TM ">>";
.410 FOR J=0 TO ND
.420 PRINT M(J);:NEXT J
.430 TM=TM+1
.440 RETURN
.495 REM
.499 REM ----- PLOT ROUTINE -----
.500 FOR J=0 TO ND
.510 Y=M(J) : S$=RIGHT$(STR$(J),1)
.520 ROW%=22-SF*Y : COL%=2*T-2
.530 IF ROW%>23 THEN ROW%=23
.540 IF ROW%<=0 THEN ROW%=0
.550 IF COL%>38 THEN COL%=38
.560 IF COL%<0 THEN COL%=0
.570 POKE 214,ROW%: PRINT
.580 POKE 211,COL%: PRINT S$
.590 NEXT J : RETURN

```

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JG
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IG
PJ
GL
IO
JJ

ALIVE & IN LIVING COLOR

FROM PAGE 18

DRAGON

```

.1 REM
.2 REM * RADIOACTIVE DECAY *
.3 REM RUPERT REPORT #22
.4 REM

```

JD
FF
OL
JD

```

.1 REM *** DRAGON ***
.2 REM MULTI-COLOR SPRITE ANIMATION
.4 REM ** MOVE TOP OF MEMORY TO MAKE ROOM
FOR VIDEO BLOCK AT 32768

```

EK
GE
CA

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```

5 POKE 55,255:POKE 56,127:POKE 643,255:P
OKE 644,127
9 REM      *** SET-UP SUBROUTINES ***
10 GOSUB 600:REM (VIDEO MEMORY)
12 GOSUB 1000:REM (SPRITE SHAPES)
13 GOSUB 900:REM (SPRITE POSITIONS)
15 GOTO 100
98 REM      *** ACTION LOOP ***
100 FOR AN=0 TO 3
105 K=KP(PEEK(653)):IF K>2 THEN 370
110 IF (K>1)AND(Q=1) THEN AN=0:Q=0:POKE
LT(0),ST(XK,AN):GOTO 105
115 IF K>1 THEN 105
120 Q=1:HP=HP+K(K):IF HP<0 THEN HP=HP+1
125 IF HP>HZ THEN HP=HP-1
130 IF K<>XK THEN XK=K
135 POKE HT(0),HH(HP):POKE HR,HB(HP)
140 POKE LT(0),ST(XK,AN)
196 NEXT:GOTO 100
296 RETURN
369 REM ** PUT VIDEO MEMORY BACK TO FIRS
T BLOCK, AND SCREEN MEMORY TO 1024
370 POKE 56578,PEEK(56578)OR3:POKE 56576
,(PEEK(56576)AND 252)OR 3
371 POKE 53272,20:POKE 648,4
379 REM ** REENABLE SHIFT/COMMODORE AND
RUN-STOP/RESTORE
380 POKE 657,0:POKE 792,71:POKE 808,237
390 END
598 REM      *** ARRANGE MEMORY ***
599 REM USE THIRD VIDEO BLOCK (32768 TO
49151), SO ROM CHARACTER SET IS USABLE.
600 VB=32768:POKE 56578,PEEK(56578)OR3:P
OKE 56576,(PEEK(56576)AND 252)OR 1
601 REM ** TELL VIC-2 WHERE SCREEN IS WI
THOUT CHANGING CHARACTER SET LOCATION
602 SB=0:POKE 53272,(SB*16)+4:SB=VB+1024
*SB
603 REM ** TELL BASIC WHERE SCREEN IS
604 BB=SB/256:POKE 648,BB
608 REM      *** REGISTER ADDRESSES ***
609 REM ** SPRITE SHAPE LOCATION TABLE
610 LT(0)=SB+1016:FOR I=1 TO 7:LT(I)=LT(
I-1)+1:NEXT
611 REM ** SPRITE COLOR TABLE
612 CT(0)=53287:FOR I=1 TO 7:CT(I)=CT(I-
1)+1:NEXT
613 REM ** SPRITE HORIZONTAL POSITION TAB
LE (LOW BYTES)
614 HT(0)=53248:FOR I=1 TO 7:HT(I)=HT(I-
1)+2:NEXT
615 REM ** SPRITE VERTICAL POSITION TABL
E
616 VT(0)=53249:FOR I=1 TO 7:VT(I)=VT(I-
1)+2:NEXT
617 REM ** SPRITE HORIZONTAL HIGH-BIT RE
GISTER
618 HR=53264

```

```

619 REM ** SPRITE ENABLE REGISTER
620 ES=53269
621 REM ** VERTICAL EXPANSION REGISTER (
1=DOUBLE HEIGHT)
622 VE=53271
623 REM ** HORIZONTAL EXPANSION REGISTER
(1=DOUBLE WIDTH)
624 HE=53277
625 REM ** SPRITE PRIORITY REGISTER (1=S
PRITE IS IN FRONT OF FOREGROUND)
626 PR=53275
627 REM ** MULTICOLOR ENABLE REGISTER (1
=MULTI-COLOR ENABLED)
628 EM=53276
629 REM ** SPRITE MULTICOLOR COLOR REGIS
TERS
630 MR=53285:REM ('01' REGISTER: ADD 1 T
O MR FOR '11' REGISTER)
631 REM ** SPRITE-SPRITE COLLISION REG:S
PRITE-FOREGROUND COLLISION REG
632 CS=53278:CF=53279
633 REM ** SET-BIT AND CLEAR-BIT VALUES
634 BS(0)=1:FOR I=1 TO 7:BS(I)=2*BS(I-1)
:NEXT
635 FOR I=0 TO 7:BC(I)=255-BS(I):NEXT
636 REM ** MULTICOLOR SET-BIT VALUES
637 FORI=0TO3:MS(0,I)=I:NEXT:FORI=1TO3:F
ORJ=0TO3:MS(I,J)=MS(I-1,J)*4:NEXT:NEXT
638 REM      *** INITIALIZE VALUES ***
639 REM ** FOREGROUND COLOR
640 POKE 53281,9:PRINT "[CLEAR][c 1]";:R
EM (BROWN)
641 REM ** BACKGROUND COLOR
642 POKE 53281,0:REM (BLACK)
643 REM ** BORDER COLOR
644 POKE 53280,9:REM (BROWN)
645 REM ** SPRITE COLORS (DEFAULTS: WHI,
RED,L-GRN,PUR,GRN,BLU,YEL,M-GRAY)
646 POKE CT(0),5:REM (THE SCALES ARE GRE
EN)
647 REM ** SET PRIORITY
648 POKE PR,0:REM (ALL IN FRONT)
649 REM ** SET HORIZONTAL SIZES
650 POKE HE,1:REM (SPR 0=DOUBLE)
651 REM ** SET VERTICAL SIZES
652 POKE VE,1:REM (SPR 0=DOUBLT)
653 REM ** ENABLE SPRITES
654 POKE ES,BS(0):REM (SPRITE 0 ONLY)
655 REM ** ENABLE MULTICOLOR FOR SPR 0
656 POKE EM,BS(0)
657 REM ** SET MULTI-COLORS 1 AND 3 (1=L
IGHT GREY, 3=FLAME YELLOW)
658 POKE MR,15:POKE MR+1,7
689 REM      *** SAFETY PROCEDURES ***
690 POKE 657,128:REM DISABLE SHIFT/COMMO
DORE CHARACTER SET SWITCH
691 POKE 808,234:POKE 792,193:REM DISABL
E STOP AND STOP/RESTORE

```


IMPORTANT!

Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 117 and 118 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

•696 RETURN	IM	•1020 DATA "[6"."]2[5"."]"	BK
•898 REM *** SPRITE POSITIONS ***	KA	•1021 DATA "[4"."]22.2[4"."]"	AK
•899 REM ** POSSIBLE POSITIONS DIM'ED	MK	•1022 DATA "[4"."][4"2"] [4"."]"	CO
•900 VZ=19:HZ=102:DIM HH(HZ),VV(VZ),HB(HZ)	NM	•1023 DATA "[6"."]22[4"."]"	DO
•901 REM ** ASSIGN HORIZONTAL VALUES	IA	•1024 DATA "[5"."]1[3"2"] [3"."]"	AF
•902 X=8:B=0:FOR I=0 TO HZ:HH(I)=X:HB(I)=B	PB	•1025 DATA "[4"."]22122[3"."]"	AB
•903 X=X+3:IF X>255 THEN X=X-256:B=1	DC	•1026 DATA "[5"."]1122.2."	BI
•904 NEXT	IA	•1027 DATA "[5"."]1122..2"	AA
•905 REM ** ASSIGN VERTICAL VALUES	LF	•1028 DATA "[6"."]122..2"	BF
•906 X=53:FOR I=0 TO VZ:VV(I)=X:X=X+8:NEXT	JN	•1029 DATA "[7"."]22..2"	BC
•919 REM ** KEYPRESS MATRIX	EO	•1030 DATA "[6"."]1[3"2"] .2"	BJ
•920 DIM KP(7),K(2)	JA	•1031 DATA "[6"."][3"2"] .2"	DO
•921 FOR I=0 TO 7:KP(I)=2:NEXT:KP(1)=1:KP(2)=0:KP(7)=3	ML	•1039 REM ** 2ND SHAPE, 1ST SEQUENCE	FG
•922 K(0)=-1:K(1)=1:K(2)=0	BK	•1040 DATA "[6"."]2[5"."]"	BK
•929 REM ** INITIAL SPRITE POSITIONING	IO	•1041 DATA "[4"."]22.2[4"."]"	AK
•930 HP=6:VP=VZ:XK=1:AN=0	PG	•1042 DATA "[3"."][3"3"]22[4"."]"	AB
•931 POKE VT(0),VV(VP):POKE HT(0),HH(HP):POKE HR,HB(HP)	AC	•1043 DATA "[4"."][4"2"] [4"."]"	CO
•939 REM ** TELL VIC-2 WHERE TO FIND SPRITE SHAPE	HK	•1044 DATA "[4"."]11[3"2"] [3"."]"	DC
•940 POKE LT(0),ST(XK,AN)	DD	•1045 DATA "[5"."]2212[3"."]"	AP
•949 REM ** CLEAR SCREEN	BI	•1046 DATA "[5"."][3"1"]2..2"	AJ
•950 PRINT "[CLEAR]";	KN	•1047 DATA "[5"."][3"1"]2..2"	AJ
•996 RETURN	IM	•1048 DATA "[6"."]112.2."	AK
•998 REM *** SPRITE SHAPES ***	CD	•1049 DATA "[7"."]12.2."	BD
•999 REM ** # SPR SHAPES -1; # SHAPES/ANIMATION SEQ; # LINES/SHAPE -1	OF	•1050 DATA "[5"."][3"1"] [3"2"] ."	AF
•1000 NS=1:AS=3:TS=11	FJ	•1051 DATA "[6"."][3"2"] [3"."]"	AC
•1001 REM ** LOCATE SPRITE SHAPE MEMORY	OM	•1059 REM ** 3RD SHAPE, 1ST SEQUENCE	GL
•1002 ST(0,0)=16:FOR I=1 TO NS:ST(I,0)=ST(I-1,0)+AS+1:NEXT	MP	•1060 DATA "[6"."]2[5"."]"	BK
•1003 FOR I=0 TO NS:FOR J=1 TO AS:ST(I,J)=ST(I,J-1)+1:NEXT:NEXT	GH	•1061 DATA "...3.22.2[4"."]"	AL
•1004 FOR I=0 TO NS:FOR J=0 TO AS:FOR K=0 TO TS:READ SS\$	OL	•1062 DATA "...3.3..22[4"."]"	AG
•1005 FOR L=0 TO 2:X=0:Y=VB+ST(I,J)*64+K*3+L	CC	•1063 DATA "...3.[4"2"] [4"."]"	CP
•1006 REM ** CONVERT STRINGS TO SHAPE BYTES (USE MS(0-3,0-3) TO SET BITS)	MN	•1064 DATA "[5"."]1[3"2"] [3"."]"	AF
•1007 FOR M=1 TO 4:N=ASC(MID\$(SS\$,M+L*4,1))	AJ	•1065 DATA "[4"."]22122[3"."]"	AB
•1008 IF(N>48)AND(N<52)THEN X=X OR MS(4-M,N-48)	AH	•1066 DATA "[5"."]1122..2"	AA
•1009 NEXT:POKE Y,X:NEXT:PRINT SS\$:NEXT	GO	•1067 DATA "[5"."]1122.2."	BI
•1010 Z=64-(TS*3+2):FOR K=Y+1 TO Y+Z:POKE K,0:NEXT:NEXT:NEXT	IE	•1068 DATA "[6"."]122.2."	AN
•1017 REM ** SPRITE SHAPE DATA	HJ	•1069 DATA "[7"."]22..2"	BC
•1018 REM .='OFF' 1=COLOR 1 2=COLOR 2 3=COLOR 3	IO	•1070 DATA "[6"."]1[5"2"]"	BF
•1019 REM ** 1ST SHAPE, FIRST SEQ	LG	•1071 DATA "[6"."][3"2"] [3"."]"	AC
		•1079 REM ** 4TH SHAPE, 1ST SEQUENCE	LC
		•1080 DATA "3[5"."]2[5"."]"	BB
		•1081 DATA "...3..22.2[4"."]"	AD
		•1082 DATA "...3.[4"2"] [4"."]"	CO
		•1083 DATA "...3[4"."]22[4"."]"	BH
		•1084 DATA "3[5"."][3"2"] [3"."]"	AJ
		•1085 DATA "[4"."][5"2"] [3"."]"	DC
		•1086 DATA "[5"."]1[3"2"] .2."	AB
		•1087 DATA "[5"."]1[3"2"] .2."	AB
		•1088 DATA "[6"."][3"2"] ..2"	AG
		•1089 DATA "[7"."]22..2"	BC
		•1090 DATA "[7"."][3"2"] .2"	BG
		•1091 DATA "[5"."][4"2"] .2."	AC
		•1119 REM ** 1ST SHAPE, 2ND SEQUENCE	HE
		•1120 DATA "[5"."]2[6"."]"	BK
		•1121 DATA "[4"."]2.22[4"."]"	DK

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BK 1122 DATA "[4"."][4"2"] [4"."]"
AK 1123 DATA "[4"."]22[6"."]"
CO 1124 DATA "[3"."][3"2"]1[5"."]"
DO 1125 DATA "[3"."]22122[4"."]"
AF 1126 DATA ".2.2211[5"."]"
AB 1127 DATA ".2..2211[5"."]"
BI 1128 DATA ".2..221[6"."]"
AA 1129 DATA ".2..22[7"."]"
BF 1130 DATA ".2.[3"2"]1[6"."]"
BC 1131 DATA ".2.[3"2"] [6"."]"
BJ 1139 REM ** 2ND SHAPE, 3RD SEQ
DO 1140 DATA "[5"."]2[6"."]"
FG 1141 DATA "[4"."]2.22[4"."]"
BK 1142 DATA "[4"."]22[3"3"] [3"."]"
AK 1143 DATA "[4"."] [4"2"] [4"."]"
AB 1144 DATA "[3"."] [3"2"] 11[4"."]"
CO 1145 DATA "[3"."]2122[5"."]"
DC 1146 DATA ".2..2[3"1"] [5"."]"
AP 1147 DATA ".2..2[3"1"] [5"."]"
AJ 1148 DATA ".2.211[6"."]"
AJ 1149 DATA ".2.21[7"."]"
AK 1150 DATA ".[3"2"] [3"1"] [5"."]"
CO 1151 DATA "[3"."] [3"2"] [6"."]"
DC 1160 DATA "[5"."]2[6"."]"
AP 1161 DATA "[4"."]2.22.3.."
AJ 1162 DATA "[4"."]22..3.3.."
AJ 1163 DATA "[4"."] [4"2"] .3.."
AK 1164 DATA "[3"."] [3"2"] 1[5"."]"
BD 1165 DATA "[3"."]22122[4"."]"
AF 1166 DATA ".2..2211[5"."]"
AC 1167 DATA ".2.2211[5"."]"
GL 1168 DATA ".2.2211[5"."]"
BK 1169 DATA ".2..22[7"."]"
AL 1170 DATA "[5"2"]1[6"."]"
AG 1171 DATA "[3"."] [3"2"] [6"."]"
CP 1179 REM ** 4TH SHAPE, 2ND SEQUENCE
AF 1180 DATA "[5"."]2[5"."]3"
AB 1181 DATA "[4"."]2.22..3.."
AA 1182 DATA "[4"."] [4"2"] .3.3"
BI 1183 DATA "[4"."]22[4"."]3.."
AN 1184 DATA "[3"."] [3"2"] [5"."]3"
BC 1185 DATA "[3"."] [5"2"] [4"."]"
BF 1186 DATA ".2.[3"2"]1[5"."]"
AC 1187 DATA ".2.[3"2"]1[5"."]"
LC 1188 DATA ".2..[3"2"] [6"."]"
BB 1189 DATA ".2..22[7"."]"
AD 1190 DATA ".2.22[8"."]"
CO 1191 DATA ".2..[4"2"] [5"."]"
BH 1990 RETURN

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SOLITAIRE 64 FROM PAGE 37

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AG 1 REM SOLITAIRE 64
BC 2 REM BY ERIC W SINK
BG 3 POKE55,255:POKE56,63:CLR:POKE53269,..:P
AC OKE53271,..:POKE53277,..
HE 4 X=RND(-TI)
BK
DK

```

```

CO 5 S4=64:O4=14:T6=26:H9=39:Z1=1:Z2=2:Z3=3
AG :Z4=4:O3=13
BN 6 POKE53280,0:POKE53281,4:PRINT"[CLEAR]"
AB YELLOW];CHR$(142)"[008]"
DI 7 IFPEEK(2)=15THENPRINTCHR$(14)"[008]"
DI 8 GOSUB103
DN 9 GOSUB54:GOSUB101:GOSUB72:GOSUB190:GOSU
AK B216
BJ 10 CLR:DIM P(7,20),H(13),C(13),D(13),S(1
CO 3),NP(7),DK%(52)
PM 11 S4=64:O4=14:T6=26:H9=39:Z1=1:Z2=2:Z3=
BK 3:Z4=4:O3=13
DK 12 M$="HANG ON, STILL SETTING UP[3"."]":
DF P$="[HOME][DOWN][DOWN]":PRINT"[CLEAR]":G
CO OSUB108
DO 13 X=RND(-TI)
OH 14 DP=0:NH=0:NC=0:ND=0:NS=0:DN=0
DB 15 PRINT:PRINT:PRINT"SHUFFLING[3"."]"
DB 16 FORI=1TO52
CO 17 CD=INT(RND(1)*52)+Z1:IFDK%(CD)THEN17
AD 18 DK%(CD)=I:NEXT
BN 19 PRINT"DEALING OUT CARDS[3"."]"
BK 20 FORI=1TO28
BK 21 F1=.:CD=DK%(53-I):DK%(53-I)=.
DL 22 IFI=7ORI=13ORI=18ORI=22ORI=25ORI=27OR
AG I=28THENCDCD+S4:F1=1
CP 23 PI=PI+1:P(PI,NP(PI)+1)=CD:NP(PI)=NP(P
BN I)+1:IFF1=1THENPI=0
AB 24 NEXT
DI 25 DN=24:DP=24:POKE53280,0:POKE53281,1
DI 26 PRINT"[CLEAR][RVSON][BLUE][3" "]* * *
DI [3" "]* * *S O L I T A I R E[3" "]* * *
AK ";:POKE16423,160
CN 27 GOSUB368
BK 28 PRINT"[CLEAR][RVSON][BLUE][3" "]* * *
HE [3" "]* * *S O L I T A I R E[3" "]* * *
DN ";:POKE16423,160
DD 29 IFLV=1THENGOSUB382
DG 30 POKE55335,11:PRINT:PRINT"[HOME]";
DP 31 FORQ=1TO7:PN=Q:GOSUB111:NEXT
DN 32 GOSUB155
BC 33 GOSUB187:GOSUB226
DB 34 GOSUB243:REM FIRST MOVE
DB 35 GOSUB269:REM SECOND MOVE
CO 36 IFBU=1THENBU=.:GOTO34
AK 37 IFDNTHEN34
BK 38 FORI=1TO7:IFP(I,1)ANDS4=S4ORNP(I)=0TH
DC ENNEXT:GOTO40
IM 39 GOTO34
40 FORI=1TO7:NP(I)=.:NEXT:NH=03:NC=03:ND
=03:NS=03
41 H(NH)=03:C(NC)=03:D(ND)=03:S(NS)=03
42 GOSUB155:GOSUB137:FORHI=1TO7:PN=HI:GO
SUB111:NEXT
43 IFLV=1THEN374
44 PRINT"[HOME][6"[DOWN]]"TAB(15);"[RVS
ON]YOU WON[3"!]"
45 PRINT"[HOME][9"[DOWN]]"TAB(14);"[RVS

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ON][RED]PLAY AGAIN??"	AO	00	JH	
•46 PRINT:PRINT	GJ	•85 DATA076,255,000,240,144,144,240,024,0	LN	•122
•47 PRINTTAB(9)"[RVSON]PRESS UP TO PLAY A	KO	00		•123
GAIN"	JJ	•86 DATA077,255,000,144,160,192,160,144,0	GA	•124
•48 PRINT		00		•125
•49 PRINTTAB(11)"[RVSON]PRESS DOWN TO QUI	PN	•87 DATA078,255,000,054,127,127,062,028,0	EG	•126
T[BLACK]"		08		10RS
•50 X=PEEK(56320):U=XAND1:V=XAND2:IFU=1AN	CP	•88 DATA079,255,000,012,012,051,051,012,0	CC	•127
DV=2THEN50	FL	30		•128
•51 IFU=.THENRUN10		•89 DATA080,255,000,008,028,062,028,008,0	FA	HR\$(
•52 PRINT"[CLEAR][BLACK]";:POKE53269,.:EN	FH	00		•129
D	JD	•90 DATA081,255,000,024,060,126,126,024,0	NB	•130
•53 REM		60		•131
•54 REM	JD	•91 DATA082,224,048,024,024,024,024,024,0	DM	•132
•55 POKE2,15	GH	24		U][c
•56 DATA173,000,221,041,252,009,002	IL	•92 DATA085,024,024,024,024,024,024,012,0	FF	•133
•57 DATA141,000,221,169,002,141,024	GH	07		•134
•58 DATA208,169,064,141,136,002,169	GC	•93 DATA086,024,024,024,024,024,024,048,2	DI	4" "
•59 DATA147,032,210,255,169,127,141	NI	24		•135
•60 DATA013,220,169,051,133,001,160	GF	•94 DATA087,024,024,024,024,024,024,024,0	JH	:PRI
•61 DATA000,169,000,133,251,133,253	BA	24		•136
•62 DATA169,208,133,252,169,072,133	PI	•95 DATA088,000,000,000,000,000,000,000,2	PI	•137
•63 DATA254,177,251,145,253,200,192	JO	55		•138
•64 DATA000,208,247,230,252,230,254	EN	•96 DATA-1	OE	•139
•65 DATA165,252,201,224,208,237,169	AI	•97 PRINT"[CLEAR]E"	MD	•140
•66 DATA055,133,001,169,129,141,013	HI	•98 READA:IFA=-1THENRETURN	KN	•141
•67 DATA220,096,000	LB	•99 POKE16384,A	AF	•142
•68 PRINT"[HOME]E"	DK	•100 FORI=0TO7:READB:POKE18432+A*8+I,B:NE	MF	•143
•69 C1=.:FORI=49152TO49231:READB:C1=C1+B:	BI	XT:GOTO98	JD	•144
POKEI,B:POKE1024,B:POKE16384,B:NEXT	MC	•101 REM	GI	•145
•70 IFC1<>11494THENPRINT"ERROR IN DATA LI	IM	•102 SYS49152:RETURN	JD	•146
NES 10010-10065":STOP	JD	•103 REM	GJ	•147
•71 RETURN	DE	•104 M\$="[15" "]SOLITAIRE":P\$="[HOME][7"[	NE	•148
•72 REM	KE	DOWN"]":GOSUB108	CH	•149
•73 DATA064,007,012,024,024,024,024,024,0	EI	•105 M\$="[13" "]BY ERIC W SINK":P\$="[HOME	IM	•150
24	CH	][11"[DOWN"]":GOSUB108	JD	•151
•74 DATA065,255,000,240,144,240,144,144,0	AE	•106 M\$="[8" "]PLEASE WAIT[3"."]SETTING U	FP	•152
00	IN	P":P\$="[HOME][16"[DOWN"]":GOSUB108	IM	10RSU
•75 DATA066,255,000,240,016,240,128,240,0	PN	•107 RETURN	HK	•153
00	OM	•108 REM	OC	HR\$(
•76 DATA067,255,000,240,016,240,016,240,0	AJ	•109 FORI=1TOLEN(M\$):PRINTP\$RIGHT\$(M\$,I);	FD	•154
00	AC	:NEXT	LD	[s -
•77 DATA068,255,000,144,144,240,016,016,0	BM	•110 RETURN	MD	:RET
00		•111 REM	DM	•155
•78 DATA069,255,000,240,128,240,016,240,0		•112 REM		•156
00		•113 REM		•157
•79 DATA070,255,000,240,128,240,144,240,0		•114 REM		•158
00		•115 HP=3+(PN-1)*5:UC=.		•159
•80 DATA071,255,000,240,016,016,016,016,0		•116 VP=5:ZQ=.		•160
00		•117 PRINT"[HOME]";:FORI=1TOVP:PRINT"[DOW		INTTA
•81 DATA072,255,000,240,144,240,144,240,0		N]";:NEXT:PRINTTAB(HP);		TO171
00		•118 IFNP(PN)THEN120		•161
•82 DATA073,255,000,240,144,240,016,240,0		•119 PRINT"[4" "]:FORI=1TO13:PRINTTAB(HP		•162
00		);"[4" "]:NEXT:GOTO135		•163
•83 DATA074,255,000,152,164,164,164,152,0		•120 FORI=1TONP(PN):CD=P(PN,I):IFI=5XTHEN		•164
00		ZQ=1		•165
•84 DATA075,255,000,112,032,032,160,224,0		•121 IFCD<S4THENU=UC+Z1:GOTO130		10RSU

JH	•122 CD=CD-S4:SU=Z4:IFCD<04THENSU=Z1	JF	•167 CD\$=CO\$+CHR\$(192)+CHR\$(192+CH)+SU\$+C	
LN	•123 IFCD>=04ANDCD<=T6THENSU=Z2	ML	HR\$(210)	OO
GA	•124 IFCD>T6ANDCD<=H9THENSU=Z3	OB	•168 PRINTCD\$	EH
EG	•125 CH=CD-((SU-1)*13)	OB	•169 PRINTTAB(9);	NF
CC	•126 SU\$=CHR\$(205+SU):CO\$="[BLACK]":IFSU=	AH	•170 PRINT"[s -] [s -]":PRINTTAB(9)"[s U	PO
CC	1ORSU=3THENCO\$="[RED]"	OF	][c @][c @][s V]"	MH
FA	•127 IFZC=1ANDZQ=1THENCO\$="[BLUE]"	OO	•171 PRINT"[HOME][19"[DOWN]]"[BLUE]"TAB(3	IP
NB	•128 CD\$=CO\$+CHR\$(192)+CHR\$(192+CH)+SU\$+C	DE	);"4" "]"	BF
DM	HR\$(210)	EA	•172 PRINT"[HOME][19"[DOWN]]"[BLUE]"TAB(3	OO
FF	•129 PRINTCD\$	CP	);DP	IM
DI	•130 PRINTTAB(HP);	BK	•173 PRINT"[HOME][19"[DOWN]]"[BLUE]"TAB(9	JD
JH	•131 NEXT	IM	);"4" "]"	NM
PI	•132 PRINT"[s -] [s -]":PRINTTAB(HP)"[s	KP	•174 PRINT"[HOME][19"[DOWN]]"[BLUE]"TAB(9	ME
OE	U][c @][c @][s V]"	DE	);DN-DP	IM
MD	•133 ZC=. :ZQ=.	EI	•175 RETURN	JD
KN	•134 FORI=1TO12-NP(PN)+UC:PRINTTAB(HP);"4"	NH	•176 REM	FG
AF	" "":NEXT	DE	•177 PRINT"[HOME][20"[DOWN]]"[PURPLE]"TAB	GP
MF	•135 PRINT"[HOME][BLUE]";:POKE214,3:PRINT	DO	(3);"[s *][c T][c T][s R]":PRINTTAB(3);	BL
JD	:PRINTTAB(HP+1)UC	OK	•178 PRINT"[s -] [s -]":PRINTTAB(3)"[s U	DG
GI	•136 RETURN	DE	][c @][c @][s V]"	HH
JD	•137 REM ACES	FD	•179 RETURN	IM
GJ	•138 PRINT"[HOME][DOWN]";	JL	•180 REM	JD
NE	•139 IFNH=. THEN141	IM	•181 IFLV=1THEN184	MO
U	•140 SU=Z1:CD=H(NH):HP=9:GOSUB151	FN	•182 PRINT"[HOME][20"[DOWN]]"[WHITE]"TAB(	OF
CH	•141 PRINT"[HOME][DOWN]";	AH	3);"TURN":PRINTTAB(3);	JD
IM	•142 IFNC=. THEN144	IK	•183 PRINT"DECK":PRINTTAB(3)"OVER":GOTO18	AG
JD	•143 SU=Z2:CD=C(NC):HP=15:GOSUB151		6	CD
FP	•144 PRINT"[HOME][DOWN]";		•184 PRINT"[HOME][20"[DOWN]]"[WHITE]"TAB(	OF
IM	•145 IFND=. THEN147		3);"E[3" "]:PRINTTAB(3);	OC
JD	•146 SU=Z3:CD=D(ND):HP=21:GOSUB151		•185 PRINT" N ":PRINTTAB(3)" D "	FI
JD	•147 PRINT"[HOME][DOWN]";		•186 RETURN	PE
HK	•148 IFNS=. THEN150		•187 REM	DD
OC	•149 SU=Z4:CD=S(NS):HP=27:GOSUB151		•188 PRINT"[HOME][23"[DOWN]]"TAB(32)"CON	AH
FD	•150 RETURN		CEDE"	GN
LD	•151 REM ACE		•189 PRINT"[HOME]";:RETURN	GD
MD	•152 SU\$=CHR\$(205+SU):CO\$="[BLACK]":IFSU=		•190 REM	BE
DM	1ORSU=3THENCO\$="[RED]"		•191 DATA234,173,000,220,141,144,003	OI
	•153 CD\$=CO\$+CHR\$(192)+CHR\$(192+CD)+SU\$+C		•192 DATA074,176,010,173,001,208,201	DB
	HR\$(210)		•193 DATA052,144,003,206,001,208,173	HG
	•154 PRINTTAB(HP)CD\$:PRINTTAB(HP)"[s -]		•194 DATA144,003,074,074,176,010,173	CD
	[s -]":PRINTTAB(HP)"[s U][c @][c @][s V]		•195 DATA001,208,201,228,176,003,238	DL
	"":RETURN		•196 DATA001,208,173,144,003,074,074	PO
	•155 REM DECK		•197 DATA074,176,034,173,016,208,074	NE
	•156 IFDPHENGOSUB176:GOTO158		•198 DATA176,013,173,000,208,201,025	FI
	•157 GOSUB180		•199 DATA144,021,206,000,208,024,144	JP
	•158 PRINT"[HOME][20"[DOWN]]"TAB(9);		•200 DATA015,206,000,208,173,000,208	KJ
	•159 IFDP<>DNTHEN161		•201 DATA201,255,208,005,169,000,141	
	•160 PRINT"[4" "]:PRINTTAB(9)"[4" "]:PR		•202 DATA016,208,173,144,003,074,074	
	INTTAB(9)"[4" "]:PRINTTAB(9)"[4" "]:GO		•203 DATA074,074,176,029,173,016,208	
	TO171		•204 DATA074,176,013,238,000,208,208	
	•161 CD=DK%(DP+Z1):SU=4:IFCD<=03THENSU=Z1		•205 DATA018,169,001,141,016,208,024	
	•162 IFCD>=04ANDCD<=T6THENSU=Z2		•206 DATA144,010,173,000,208,201,063	
	•163 IFCD>T6ANDCD<=H9THENSU=Z3		•207 DATA176,003,238,000,208,173,144	
	•164 CH=CD-((SU-1)*03)		•208 DATA003,074,074,074,074,074,176	
	•165 SU\$=CHR\$(205+SU):CO\$="[BLACK]":IFSU=		•209 DATA001,096,160,243,162,161,232	
	1ORSU=3THENCO\$="[RED]"		•210 DATA208,253,200,208,248,076,000	
	•166 IFZC=1THENZC=. :CO\$="[BLUE]"		•211 DATA193,000,000	


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•212 C2=.:FORI=49408TO49550:READB:C2=C2+B
:POKEI,B:POKE1024,B:POKE16384,B:NEXT
•213 IFC2<>16685THENPRINT"ERROR IN DATA L
INES 11400-11500":STOP
•214 POKE49519,79:POKE49439,243
•215 RETURN
•216 REM
•217 DATA252,000,000,224,000,000,240,000
•218 DATA000,152,000,000,140,000,000,012
•219 DATA000,000,000,000,000,000,000,000
•220 DATA000,000,000,000,000,000,000,000
•221 DATA000,000,000,000,000,000,000,000
•222 DATA000,000,000,000,000,000,000,000
•223 DATA000,000,000,000,000,000,000,000
•224 DATA000,000,000,000,000,000,000,000
•225 FORI=22528TO22591:READB:POKEI,B:NEXT
:RETURN
•226 REM
•227 POKE53269,.:POKE53264,.:POKE53248,17
0:POKE53249,150:POKE53287,6
•228 POKE17400,96:POKE53269,1:RETURN
•229 REM READ JOYSTICK-SPRITE POSITION
•230 SYS49408:YS=PEEK(53249):XS=PEEK(5324
8)+256*(PEEK(53264)AND1)
•231 XS=XS-24:YS=YS-51
•233 CX=INT(XS/8):CY=INT(YS/8)
•234 RETURN
•235 REM
•236 JC=.
•237 IFCY>=22ANDCX>33THENJC=1
•238 IFCX>=3ANDCX<=7ANDCY>=19ANDCY<=22THE
NJC=2
•239 IFCX>=8ANDCX<=12ANDCY>=19ANDCY<=22TH
ENJC=3
•240 IFCX>=3ANDCX<=36ANDCY<=18ANDCY>=5THE
NJC=4
•241 IFCY<=4THENJC=5
•242 RETURN
•243 REM 1ST MOVE
•244 AM=.
•245 GOSUB229:GOSUB235
•246 ONJCGOTO248,249,254,256
•247 GOSUB306:GOTO243
•248 GOTO45
•249 IFDP=.THENIFLV=.THENDP=DN-3:GOTO252
•250 IFDP=.THEN374
•251 DP=DP-CG
•252 IFDP<.THENDP=.
•253 GOSUB155:GOTO243
•254 IFDP=DNTHEN247
•255 ZC=1:GOSUB155:AM=1:RETURN
•256 REM
•257 PN=7:IFCX<33THENPN=6
•258 IFCX<28THENPN=5
•259 IFCX<23THENPN=4
•260 IFCX<18THENPN=3
•261 IFCX<03THENPN=2
•262 IFCX<8THENPN=1

```

```

•263 P1=PN:IFNP(PN)=.THENGOSUB306:GOTO243
•264 DC=.:FORI=1TONP(PN):IFP(PN,I)>52THEN
DC=DC+Z1
•265 NEXT:D1=NP(PN)-DC+1
•266 CA=CY-5:CA=CA+D1:IFCA>NP(PN)THENCA=N
P(PN)
•267 SX=CA
•268 ZC=1:GOSUB111:RETURN
•269 REM 2ND MOVE
•270 GOSUB229:GOSUB235
•271 ONJCGOTO273,274,275,277,308
•272 GOSUB306:GOTO269
•273 GOTO248
•274 GOTO272
•275 IFAM=1THENZC=.:AM=.:BU=1:GOSUB155:RE
TURN
•276 GOTO272
•277 REM DROP CARDS TO A PILE
•278 P2=7:IFCX<33THENP2=6
•279 IFCX<28THENP2=5
•280 IFCX<23THENP2=4
•281 IFCX<18THENP2=3
•282 IFCX<03THENP2=Z2
•283 IFCX<8THENP2=1
•284 W2=P(P2,NP(P2))
•285 W2=W2-S4:S2=Z4:IFW2<04THENS2=Z1
•286 IFW2>=04ANDW2<=T6THENS2=Z2
•287 IFW2>T6ANDW2<=H9THENS2=Z3
•288 IFW2>03THENW2=W2-03:GOTO288
•289 IFAM=1THEN342
•290 W1=P(P1,SX)
•291 W1=W1-S4:GOSUB386
•292 IFNP(P2)=.ANDW1=03THEN300
•293 IFP1=P2THENBU=1:PN=P1:GOSUB111:RETUR
N
•294 IFW2<>W1+1THENGOSUB306:GOTO269
•295 O1=1:IFS1=2ORS1=4THENO1=2
•296 O2=1:IFS2=2ORS2=4THENO2=2
•297 IF01=1ANDO2=2THEN300
•298 IF01=2ANDO2=1THEN300
•299 GOSUB306:GOTO269
•300 FORI=SXTONP(P1):NP(P2)=NP(P2)+1:P(P2
,NP(P2))=P(P1,I):NEXTI
•301 NP(P2)=NP(P2)+CQ
•302 NP(P1)=SX-1:P(P1,NP(P1))=P(P1,NP(P1)
)ORS4
•303 PN=P1:GOSUB111
•304 PN=P2:GOSUB111
•305 RETURN
•306 FORA=1TO20:POKE54296,15:FORT=1TO3:NE
XT:POKE54296,0:FORT=1TO3:NEXT:NEXT
•307 RETURN
•308 REM
•309 IFAM=1THEN314
•310 IFSX<>NP(P1)THENGOSUB306:GOTO269
•311 W1=P(P1,SX)
•312 W1=W1-S4:GOSUB386
•313 ONS1GOTO326,330,334,338

```

IMP

•314 F
•315 V
•316 C
•317 C
•318 W
•319 N
•320 W
•321 N
•322 W
•323 N
•324 W
•325 N
•326 W
•327 N
•328 N
•329 R
•330 W
•331 N
•332 N
•333 R
•334 W
•335 N
•336 N
•337 R
•338 W
•339 N
•340 N
•341 R
•342 R
•343 P
•344 I
•345 I
•346 I
•347 I
•348 I
•349 W
•350 W
•351 I
•352 I
•353 I

IMPORTANT!

Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 117 and 118 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

JO	•314 REM	JD	•354 W1=DK%(DP+1)	MF
KI	•315 W1=DK%(DP+1)	MF	•355 GOSUB386	DB
A=N	•316 GOSUB386	DB	•356 IFW1=03ANDNP(P2)=.THEN363	IH
MA	•317 ONS1GOTO318,320,322,324	KM	•357 IFW2<>W1+1THENGOSUB306:GOTO269	OD
OF	•318 W2=H(NH):IFW2+1<>W1THENGOSUB306:GOTO269	JN	•358 O1=1:IFS1=2ORS1=4THEN01=2	LM
IH	•319 NH=NH+Z1:H(NH)=W1:GOSUB365:GOSUB137:	JN	•359 O2=1:IFS2=2ORS2=4THEN02=2	MI
JJ	GOSUB155:RETURN	CN	•360 IFO1=1ANDO2=2THEN363	DF
IJ	•320 W2=C(NC):IFW2+1<>W1THENGOSUB306:GOTO269	CN	•361 IFO1=2ANDO2=1THEN363	DH
LM	•321 NC=NC+Z1:C(NC)=W1:GOSUB365:GOSUB137:	BB	•362 GOSUB306:GOTO269	JA
CL	GOSUB155:RETURN	BB	•363 NP(P2)=NP(P2)+Z1:P(P2,NP(P2))=DK%(DP+1)ORS4:GOSUB365	KA
RE	•322 W2=D(ND):IFW2+1<>W1THENGOSUB306:GOTO269	NJ	•364 GOSUB155:PN=P2:GOSUB111:RETURN	HM
AJ	•323 ND=ND+Z1:D(ND)=W1:GOSUB365:GOSUB137:	AN	•365 REM	JD
CL	GOSUB155:RETURN	AN	•366 FORA=DP+1TODN:DK%(A)=DK%(A+1):NEXT:D	GE
EP	•324 W2=S(NS):IFW2+1<>W1THENGOSUB306:GOTO269	DN	N=DN-1:RETURN	IC
OI	•325 NS=NS+Z1:S(NS)=W1:GOSUB365:GOSUB137:	DN	•367 END	IE
HE	GOSUB155:RETURN	DB	•368 REM LAS VEGAS OR REGULAR	DO
GK	•326 W2=H(NH):IFW2+1<>W1THENGOSUB306:GOTO269	DB	•369 PRINT"[6"[DOWN]]":PRINT"LAS VEGAS S	LI
GF	•327 NH=NH+1:H(NH)=W1	BJ	TYLE OR REGULAR??"	EE
NF	GOSUB155:RETURN	BJ	•370 PRINT"[DOWN][DOWN]PUSH UP FOR 'VEGAS	II
CD	•328 NP(P1)=NP(P1)-Z1:P(P1,NP(P1))=P(P1,N	JN	' AND DOWN FOR REGULAR"	PG
DG	P(P1))ORS4:GOSUB111:GOSUB137	JN	•371 X=PEEK(56320):U=XAND1:V=XAND2:IFU=1A	HO
AD	•329 RETURN	JB	NDV=2THEN371	BK
PC	•330 W2=C(NC):IFW2+1<>W1THENGOSUB306:GOTO269	JB	•372 IFU=.THENLV=1:CG=1:RETURN	NB
AH	•331 NC=NC+1:C(NC)=W1	EE	•373 LV=. :CG=3:RETURN	MC
IB	•332 NP(P1)=NP(P1)-Z1:P(P1,NP(P1))=P(P1,N	IM	•374 PRINT"[CLEAR]HAD YOU BOUGHT THE DECK	DM
DK	P(P1))ORS4:GOSUB111:GOSUB137	IM	FOR \$50,"	DP
DI	•333 RETURN	BB	•375 PRINT"[DOWN]AT \$5 FOR EVERY CARD YOU	OI
GM	•334 W2=D(ND):IFW2+1<>W1THENGOSUB306:GOTO269	BD	PUT AT THE TOP,"	PP
KG	•335 ND=ND+1:D(ND)=W1	BD	•376 PRINT"[DOWN]YOU WOULD RECEIVE \$"(NH	KP
UR	•336 NP(P1)=NP(P1)-Z1:P(P1,NP(P1))=P(P1,N	EE	+NC+ND+NS)*5"BACK."	NO
IN	P(P1))ORS4:GOSUB111:GOSUB137	IM	•377 PRINT"[DOWN]THIS LEAVES YOU WITH A N	IA
OD	•337 RETURN	AN	ET ";	IM
LM	•338 W2=S(NS):IFW2+1<>W1THENGOSUB306:GOTO269	FJ	•378 IF((NH+NC+ND+NS)*5)-50>=0THENPRINT"P	JJ
MI	•339 NS=NS+1:S(NS)=W1	EE	ROFIT":GOTO380	BG
OH	•340 NP(P1)=NP(P1)-Z1:P(P1,NP(P1))=P(P1,N	EE	•379 PRINT"LOSS"	EK
OP	P(P1))ORS4:GOSUB111:GOSUB137	IM	•380 PRINT"OF[3" "]\$"ABS(((NH+NC+ND+NS)*5	IM
EL	•341 RETURN	DB	)-50)	
DI	•342 REM	FD	•381 GOTO45	
IM	•343 P2=7:IFCX<33THENP2=6	FD	•382 X\$="LAS VEGAS":PRINT:PRINT:PRINT:PRI	
JD	•344 IFCX<28THENP2=5	EE	NT"[WHITE]"	
IM	•345 IFCX<23THENP2=4	IM	•383 FORI=1TO9:PRINT"[RIGHT]"MID\$(X\$,I,1)	
JD	•346 IFCX<18THENP2=3	IM	TAB(38)MID\$(X\$,I,1)	
IM	•347 IFCX<03THENP2=Z2	JD	•384 NEXT	
JD	•348 IFCX<8THENP2=1	OI	•385 RETURN	
DL	•349 W2=P(P2,NP(P2))	HE	•386 S1=Z4:IFW1<04THENS1=Z1	
CJ	•350 W2=W2-S4:S2=Z4:IFW2<04THENS2=Z1	GK	•387 IFW1=04ANDW1<=T6THENS1=Z2	
DI	•351 IFW2>=04ANDW2<=T6THENS2=Z2	GF	•388 IFW1>T6ANDW1<=H9THENS1=Z3	
GM	•352 IFW2>T6ANDW2<=H9THENS2=Z3	NF	•389 IFW1>03THENW1=W1-03:GOTO389	
LE	•353 IFW2>03THENW2=W2-03:GOTO353	CD	•390 RETURN	
		CD		
		DG		
		AD		
		PC		
		AH		
		JA		

MYSTERY AT MYCROFT MEWS FROM PAGE 29

•10 REM "MYSTERY AT MYCROFT MEWS" II
•20 S=54272:FORJ=0TO24:POKES+J,0:NEXT:POK

ES+24,15	NI	]":POKEV+21,0	OH
•30 POKE53280,0:POKE53281,0:POKE53283,6:P	BF	•410 FORY=1TO4:PRINT"[DOWN][3" "];:FORX=	HG
RINT"[CLEAR]"CHR\$(8)CHR\$(142);		1TO4:H=(X*4-Y-6-2*(H=12))AND15	
•40 M\$="[RVSON][c *][RIGHT][RIGHT][sEP][4		•420 PRINT"[c 8][RVSON][sEP] [RVSOFF][sE	
"[LEFT]]][DOWN] [c *][sEP] [4"[LEFT]]][D		P][s M][LEFT][LEFT][DOWN][c H][c N][LEFT	
OWN][4" "][4"[LEFT]]][DOWN] [s T][s Y] [		][LEFT][DOWN][s L][s @][5"[LEFT]]][UP]";	
4"[LEFT]]][DOWN][RVSOFF][RED][c *][RVSON		:POKE646,H:PRINT"[RVSON][3"[c T]]][3"[LE	
][s M] [s M] [UP][LEFT] [LEFT][UP] [LEFT		FT]]][DOWN] [RIGHT] [RVSOFF][RIGHT][RIGH	
][UP] [LEFT][UP][c *][RVSOFF][DOWN][DOWN		T]][UP][UP][3" "];	JL
][WHITE]"	NO	•430 NEXT:PRINT"[3"[DOWN]]":NEXT:PRINT"[
•50 PRINT"[CLEAR][DOWN][DOWN][c 3]"TAB(8)		HOME][WHITE]PLAYER #"P"[DOWN]":IFL(57)-L	KC
M\$"YSTERY AT":PRINT"[3"[DOWN]]][c 1]"TAB	PA	(58)=1THEN500	CG
(16)M\$"YCROFT"	KI	•440 PRINT"ENTER YOUR SECRET CODE!":POKE1	EK
•60 PRINT"[3"[DOWN]]][YELLOW]"TAB(24)M\$"E	HG	98,0:WAIT198,2:GETA\$,B\$	EL
WS":GOSUB2000		•450 IFSC\$(P)=""THENSC\$(P)=A\$+B\$	IK
•100 FOR J=49152TO49220:READX:A=A+X:POKEJ	BM	•460 IFSC\$(P)=A\$+B\$THEN500	NL
,X:NEXT:POKE785,0:POKE786,192	DD	•470 J=USR(33000):GOSUB2000:GOSUB2010:G	DK
•110 IFA<>8919THENPRINT"[CLEAR]ML DATA ER	HJ	OTO440	FI
ROR":STOP	GJ	•500 X=L(36+P):Y=L(42+P):POKES+1,33:POKES	IP
•120 DEFFNR(X)=INT(RND(1)*X)+1:Y=RND(-TI)	IA	+5,9:POKES+6,0	MF
:DEFFNSX(X)=-X>6)	OD	•510 POKE198,0:GOSUB2010:PRINT"MOVE TO B	EF
•140 V=53248:POKEV+28,1:POKEV+39,4:POKEV+	OE	UILDING DESIRED":GOSUB2050	EI
37,15:POKEV+38,6:POKEV+27,0:POKE2040,13	ON	•520 GOSUB2030:GOSUB2010:IF(XAND1)OR(YA	FO
•150 FORJ=832TO894STEP3:POKEJ,0:POKEJ+1,0	ED	ND1)THEN520	OL
:POKEJ+2,0:IFJ<=880THENREADA:POKEJ,A	DA	•530 J=2*Y+X/2-8:B=L(58+J):IFB<>MVTHEN600	PP
•160 NEXT	BB	•540 IFL(26)=P+100ORABS(L(26))=MVORL(30+P	CE
•170 MX=FNR(3):MV=FNR(12):MW=FNR(12):MR=F	NG	)=MVTHEN600	OD
NR(12):IFMV=MRTHEN170	NF	•550 PRINT"THAT BUILDING IS LOCKED. TRY A	HI
•180 I=12:DIML(74),U1(I),U2(I),G(I),AL(I)	PB	NOTHER.":GOTO520	NH
,H(I),L0(I),SX(1,4)	OK	•600 L(30+P)=B:L(36+P)=X:L(42+P)=Y:POKES+	BH
•190 DIMAL\$(5),IT\$(16),B\$(16),S\$(I),H\$(I)	BL	6,96:POKES+4,33:FORJ=0TO12:POKES+1,33-J	GF
:H\$(0)="STAMP COLLECTOR"	FM	•610 U2(J)=0:U1(J)=0:NEXT:POKES+4,0:POKEV	KA
•200 FORJ=1TO16:READB\$(J),IT\$(J)	FN	+21,0:PRINT"[CLEAR][c 7]YOU ARE AT THE "	OO
•210 I=FNR(16):IFL(58+I)>0THEN210	LL	"THE "IT\$(L(50+P))".":GOTO640	NM
•220 L(58+I)=J:L(12+J)=16:IFJ>12THEN250	PC	•620 PRINT"YOU HAVE ";:IFL(50+P)THENPRINT	IJ
•230 READS\$(J),H\$(J):L(J)=J:AL(J)=FNR(6)-	FL	"THE "IT\$(L(50+P))".":GOTO640	
1:H(J)=FNR(12):L0(J)=FNR(15)	HA	•630 PRINT"NO ITEM."	
•240 L(J+12)=-L0(J):G(J)=FNR(7)-16*(RND(1)		•640 I=0:PRINT"[DOWN]YOU SEE:[c 5]":FORJ=	
)<.5)-32*(RND(1)<.5)-64*(RND(1)<.5)		1TO12	
•250 NEXT:L(30)=MX:L(49)=3ANDMW:L(50)=FNR		•645 IFL(J)=BTHENPRINTS\$(J):U2(1)=U2(1)+1	
(40)+20:FORJ=0TO1:FORI=0TO3		:I=1:U2(5)=J	
•260 READSX\$(J,I):NEXTI,J:FORJ=0TO5:READA		•650 NEXT:FORJ=1TO16:IFL(J+12)=BTHENPRINT	
L\$(J):NEXT:FORJ=1TOMX:READIT\$(13):NEXT		"THE "IT\$(J):U2(2)=U2(2)+1:I=1	
•270 L(MV)=0:L(25)=-MV:AL(MR)=FNR(3)-1		•660 NEXT:FORJ=1TOL(57):IFJ=PORL(J+30)<>B	
•275 L0(MW)=MR:IF-L(12+MW)=MRTHENL(12+MW)		THEN690	
=-FNR(15):GOTO275		•670 PRINT"PLAYER #"J;:I=1:U2(3)=U2(3)+1:	
•280 G(MV)=FNR(7)-8*(MX=2):IFMX<3THENG(MV)		IFL(50+J)=0THENPRINT:GOTO690	
)=G(MV)OR6		•680 PRINT"<WITH AN ITEM>":U2(4)=U2(4)+1	
•290 G(MR)=G(MR)OR2[UPARROW](MX+3):IFMX<3		•690 NEXT:IFI=0THENPRINT"NOTHING WORTH ME	
THENG(MR)=G(MR)AND251		NTIONING."	
•300 PRINTTAB(8)"[3"[DOWN]]][PURPLE]HOW M		•695 PRINT"[DOWN][c 8]PRESS BUTTON FOR TU	
ANY PLAYERS? [WHITE](1-6)":POKE198,0		RN OPTIONS":GOSUB2040	
•310 WAIT198,1:GETA\$:A=VAL(A\$):IFA<1ORA>6		•700 PRINT"[CLEAR][c 3]TURN OPTIONS[3""]	
THEN310		[4"[DOWN]]][WHITE]":MY=1:Y=1:POKEV+17,91	
•320 L(57)=A:FORJ=1TOA:L(36+J)=5:L(42+J)=		:U1(1)=1:PRINT"SEARCH"	
7:L(30+J)=17:NEXT:P=1:DIMSC\$(A)		•720 IFU2(1)THENPRINT"INTERROGATE SUSPECT	
•400 POKEV+17,27:PRINT"[CLEAR][DOWN][DOWN		"":MY=2:U1(2)=2	

OH	•730 IFU2(2)ORU2(4)THENPRINT"TAKE ITEM":M	JN	I))":RETURN	LH
HG	Y=MY+1:U1(MY)=3	II	•1160 IFI=13THENPRINTS\$(MV)":RETURN	LL
E	•740 IFB=16AND(U2(2)ORL(50+P))THENPRINT"F	AL	•1170 PRINT"NO SUSPECT":RETURN	MP
T	INGERPRINT ITEM":MY=MY+1:U1(MY)=4	KD	•1200 PRINT"CORONER'S REPORT:[WHITE][DOWN	
H	•750 IFB=16THENPRINT"ACCUSE A SUSPECT":MY	PK	][DOWN]":X=ABS(MV>6):PRINT"SUBJECT IS "S	
JL	=MY+1:U1(MY)=5	EK	X\$(X,0)",	AH
[	•760 IFB=14THENPRINT"READ CORONER'S REPOR	NJ	•1210 PRINT"APPROXIMATELY"L(50)"YEARS OF	
L	T":MY=MY+1:U1(MY)=6	BE	AGE.":J=USR(34000+L(49)*10)	IF
KC	•770 IFL(25)=100+PORL(25)=BTHENPRINT"READ	EN	•1220 READT\$:PRINT"[DOWN]SUBJECT APPARENT	
CG	"IT\$(13):MY=MY+1:U1(MY)=7	FM	LY WAS "T\$	EK
EK	•780 IFL(50+P)THENPRINT"DROP OR HIDE ITEM	LB	•1230 READT\$:PRINT"BY A "T\$":RETURN	
EL	CARRIED":MY=MY+1:U1(MY)=8	IL	•1300 PRINT"DROP OR HIDE ITEM CARRIED":PR	
G	•790 IFB<3ORB=7THENPRINT"EXAMINE "B\$(B)"	CL	INT"[DOWN][DOWN][c 8]DO YOU WANT TO HIDE	
IK	RECORDS":MY=MY+1:U1(MY)=9	DI	THE"	AJ
NL	•800 GOSUB20100:PRINT"CHOOSE ONE":GOSUB20	OM	•1310 I=L(50+P):PRINTIT\$(I)"? [WHITE]";:	
B	600:I=U1(Y):Y=1:PRINT"[CLEAR][c 7]";	CF	GOSUB20700:L(50+P)=0	CD
A	•810 ONIGOSUB1000,2000,1400,1100,5000,120	HK	•1320 PRINT:PRINT"[DOWN][c 8]YOU DROP THE	
FI	0,1500,1300,1600:J=FRE(0)	MI	"IT\$(I)".	IG
IP	•900 POKE214,22:PRINT:PRINT"[YELLOW] [3"*	FL	•1330 L(12+I)=B*(1+YN*2):IFYNTHENPRINT"IT	
MF	] PRESS BUTTON TO END YOUR TURN [3"*"]	OJ	EM HIDDEN."	IK
EF	;:GOSUB20400	MM	•1340 FORI=1TO200:NEXT:POKE198,0:RETURN	GB
EI	•910 PRINT"[CLEAR][8"[DOWN]]"[c 7]"TAB(12	CF	•1400 PRINT"TAKE ITEM":PRINT"[DOWN][c 8]W	
V	)"PLAYER #"P:PRINTTAB(12)"[DOWN]END OF T	ED	HICH ONE?[WHITE][DOWN][DOWN]":MY=0	KC
"	URN"	OC	•1410 FORJ=1TO16:IFL(J+12)=BTHENPRINT"THE	
FO	•915 J=USR(33000):GOSUB20000	EH	"IT\$(J):MY=MY+1:U1(MY)=J	OM
OL	•920 P=P+1:IFP>L(57)THEN950	ON	•1420 NEXT:IFU2(4)=0THEN1450	LH
PP	•930 IFL(30+P)>0THEN400	LL	•1430 FORJ=1TOL(57):IFJ=PORL(J+30)<>BORL(
CE	•940 GOTO920	EH	J+50)=0THENNEXT:GOTO1450	CF
L	•950 FORJ=1TO12:L(J)=FNR(16):IFL(J)=MVTHE	ED	•1440 PRINT"PLAYER #"J"[LEFT]'S ITEM":MY=	
OD	NL(J)=J	II	MY+1:U1(MY)=100+J:NEXT	HG
HI	•960 NEXT:FORJ=31TO36:IFL(J)<13THENL(L(J)	OC	•1450 GOSUB20600:I=U1(Y):IFI>100THENI=L(I	
B	)=L(J)	II	-50):L(U1(Y)-50)=0	DF
NH	•970 NEXT:L(MV)=0:P=1:GOTO930	EH	•1460 PRINT"[CLEAR]":J=L(50+P):IFJTHENPRI	
BH	•1000 PRINT"SEARCH[DOWN][DOWN]":PRINT"[c	ON	NT"YOU DROP THE "IT\$(J)":L(J+12)=B	KJ
GF	8]YOU FIND:[DOWN][c 5]":I=0	LL	•1470 PRINT"YOU TAKE THE "IT\$(I)":L(50+P)=I:	
KA	•1010 FORJ=1TO16:IFL(J+12)<>-BTHEN1030	EH	L(I+12)=100+P:RETURN	BI
OO	•1020 IFRND(1)<.6ORL(50+P)=15THENI=1:PRIN	ON	•1500 PRINT"EXTRACT FROM THE "IT\$(13):PRI	
NM	T"THE "IT\$(J):L(J+12)=B	ON	NT"OF "S\$(MV)":[WHITE][DOWN][DOWN]"	AE
IJ	•1030 NEXT:IFI=0THENPRINT"NOTHING OF INTE	ON	•1510 J=USR(34000+L(30)*100)	OL
	REST":RETURN	ON	•1520 READT\$:I=VAL(T\$):IFI=0THENPRINTT\$:G	
	•1040 PRINT"[DOWN][c 7]TAKE AN ITEM? [WH	ON	OTO1520	NF
	ITE]";:GOSUB20700:IFYN=0THENRETURN	ON	•1530 PRINT"[c 5]":FORJ=1TO12:IFIANDG(J)T	
	•1050 U2(4)=0:PRINT"[CLEAR][c 7]";:Y=1:GO	ON	HENPRINT"[4" "]"S\$(J)	ED
	TO1400	ON	•1540 NEXT:PRINT:J=FRE(0):RETURN	IF
	•1100 PRINT"FINGERPRINT ITEM":PRINT"[DOWN	ON	•1600 PRINT"EXAMINE "B\$(B)" RECORDS":PRIN	
	][c 8]WHICH ONE?[WHITE][DOWN][DOWN]":MY=	ON	T"[DOWN][c 8]ABOUT WHOM?[WHITE][DOWN][DO	
	0	ON	WN]"	JJ
	•1110 FORJ=1TO16:IFL(J+12)=BTHENPRINT"THE	ON	•1610 FORJ=1TO12:PRINTS\$(J):NEXT:MY=12:GO	
	"IT\$(J):MY=MY+1:U1(MY)=J	ON	SUB20600	OC
	•1120 NEXT:I=L(P+50):IFITHENPRINT"THE "IT	ON	•1620 PRINT"[CLEAR][c 7]"B\$(B)" REPORT":P	
	\$(I):MY=MY+1:U1(MY)=I	ON	RINT"ON "S\$(Y)":[WHITE][DOWN]":ONBGOTO16	
	•1130 GOSUB20600:I=U1(Y):PRINT"[CLEAR][c	ON	50,1690	II
	7]LAB REPORT":PRINT"[DOWN][WHITE]THE "I	ON	•1630 J=USR(34400):FORJ=1TO(G(Y)AND7):REA	
	T\$(I)	ON	DT\$:NEXT	HG
	•1140 PRINT"BEARS THE FINGERPRINTS OF":L(	ON	•1640 PRINTTAB(8)T\$" ACCOUNT":RETURN	FD
	I+12)=B:IFL(P+50)=ITHENL(P+50)=0	ON	•1650 IF(G(Y)AND40)=0THENPRINT"SUBJECT NO	
	•1150 IFI<13THENIFL(I)<13THENPRINTS\$(L0(	ON	T IN RECORDS":RETURN	NF


```

•1660 IFG(Y)AND8THENPRINT"SUBJECT RECENTLY
DREW UP A NEW WILL.":RETURN
•1670 PRINT"SUBJECT CAN EXPECT TO INHERIT
":PRINT"SUBSTANTIAL WEALTH IN THE NEAR"
•1680 PRINT"FUTURE.":RETURN
•1690 IF(G(Y)AND64)=0THENPRINT"SUBJECT NOT
IN FILES":RETURN
•1700 PRINT"PATIENT SEVERELY PARANOID, E
NVIOUS AND"
•1710 PRINT"RESENTFUL OF OTHERS. MAY SHOW
SUDDEN"
•1720 PRINT"HOMICIDAL FURY.":RETURN
•2000 Y=1:Q=3:H=0:Q4=-1:IFU2(1)=1THENQ1=U
2(5):GOTO2100
•2010 PRINT"INTERROGATE A SUSPECT":PRINT"
[DOWN][c 8]WHICH ONE?[DOWN][DOWN][WHITE]
":MY=0
•2020 FORJ=1TO12:IFL(J)=BTHENPRINTS$(J):M
Y=MY+1:U1(MY)=J
•2030 NEXT:GOSUB20600:Q1=U1(Y):Y=1
•2100 PRINT"[CLEAR][c 7]INTERROGATE "S$(Q
1):MY=13:POKE198,0:I=12:IFQ4=0THEN2120
•2110 PRINT"[DOWN][c 8]ABOUT WHOM?[DOWN][
DOWN][WHITE]":FORJ=1TOI:PRINTS$(J):NEXT
•2115 PRINT"<AN ITEM>":GOTO2130
•2120 PRINT"[DOWN][c 8]ABOUT WHAT ITEM?[D
OWN][DOWN][WHITE]":FORJ=1TOI:PRINT"THE "
IT$(J):NEXT
•2125 PRINT"<A SUSPECT>"
•2130 IFH<>0THENPOKE782,Y:SYS49189:H=0
•2140 GOSUB20600:H=1:IFY=13THENH=0:Q4=NOT
Q4:GOTO2100
•2150 Q2=Y:Q=Q-1:YN=(RND(1)<.75):GOSUB201
00:ONQ4+2GOSUB2200,3000
•2160 FORJ=1TO100:NEXT:POKE198,0:IFQTHEN2
130
•2170 J=FRE(0):RETURN
•2200 Q3=FNR(12):IFQ3=MVORQ3=Q1THEN2200
•2210 T$=S$(Q2):IFRND(1)>.2ORL(28)=100+PT
HEN2240
•2220 L(29)=(L(29)+1)AND1:IFL(29)THENPRIN
T"I NEVER GOSSIP.":RETURN
•2230 PRINT"I DON'T HAVE TIME TO TALK NOW
.":RETURN
•2240 X=FNSX(Q2):IFQ2=Q1THEN2500
•2250 IFQ2=MVTHEN2400
•2260 ONFNR(7)GOTO2290,2300,2300,2320,232
0,2360
•2270 IFAL(Q1)<3ORAL(Q1)<>AL(Q2)THEN2285
•2280 PRINT"I WAS WITH "T$:PRINT"ON THE N
IGHT OF THE MURDER.":RETURN
•2285 PRINT"I CAN'T CONFIRM "SX$(X,3)" AL
IBI.":RETURN
•2290 PRINTT$ "DID IT, I'M SURE!":RETURN
•2300 PRINTT$:I=FNR(3):J=2*I-1:IFG(Q2)AND
2[UPARROW](3+I)THENJ=J-1
•2310 GOSUB20800:RETURN
•2320 GOSUB20900:IFRND(1)>.5THEN2370

```

```

CH •2340 PRINTT$ "OWNS":A=-1*YN:IFA=0THENPRI
NT"A NEW CAR.":RETURN
CA •2350 PRINT"THE "IT$(A)".":RETURN
LJ •2360 A=H(Q2)
MM •2370 PRINTT$ "IS":PRINT"A "H$(A)".":RETU
RN
ED •2400 ONFNR(3)GOTO2440,2470
IC •2410 IFFNR(3)=1THENPRINT"HOW TRAGIC THAT
LH ":PRINTSX$(X,1)"'S GONE.":RETURN
BO •2420 IFFNR(2)=1THENPRINT"I THINK IT WAS
SUICIDE.":RETURN
PB •2430 PRINT"I THINK THAT "S$(Q3):PRINT"MU
RDERED "SX$(X,2)".":RETURN
AA •2440 I=FNR(4)-1:IFYTHENI=L(49)
ID •2450 PRINT"I HEARD THAT "SX$(X,1)" WAS K
ILLED":J=USR(34000+I*10)
JP •2460 READT$,T$:PRINT"BY A "T$".":RETURN
HN •2470 I=FNR(3):IFYTHENI=L(30)
JJ •2480 PRINT"I HEARD THAT "SX$(X,1)" WAS":
J=I+5:GOSUB20800:RETURN
IA •2500 ONFNR(4)GOTO2530,2540,2550
PO •2510 GOSUB20900:IFA=0THENPRINT"I OWN A N
EW CAR.":RETURN
EF •2520 PRINT"I OWN THE":PRINTIT$(A)".":RET
URN
IN •2530 PRINT"I WAS "AL$(AL(Q1)):PRINT"ON T
HE NIGHT OF THE CRIME.":RETURN
KN •2540 A=H(Q1):GOTO2560
DJ •2550 GOSUB20900
AC •2560 PRINT"I AM A "H$(A)".":RETURN
OB •3000 ONFNR(5)GOTO3030,3060,4030,4050
EC •3010 PRINT"I ";:IFNOT(L0(Q2)=Q1)OR(Q1=MR
)THENPRINT"DO NOT ";
OF •3020 PRINT"OWN THE":PRINTIT$(Q2)".":RETU
RN
HH •3030 IFYN=0OR(Q2=MWANDQ1=MR)ORL0(Q2)>12T
HEN3050
PI •3035 IFL0(Q2)=Q1THEN3010
NP •3040 PRINTS$(L0(Q2)) "OWNS":PRINT"THE "I
T$(Q2)".":RETURN
LK •3050 PRINT"I'M NOT SURE WHO OWNS":PRINT"
THE "IT$(Q2)".":RETURN
PO •3060 I=FNR(57):X=ABS(L(12+Q2)):IFX<100TH
EN4000
OP •3070 X=X-100:IFYN=0THENX=I
BD •3080 IFX=PTHENPRINT"YOU HAVE THE "IT$(Q2
)"",":PRINT"DON'T YOU?":RETURN
IL •3090 PRINT"I THINK THAT PLAYER #"X"HAS":
PRINT"THE "IT$(Q2)".":RETURN
LI •4000 IFYN=0OR(Q2=MWANDQ1=MR)THENJ=9:GOTO
20800
FK •4010 IFX=Q1THENPRINT"I'VE GOT THE":PRINT
IT$(Q2)".":RETURN
FE •4020 PRINT"I SAW THAT AT THE ":PRINTB$(X
)"",":RETURN
•4030 PRINT"THE "IT$(Q2)" WAS ";:I=(Q2=MW
)=YN:IFI=0ORQ1=MRTHENPRINT"NOT";
•4040 PRINT:PRINT"THE MURDER WEAPON.":RET
URN
MI •4050
AA •5THEN
PA •4060
FJ •4070
FJ •4080
CG •4090
PN •4090
DB •5000
FB •8]WHO
EI •=12:Q
GC •5010
JB •B2060
JB •5020
EI •"[DOW
GC •WN][W
JB •5030
EE •00:H=
JL •5040
JL •OWN][
FM •E?[DO
FM •5050
FJ •OSUB2
FJ •5060
NE •OWN][
KC •DER?[
IM •5070
KN •X$(X,
MK •5080
JG •5100
JG •NG":P
EM •6,0
EM •5110
EM •*(JAN
JN •5120
JN •EXT:I
JB •5130
ED •E ARR
ED •"
MC •5140
MC •)=B:L
DH •5150
DH •+1:IF
NM •5160
NM •S HAV
GC •5170
GC •URPLE
JH •5200
JH •THE
PF •ME!"
AK •5210
AK •5300
CN •]HERE
CN •S$(MR
KH •5310
KH •), B
KH •5320
KH •NEXT:

```


GD	URN	NK	•20000 POKES+5,9:POKES+6,192:POKES+3,8:T=	
MI	•4050 X=0:FORJ=1TO12:IFH(J)=Q2ANDRND(1)>.	EI	TI	LN
AA	5THENX=J			NM
	•4060 NEXT:I=L0(Q2):IFI>12THENI=0	MI	•20010 IFT>TITTHEN20010	AF
PA	•4070 IFRND(1)<.5THENX=I	NB	•20020 POKES+4,64:READJ:IFJ=0THEN20040	
FJ	•4080 IFX=0THENJ=9:GOTO20000	HP	•20030 READX,Y:POKES+1,X:POKES,Y:T=T+J*9:	KJ
	•4090 PRINTS\$(X)" IS":PRINT"A "H\$(Q2)".":		POKES+4,65:GOTO20010	PH
CG	RETURN	LK	•20040 POKES+4,0:RETURN	LM
	•5000 PRINT"[c 3]ACCUSE!":PRINT"[DOWN][c		•20100 SYS49178:PRINT"[HOME][DOWN][DOWN][
PN	8]WHO WAS KILLED?[WHITE][DOWN][DOWN]":MY		c 8]";:RETURN	
	=12:Q=-1	AK	•20200 J=NOT(PEEK(56320)ANDPEEK(56321))AN	FD
DB	•5010 FORJ=1TO12:PRINTS\$(J):NEXT:Y=1:GOSU		D31:A=0:IFPEEK(198)THENGETA\$:A=ASC(A\$)	CH
FB	B20600:Q=Q*(Y=MV)	II	•20210 BT=(JAND16)OR(A=13):IFBTTHENRETURN	PK
EI	•5020 PRINT"[CLEAR][YELLOW]ACCUSE!":PRINT		•20220 DX=SGN((JAND8)-(A=135)-(JAND4)+(A=	
GC	"[DOWN][c 8]WHO KILLED "S\$(Y)"?[DOWN][DO	FK	134))	OL
JB	WN][WHITE]":Y=1		•20230 DY=SGN((JAND2)-(A=136)-(JAND1)+(A=	IF
	•5030 FORJ=1TO12:PRINTS\$(J):NEXT:GOSUB206	AA	133)):IFDXORDYTHENRETURN	DG
EE	00:H=Y:Q=Q*(H=MR)		•20240 GOTO20200	AF
JL	•5040 PRINT"[CLEAR][c 6]ACCUSE!":PRINT"[D	DA	•20300 GOSUB20200:IFBTTHENRETURN	GI
FM	OWN][c 8]WHAT WEAPON DID":PRINTS\$(H)" US	DN	•20310 IFABS(DX+X-5)>3THENDX=0	MI
	E?[DOWN][WHITE]":Y=1		•20320 IFABS(DY+Y-7)>3THENDY=0	MA
FJ	•5050 FORJ=1TO12:PRINT"THE "IT\$(J):NEXT:G		•20330 IFDX=0ANDDY=0THEN20300	BK
	OSUB20600:Q=Q*(Y=MW)		•20340 FORI=1TO4:X=X+DX/4:Y=Y+DY/4:GOSUB2	KB
NE	•5060 PRINT"[CLEAR][c 7]ACCUSE!":PRINT"[D	BF	0500:POKES+1,30+3*(1ANDI)	KI
KC	OWN][c 8]WHY DID "S\$(H):PRINT"COMMIT MUR	IB	•20350 POKES+4,17:FORJ=1TO40:NEXT:POKES+4	IM
IM	DER?[DOWN][WHITE]":Y=1	FE	0,0:NEXT:GOTO20300	
KN	•5070 X=FNSX(H):FORA=0TO4STEP2:J=A:PRINTS		•20400 POKE198,0	
MK	X\$(X,1)" ";:GOSUB20800:NEXT		•20410 GOSUB20200:IFBT=0THEN20410	
JG	•5080 MY=3:Y=1:GOSUB20600:Q=Q*(Y=L(30))	LC	•20420 RETURN	
EM	•5100 PRINT"[CLEAR]THE POLICE ARE ARRESTI	PE	•20500 POKEV,X*32-1:POKEV+1,Y*20+12:POKEV	EC
	NG":PRINTS\$(H)"[5".]":POKES+5,13:POKES+	IF	+21,1:RETURN	DG
JN	6,0	IE	•20600 POKE782,Y:SYS49189	CF
JB	•5110 POKES+4,65:FORJ=1TO20:POKES+1,16+16	MG	•20610 GOSUB20200:IFBTTHENRETURN	PH
ED	*(JAND1):FORI=1TO250:NEXT:NEXT		•20620 X=Y+DY:IFX<1ORX>MYTHENX=-(X>MY)-MY	
MC	•5120 POKES+4,0:POKEV+17,27:FORJ=1TO600:N		*(X<1)	JC
DH	EXT:IFQTHEN5200		•20630 IFX=YTHEN20610	GB
NM	•5130 PRINT"[DOWN]NO[3".]THAT WAS A FALS		•20640 POKE782,Y:SYS49189:Y=X:GOTO20600	MC
GC	E ARREST.":PRINT"YOU'RE OUT OF THE GAME!		•20700 POKE190,0:YN=-1	IA
JH	"		•20710 PRINTCHR\$(-18*YN)"YES[RVSOFF] "CHR	
PF	•5140 L(30+P)=0:IFL(50+P)THENL(12+L(50+P)		\$ (YN*2+18)"NO [RVSOFF][7"[LEFT]]";	
AK	)=B:L(50+P)=0		•20720 GOSUB20200:IFBTTHENRETURN	
CN	•5150 J=USR(33200):GOSUB20000:L(58)=L(58)		•20730 IFDXTHENYN=NOTYN:GOTO20710	
	+1:IFL(58)<L(57)THENRETURN		•20800 J=USR(35000+10*J):READT\$:PRINTT\$".	
KH	•5160 RESTORE:PRINT"[DOWN][c 3]ALL PLAYER		"":RETURN	
	S HAVE BEEN ELIMINATED!"		•20840 GOTO20720	
	•5170 PRINT"[WHITE]NOBODY WINS!":PRINT"[P		•20900 A=0:X=1:FORJ=1TO12:IFL0(J)=Q2ANDRN	
	URPLE][6"[c T]]":GOTO5300		D(1)<1/XTHENA=J:X=X+1	
	•5200 PRINT"[DOWN]YES[3".]YOU'VE CRACKED		•20910 NEXT:RETURN	
	THE CASE!":PRINT"PLAYER #"P"WINS THE GA		•30000 DATA8,11,48,12,10,143,4,9,104,4,10	
	ME!"		,143,4,11,48,12,13,78	
	•5210 J=USR(33100)		•30010 DATA4,14,24,12,8,97,0	
	•5300 GOSUB20000:PRINT"[DOWN][DOWN][WHITE		•31000 DATA32,247,183,32,19,166,144,13,16	
	]HERE IS THE SOLUTION:[DOWN][c 5]":PRINT		5,95,233,1	
	S\$(MR)" MURDERED"		•31010 DATA133,65,165,96,233,0,133,66,96,	
	•5310 PRINTS\$(MV)" USING THE":PRINTIT\$(MW		162,17,76	
	)", BECAUSE "SX\$(FNSX(MR),1)		•31020 DATA55,164,169,32,160,80,136,153,8	
	•5320 J=L(30)*2-2:GOSUB20800:FORJ=1TO4E3:		0,4,208,250	
	NEXT:END		•31030 DATA96,169,4,133,252,169,160,24,10	
			5,40,144,2	

•31040 DATA230,252,136,208,246,133,251,16
 0,40,136,177,251
 •31050 DATA73,128,145,251,192,0,208,245,9
 6
 •32000 DATA20,20,20,0,170,170,170,170,190
 ,190,190,125,60,60,60,60,85
 •32100 DATA LAW OFFICE,ELEPHANT GUN,PHYLLI
 S WRIT,BIG-GAME HUNTER
 •32110 DATA MENTAL HEALTH CLINIC,ANTIQUE C
 ROSSBOW,DR. WILMA LIBIDO
 •32120 DATA"[LEFT]N ARCHERY EXPERT",DELIC
 ATESSEN,BASEBALL BAT,HANNAH NOSH,SPORTS
 FAN
 •32130 DATA THEATRE,BOX OF RAT POISON,EDIT
 H SCRIM,PEST EXTERMINATOR,HOTEL
 •32140 DATA ARQUEBUS,CHERYL VALISE,GUN COL
 LECTOR,ART GALLERY,SCIMITAR
 •32150 DATA DESIREE OCHRE,MASTER FENCER,BA
 NK,BRASS CANDLESTICK,EMILIO LUCRE
 •32160 DATA CANDELABRA FANCIER,LIBRARY,JAR
 OF SLEEPING PILLS,MORTON SCREED
 •32170 DATA"[LEFT]N INSOMNIAC",BAKERY,.45
 AUTOMATIC,JOSEPH CRULLER,MARKSMAN,PAWN
 SHOP
 •32180 DATA KNITTING NEEDLE,NORMAN HOCK,CH
 AMPION KNITTER,CHURCH,BALL-PEEN HAMMER
 •32190 DATA REV. ARTHUR TRANSEPT,TOOL COLL
 ECTOR,PUB,VIAL OF SNAKE VENOM
 •32200 DATA EDGAR QUAFF,HERPETOLOGIST,SHOP
 PING MALL,ITEM,MORGUE,MASTER KEY
 •32210 DATA WAREHOUSE,MAGNIFYING LENS,POLI
 CE STATION,POLICE BADGE
 •32300 DATA FEMALE,SHE,HER,HER,MALE,HE,HIM
 ,HIS
 •32400 DATA AT HOME ALONE,SICK IN BED,OUT
 OF TOWN,AT A PARTY
 •32410 DATA AT THE THEATRE,IN CHURCH
 •32900 DATA LEDGER,WILL,DIARY
 •33000 DATA 2,15,210,2,14,24,2,12,143,2,11
 ,218,4,9,247,4,7,233,4,10,143,0
 •33100 DATA 4,28,49,4,37,162,4,42,62,2,47,
 107,4,37,162,2,42,62,2,47,107,2,37,162
 •33110 DATA 2,42,62,4,56,99,2,42,62,2,47,2
 07,1,42,62,1,37,162,2,42,62,8,28,49,0
 •33200 DATA 2,25,30,2,23,181,2,31,165,2,35
 ,134,2,47,107,2,37,162,2,35,134
 •33210 DATA 2,47,107,2,37,162,2,35,134,2,3
 1,165,2,29,223,4,31,165,0
 •34000 DATA POISONED,"[LEFT]N UNIDENTIFIED
 TOXIN"
 •34010 DATA SHOT,GUN
 •34020 DATA IMPALED,SHARP WEAPON
 •34030 DATA BLUDGEONED,BLUNT INSTRUMENT
 •34100 DATA I HAVE THREATENED TO TELL THE
 POLICE
 •34110 DATA ALL THAT I KNOW ABOUT THEIR CR
 IMINAL
 •34120 DATA ACTIVITIES IF ANY OF THESE PEO

ON PLE
 PB •34130 DATA DOESN'T PAY ME ANOTHER \$9000 B
 Y,MIDNIGHT SUNDAY....,16
 HO •34200 DATA I HEREBY BEQUEATH ONE HUNDRED
 MILLION
 GO •34210 DATA DOLLARS TO EACH OF THESE LOYAL
 AND
 AG •34220 DATA FAITHFUL FRIENDS....,32
 •34300 DATA DEAR DIARY---,I FOUND ANOTHER
 ANONYMOUS LETTER IN THE
 JH •34310 DATA MAIL THIS MORNING. MY LIFE IS
 IN DANGER
 NH •34320 DATA FROM A JEALOUS LUNATIC. THE HA
 NDWRITING
 AP •34330 DATA COULD BE THAT OF ANY OF THESE
 PEOPLE....,64
 NH •34400 DATA NO,OVERDRAWN,MINIMUM,AVERAGE,S
 IGNIFICANT,SUBSTANTIAL,MAXIMUM
 KJ •35000 DATA WAS BEING BLACKMAILED
 •35010 DATA HAS NO SECRETS TO HIDE
 KP •35020 DATA WILL INHERIT MILLIONS
 JJ •35030 DATA IS NOT A LEGATEE
 FF •35040 DATA IS A HOMICIDAL MANIAC
 AO •35050 DATA IS AS SANE AS I AM
 IF •35060 DATA A BLACKMAILER
 KG •35070 DATA EXTREMELY WEALTHY
 HL •35080 DATA RECEIVING DEATH THREATS
 GA •35090 DATA I DON'T KNOW WHERE THAT OBJECT
 IS

SHOTGUN

FROM PAGE 97 SHOTGUN LOADER

•2 REM "SHOTGUN LOADER"
 •4 REM BY R. HAROLD DROID
 •10 IFSG=1 THEN 30
 •20 SG=1:LOAD"SHOTGUN SHELL",8,1
 •30 PRINT CHR\$(13)"THIS PROGRAM CREATES AN
 AUTO-MENU"
 •33 PRINT" FOR A GIVEN DISK"CHR\$(13)
 •34 PRINT"SYS51200 ENABLES YOUR NEW PROGR
 AM:"
 •35 PRINT" SHIFT/RESTORE BREAKS TO MENU"
 •36 PRINT" SPACE/RESTORE RERUNS WITHOUT R
 ELOADING"
 •37 PRINT" RUN-STOP/RESTORE DISABLES"
 •38 PRINT" COMMODORE/RESTORE DOES NON-DIS
 ABLING"
 •39 PRINT"[3" "]"WARM START"CHR\$(13)
 •40 PRINT"INSERT A DISK CONTAINING"
 •50 PRINT" BASIC PROGRAM FILES"
 •60 PRINT" THEN PRESS A KEY"CHR\$(13)
 •70 POKE 198,0:WAIT 198,1
 •80 REM ***** READ DIRECTORY *****
 •85 PN=1:PT=51769
 •90 OPEN 1,8,0,"\$0"
 •100 FLAG=1:REM FLAG SET FOR READING DISK
 NAME

GO •110
 OO •120
 •130
 DM •140
 \$:GO
 FI •150
 IC •160
 •170
 FJ •180
 •190
 DN\$(
 KO •200
 "
 NC •210
 "
 CH •215
 •218
 CE 3)
 KD •220
 BF •230
 KE •240
 CM EN27
 KI •250
 DP ;:PO
 OP •260
 HA •270
 KC •275
 0275
 FF •280
 PT=P
 •290
 •310
 •320
 •322
 GUN[
 •330
 •340
 •350
 ;:NE
 •360
 •400
 GAIN
 Beginn
 C800
 C808
 C810
 C818
 C820
 C828
 C830
 C838
 C840
 C848
 C850
 C858
 C860


```

GO •110 F$="":GET#1,B$,B$,B$,B$ PF
OO •120 GET#1,B$:IF ST<>0 THEN320 LN
DM •130 IF B$<>CHR$(34) THEN120 PA
FI •140 GET#1,B$:IF B$<>CHR$(34)THEN F$=F$+B FL
IC •150 GET#1,B$:IF B$=CHR$(32) THEN150 DJ
FJ •160 GET#1,B$:IFB$<>""THEN160 LE
KO •170 IF ST<>0 THEN320 AG
NC •180 IFFLAG=0THEN230 NA
CH •190 FLAG=0:DN$(DN)=F$:PRINT"DISK NAME: " JO
CE •200 PRINT"INDICATE WHETHER A FILE SHOULD OL
KD •210 PRINT" BE INCLUDED IN THE AUTO-MENU PJ
BF •215 PRINT" BY PRESSING Y OR N" PE
KE •218 PRINT" CAPACITY IS 26 FILES!"CHR$(1 NM
CM •220 GOTO110 CC
KI •230 PRINTF$; ED
DP •240 POKE198,0:WAIT198,1:GETA$:IFA$="Y"TH OB
OP •250 IFA$="N"THENPOKE211,0:PRINT"[16" "]] PL
HA •260 GOTO240 CC
KC •270 PRINT JJ
FF •275 IFLEN(F$)<>16THENF$=F$+CHR$(160):GOT OM
0275
•280 FORA=1TO16:POKEPT,ASC(MID$(F$,A,1)): HK
PT=PT+1:NEXT
•290 PN=PN+1:IFPN>27THEN400 IP
•310 GOTO110 CC
•320 CLOSE1:POKE51768,PN:PT=PT+1 IB
•322 PRINT:INPUT"AUTO MENU FILENAME SHOT BO
GUN[9"[LEFT]]]";PG$
•330 OPEN8,8,8,PG$+"",P,W" GL
•340 PRINT#8,CHR$(0);:PRINT#8,CHR$(192); LP
•350 FORA=51200TOPT:PRINT#8,CHR$(PEEK(A)) CH
;:NEXT JH
•360 CLOSE8:END
•400 PRINT"MENU CAPACITY EXCEEDED! TRY A GL
GAIN[3"."]":CLOSE1:GOTO85

```

SHOTGUN SHELL*

Beginning address in hex: C800 Ending address in hex: CA36

```

C800: A9 00 8D 37 CA 20 EA C9 0E
C808: 60 48 8A 48 98 48 AD 37 49
C810: CA D0 1B 20 C0 C9 B0 19 3B
C818: A9 7F 8D 00 DC AD 01 DC 37
C820: C9 EF D0 03 4C 6E C9 C9 FB
C828: DF D0 03 4C 7C C9 4C 4C 07
C830: FE 20 82 C9 A9 05 8D 73 4B
C838: C8 A9 00 8D 75 C8 A9 01 21
C840: 8D 7B C8 A9 39 8D A3 C8 EE
C848: 8D 45 C9 A9 CA 8D A4 C8 54
C850: 8D 46 C9 A2 03 A0 0A 18 56
C858: 20 F0 FF A9 12 20 D2 FF 18
C860: A0 00 B9 00 CA 20 D2 FF 78

```

```

C868: C8 C0 14 D0 F5 A9 92 20 29
C870: D2 FF A2 03 A0 00 18 20 C1
C878: F0 FF A9 01 C9 0D D0 0C C7
C880: 48 A9 14 8D 75 C8 A9 05 01
C888: 8D 73 C8 68 CD 38 CA B0 3C
C890: 36 09 40 20 D2 FF A9 2E DA
C898: 20 D2 FF A9 20 20 D2 FF 48
C8A0: A0 00 B9 39 CA C9 A0 F0 5A
C8A8: 08 20 D2 FF C8 C0 10 D0 0E
C8B0: F1 EE 73 C8 EE 7B C8 AD AE
C8B8: A3 C8 18 69 10 8D A3 C8 B0
C8C0: 90 B0 EE A4 C8 B0 AB A2 5D
C8C8: 15 A0 0A 18 20 F0 FF A0 52
C8D0: 00 B9 14 CA 20 D2 FF C8 25
C8D8: C0 14 D0 F5 E8 A0 0C 18 22
C8E0: 20 F0 FF A0 00 B9 28 CA 3F
C8E8: 20 D2 FF C8 C0 0F D0 F5 3B
C8F0: A9 00 85 C6 20 9F FF 20 C6
C8F8: E4 FF C9 00 F0 F6 C9 20 79
C900: D0 03 4C 6E C9 C9 41 90 F3
C908: EB 29 3F CD 38 CA B0 E4 C2
C910: A8 88 C0 00 F0 12 AD 45 F7
C918: C9 18 69 10 8D 45 C9 90 A0
C920: 03 EE 46 C9 88 4C 12 C9 D2
C928: A9 93 20 D2 FF 18 A2 02 15
C930: A0 00 20 F0 FF A0 00 B9 3C
C938: F8 C9 20 D2 FF C8 C0 05 7C
C940: D0 F5 A0 00 B9 39 CA C9 2F
C948: A0 F0 08 20 D2 FF C8 C0 5E
C950: 10 D0 F1 A0 00 B9 FD C9 45
C958: 20 D2 FF C8 C0 03 D0 F5 9E
C960: 18 A2 07 20 9A C9 8D 78 AC
C968: 02 A9 02 4C B0 C9 20 82 7F
C970: C9 18 A2 02 20 9A C9 A9 25
C978: 01 4C B0 C9 20 82 C9 4C F8
C980: B7 C9 A9 01 8D 37 CA 20 5C
C988: 8A FF 20 EA C9 20 A3 FD A9
C990: 20 81 FF A9 00 85 C7 85 AE
C998: D4 60 A0 00 20 F0 FF B9 39
C9A0: F5 C9 20 D2 FF C8 C0 03 DF
C9A8: D0 F5 A9 0D 8D 77 02 60 8D
C9B0: 85 C6 A9 13 20 D2 FF A9 56
C9B8: 00 8D 37 CA 58 6C 02 A0 AF
C9C0: AD 01 DC CD 01 DC D0 F8 C1
C9C8: A9 BF 8D 00 DC AD 01 DC 28
C9D0: C9 EF F0 0F A9 FD 8D 00 BF
C9D8: DC AD 01 DC C9 7F F0 03 7E
C9E0: 18 90 01 38 A9 7F 8D 00 79
C9E8: DC 60 A9 09 8D 18 03 A9 2B
C9F0: C8 8D 19 03 60 52 55 4E B9
C9F8: 4C 4F 41 44 22 22 2C 38 C2
CA00: 53 48 4F 54 47 55 4E 20 4A
CA08: 4C 4F 41 44 20 41 4E 44 1D
CA10: 20 52 55 4E 50 52 45 53 61
CA18: 53 20 53 50 41 43 45 20 19
CA20: 54 4F 20 52 45 52 55 4E 71
CA28: 43 55 52 52 45 4E 54 20 6D
CA30: 50 52 4F 47 52 41 4D 4A

```

*This program must be entered using Flankspeed! See page 118.

AHOY! 133

DISK ERROR CHECKER FROM PAGE 59

```

100 REM GEORGE TREPAL COPYRIGHT 1985 FM
110 REM 2650 ALTURAS RD PO
120 REM BARTOW, FL 33830 AG
130 CLR:POKE53281,0:POKE53280,0:DIMTR(40) JB
140 PRINT"[CLEAR][c 6][DOWN]"
150 PRINTSPC(11)"[WHITE]DISK ERROR CHECKER" BA
160 PRINTSPC(8)"[DOWN][YELLOW]NO KNOCK - CE
- TRACKS 1-40"
170 PRINTSPC(12)"[CYAN][DOWN]BY GEORGE T OM
REPAL"
180 PRINT"[DOWN][DOWN][c 6]CHECK <A>LL T EK
RACKS OR <S>ELECTED TRACKS"
190 GETY$:IFY$<>"A"ANDY$<>"S"THEN180 LN
200 IFY$="A"THENFT=1:LT=40:GOTO260 HF
210 FT=-1:LT=50 CC
220 INPUT"[DOWN][DOWN][8" "]FIRST TRACK BG
TO CHECK";FT
230 IFFT<1ORFT>40THEN210 PP
240 INPUT"[DOWN][8" "]LAST TRACK TO CHEC ON
K";LT
250 IFLT<1ORLT>40THEN230 KJ
260 IFLT<FTTHEN210 MI
270 PRINTSPC(5)"[DOWN]PRINT OUT ERRORS F GI
OUND (Y/N)?"
280 GETY$:IFY$<>" "THEN270 EB
290 PF=0:GETY$:IFY$=" "THEN280 GA
300 IFY$="Y"THENPF=1 JK
310 PRINT"[DOWN][DOWN] INSERT DISK TO CH PK
ECK THEN PRESS RETURN"
320 PRINT SPC(2)"(FLASHING [c 3]RED[c 6] KE
DRIVE LIGHT IS NORMAL)"
330 GETA$:IFA$<>CHR$(13)THEN320 DG
340 OPEN15,8,15:PRINT#15,"I":CLOSE15 DJ
350 REM DEFINE # OF SECTORS ON TRACKS NC
360 FORJ=1TO17:TR(J)=20:NEXT:FORJ=18TO23 MK
:TR(J)=18:NEXT
370 FORJ=24TO30:TR(J)=17:NEXT:FORJ=31TO4 LH
0:TR(J)=16:NEXT
380 FORT=FTTOLT:PRINT"[CLEAR][WHITE]";P OE
RINTSPC(15)"TRACK ";T
390 PRINT"[c 6][DOWN][3" "]SECTOR[4" "]E EA
RROR[5" "]EXPLANATION"
400 FORS=0TOTR(T) KB
410 PRINT"[c 6]SECTOR # ";S;:IFS<10THENP LL
RINT" ";
420 OPEN15,8,15 AM
430 PRINT#15,"M-W"CHR$(6)CHR$(0)CHR$(2)C KO
HR$(T)CHR$(S)
440 PRINT#15,"M-W"CHR$(0)CHR$(0)CHR$(1)C LM
HR$(128)
450 PRINT#15,"M-R"CHR$(0)CHR$(0) PE

```

```

460 IFA=1THENPRINT" NO ERRORS":GOTO550 EH
470 IFA=2THENB$="[YELLOW]BLOCK HEADER GO EH
NE"
480 IFA=3THENB$="[CYAN]SYNC CHARACTER GO JG
NE"
490 IFA=4THENB$="[c 7]HEADER CHECKSUM BA HM
D"
500 IFA=5THENB$="[PURPLE]READ CHECKSUM B NB
AD"
510 IFA=6THENB$="[BLUE]BIT PATTERN ERROR AL
"
520 IFA=9THENB$="[WHITE]HEADER CHECKSUM LD
BAD"
530 IFA=11THENB$="[c 1]FORMAT ID MISMATC HA
H"
540 PRINT" ";A+18;" ";B$ BD
550 CLOSE15 AB
560 IFPF=0ORA=1THEN590 CI
570 OPEN4,4:CMD4:PRINT#4,"TRACK ";T;"[3" GC
"]SECTOR";S;" ERROR #";A+18;
580 PRINT#4,"[4" "]";B$:CLOSE4 IM
590 NEXT:NEXT EF
600 PRINTSPC(8)"[WHITE]PRESS RETURN TO C JE
ONTINUE[c 6]"
610 GETY$:IFY$<>CHR$(13)THEN610 KI
620 GOTO130 CA

```

MAESTRO FROM PAGE 39

```

3 POKE56334,PEEK(56334)AND254 DN
4 FORX=36609TO40959:POKEX,Z:NEXT KH
6 POKE55,4:POKE56,109:CLR:GOTO10 FG
9 N%(K,0)=FN H(FO):N%(K,Z)=FN L(FO):FO=F GI
O*R:RETURN
10 POKE53280,0:POKE53281,1:POKE646,0:PRI MM
NT"[CLEAR]":GOSUB2000:GOSUB3000
14 Q=54272:R=1.0594631:FO=43.65:SK=65439 FK
:DO=53248:KY=197
15 SH=653:F1=.064068:F2=16.4015:F3=256:0 KD
=1:W=16:JI(0)=-1:JI(1)=-1:JI(2)=-1:T=2
16 Q1=Q+7:Q2=Q+14:Q3=Q+0:Q4=Q+8:Q5=Q+15: HB
Q6=Q+4:Q7=Q+11:Q8=Q+18:E1=Q6:E2=Q7:E3=Q8
17 TH=119:FH=401:SI=1450:C$=CHR$(13):W1= GB
W:W2=W:W3=W:SR=240
20 L1=27909:L2=29359:L3=30809:H1=32259:H CC
2=33709:H3=35159:O1=36609:O2=38059
22 O3=39509:OV=0:HV=0:LV=0 HE
28 DIMM%(400,2):DIMR%(400,2) EB
30 DIMN%(64,1):DIMCH%(64) CK
40 DEF FN H(FO)=INT(FO*F1) MA
50 DEF FN L(FO)=INT(FO*F2)-(F3*INT(FO*F1 OL
))
55 FORI=ZTO64:READJ,K:CH%(I)=J:IFJ>ZANDJ DD
<>THTHENGOSUB9
58 NEXT IA

```


des ms!	•60 FORI=QTO54295:POKEI,Z:NEXT:POKEI,15	KN	•440 IFR%(J,V)<=OTHEN450	BM
EH	•70 POKEQ+6,SR:POKEQ+13,SR:POKEQ+20,SR	PB	•444 POKEHV+K,N%(M%(J,V),O):POKELV+K,N%(M	
EH	•71 FORX=OTO9:READT\$(X):NEXT:GOTO608	JI	%(J,V),Z):POKEOV+K,Z:K=K+O	DL
JG	•140 OV=O1+V*SI	CJ	•450 NEXT:RETURN	EJ
A	•142 FORX=ZTOK(V):POKEOV+X,Z:NEXT:K(V)=-1	IK	•470 FORX=OTO999:NEXT:GOSUB2000	HH
HM	:JI(V)=-1:JJ=Z:KK=Z:C=Z:K(3)=Z:RETURN	AO	•520 FORI=ZTOK(S-O)	HG
NB	•150 GETA\$:IFA\$<>"THEN150	BA	•525 SYSSK:IFPEEK(SH)=OTHEN600	AG
R	•160 PRINT"[CLEAR][DOWN][DOWN][RIGHT]GET	HO	•530 POKEQ,PEEK(L1+I):POKEQ1,PEEK(L2+I):P	
AL	READY TO PLAY [3".""]";:FORX=OTOFH:NEXT:P	BN	OKEQ2,PEEK(L3+I)	KN
LD	RINT"GO!"	BN	•540 POKEQ3,PEEK(H1+I):POKEQ4,PEEK(H2+I):	NF
HA	•170 POKEQ+5,AD:POKEQ+6,SR	HA	POKEQ5,PEEK(H3+I)	
BD	•295 POKEQ6,W+O:U=49152	MB	•550 POKEE1,PEEK(O1+I)+W1:POKEE2,PEEK(O2+	IP
AB	•300 SYSSK:IFPEEK(SH)=OTHEN360	LI	I)+W2:POKEE3,PEEK(O3+I)+W3	EE
CI	•305 IFU=DOTHEN363	CB	•560 FORX=ZTOE:NEXT:NEXT	
GC	•310 X=PEEK(KY):POKEQ,N%(X,Z):POKEQ3,N%(X	IM	•600 POKEQ6,Z:POKEQ7,Z:POKEQ8,Z:FORX=ZTOF	CP
IM	,1):POKEU,N%(X,Z):POKEU+1,N%(X,O)	CB	3:NEXT:RETURN	AA
EF	•320 U=U+T:GOTO300	CK	•608 GETA\$:IFA\$<>"THEN608	
JE	•360 IFSTHEN365	EJ	•609 PRINT"[CLEAR]":POKE53280,6:POKE53281	OK
KI	•362 RETURN	KI	,1:PRINTTAB(5)"[DOWN][RED][3"*"] S E L	
CA	•363 IFSTHEN365	AB	E C T I O N S [3"*"]"	
DN	•364 GOTO295	BI	•610 PRINTTAB(10)"[BLUE][3"[DOWN]]":MUSI	CL
KH	•365 PRINT"[CLEAR][DOWN][DOWN][RIGHT]HERE	EP	CAL KEYBOARD"	AO
FG	'S WHAT YOU JUST PLAYED:"	HO	•615 PRINTTAB(10)"1-PLAY IT AGAIN!"	JF
GI	•372 FORI=49152TOU-TSTEPT	PP	•620 PRINTTAB(10)"2-COMPOSE A TUNE"	FL
MM	•373 SYSSK:IFPEEK(SH)=TTHEN381	HD	•625 PRINTTAB(10)"3-LOOK AT MUSIC"	EK
FK	•375 POKEQ,PEEK(I):POKEQ3,PEEK(I+O)	IF	•630 PRINTTAB(10)"4-MUSIC EDITOR"	PI
KD	•380 FORJ=OTO35:NEXT:NEXT	HH	•632 PRINTTAB(10)"5-SELECT INSTRUMENT"	LN
HB	•381 POKEQ6,W:RETURN	BN	•635 PRINTTAB(10)"6-LISTEN TO MUSIC"	GK
GB	•386 PRINT"[DOWN][DOWN][RIGHT]NOTES: ";	CE	•640 PRINTTAB(10)"7-SAVE MUSIC ON DISK"	NJ
CC	•390 SYSSK:IFPEEK(SH)=OTHENRETURN	EA	•642 PRINTTAB(10)"8-GET MUSIC FROM DISK"	BP
HE	•400 GETA\$:IFA\$="THEN390	HM	•644 PRINTTAB(10)"9-LOOK AT DISK INDEX"	CD
EB	•401 IFPEEK(SH)=TTHEN411	NJ	•645 PRINTTAB(10)"X-QUIT PROGRAM"	BG
CK	•402 X=PEEK(KY):PRINTCHR\$(CH\$(X));	IC	•646 PRINTTAB(10)"[RED][DOWN][DOWN]YOUR C	NI
MA	•405 POKEQ,N%(X,Z):POKEQ3,N%(X,O):POKEQ6,	NL	HOICE [0-X]?"	KF
OL	W+1:FORI=OTOF3:NEXT:POKEQ6,W	KG	•650 SYSSK:GETA\$:IFA\$="THEN650	LH
DD	•410 M%(JJ,V)=X:JJ=JJ+O:IFJJ<FHTHEN390	CK	•652 IFA\$="X"THEN1350	
IA	•411 IFJJ>CTHENJJ=JJ-O:PRINT"[LEFT] [LEFT	BN	•654 S=VAL(A\$):IFS=0ANDAS\$<>"0"THEN650	
	]";	CE	•660 ON-(S=0)-2*(S=1)-3*(S=2)-4*(S=3)-5*(
	•412 GOTO390	EA	S=4)GOSUB150,150,676,710,800	
	•420 IFJI(V)<ZTHENFORX=OTO999:NEXT:K(V)=-	HM	•665 ON-(S=5)-2*(S=6)-3*(S=7)-4*(S=8)-5*(
	1:RETURN	NJ	S=9)GOSUB1150,900,1000,1050,1100	AI
	•421 PRINT:PRINT" RHYTHM: ";	IC	•670 GOTO608	CK
	•422 SYSSK:GETA\$:IFA\$="THEN422	NL	•676 PRINT"[CLEAR][DOWN][DOWN] HOW MANY V	
	•425 IFPEEK(SH)=TTHEN432	KG	OICES (1,2,3) ?";	PI
	•426 IFA\$<"A"ORA\$>"Z"THEN422	CK	•678 SYSSK:IFPEEK(SH)THENRETURN	PJ
	•430 PRINTA\$;:R%(KK,V)=ASC(A\$)-64:KK=KK+O	BN	•679 GETA\$:IFA\$="THEN678	KA
	:IFKK<=JI(V)THEN422	CI	•681 B=VAL(A\$):IFB>3ORB=ZTHEN678	MB
	•431 GOTO435	BN	•682 FORV=ZTOT:GOSUB140:NEXT	PP
	•432 IFKK>CTHENKK=KK-O:PRINT"[LEFT] [LEFT	CI	•685 FORV=ZTOB-O:PRINT"[CLEAR][DOWN][DOWN	
	]";	AB	] INPUT VOICE"V+O	NC
	•434 GOTO422	LG	•686 JJ=Z:KK=Z	JG
	•435 K=K(V)+O:HV=H1+V*SI:LV=L1+V*SI:OV=O1	OH	•688 GOSUB386:JI(V)=JJ-O:GOSUB420:K(V)=K-	BL
	+V*SI	JM	O:S=V+O:GOSUB920:NEXT:RETURN	
	•436 FORJ=CTOJI(V)	IA	•710 PRINT"[CLEAR][DOWN][DOWN] WHICH VOIC	OC
	•437 FORX=OTOR%(J,V)-O:POKEHV+K,N%(M%(J,V		E (1,2,3) ?";	PP
	,O):POKELV+K,N%(M%(J,V),Z)		•712 SYSSK:IFPEEK(SH)=OTHENRETURN	KB
	•438 POKEOV+K,O:K=K+O:IFK=SITHENRETURN		•715 GETA\$:IFA\$="THEN712	
	•439 NEXT		•718 V1=VAL(A\$):IFV1>3ORV1=ZTHEN712	HN

•719 V=V1-O:IFJI(V)>=ZTHEN721	FH	•912 SYSSK:IFPEEK(SH)THENRETURN	PJ
•720 PRINT"[CLEAR][DOWN] NO MUSIC ASSIGNED TO VOICE";V1:FORX=OTO2000:NEXT:RETURN	LM	•914 GETA\$:IFA\$=""THEN912	IL
•721 PRINT"[CLEAR][DOWN][DOWN][RIGHT]VOICE"		•916 S=VAL(A\$):IFS>4ORS=ZTHEN912	MA
•721 PRINT"[CLEAR][DOWN][DOWN][RIGHT]VOICE"		•918 PRINTS:IFS<4ANDJI(S-O)=-1THENV1=S:GOTO720	DD
•724 PRINTCHR\$(CH%(M%(J,V))):NEXT:PRINT:PRINT	FL	•920 E1=-1*(S=4ORS=0)*(Q6-820)+820:E2=-1*(S=4ORS=T)*(Q7-820)+820	NN
•735 PRINT"[DOWN] RHYTHM: ";:FORJ=ZTOJI(V):PRINTCHR\$(R%(J,V)+64):NEXT	ND	•924 E3=-1*(S=4ORS=3)*(Q8-820)+820:K(3)=K(Z):IFK(0)>K(3)THENK(3)=K(0)	BG
•739 SYSSK:IFPEEK(SH)=OTHERRETURN	PM	•928 IFK(2)>K(3)THENK(3)=K(2)	JE
•740 GOTO739	PP	•935 PRINT"[CLEAR][DOWN][DOWN] INDICATE TEMPO (0-9) "	DA
•800 PRINT"[CLEAR][RIGHT][DOWN][DOWN]EDIT WHICH VOICE (1,2,3) ?";	DB	•938 SYSSK	DL
•803 SYSSK:IFPEEK(SH)=1THENRETURN	EK	•940 GETA\$:IFA\$=""THEN938	IL
•805 GETA\$:IFA\$=""THEN803	MB	•945 E=VAL(A\$)*10:IFE=ZANDA\$<>"0"THEN935	LO
•806 V1=VAL(A\$):IFV1>3ORV1=ZTHEN805	KA	•965 GOSUB470:RETURN	OO
•808 V=V1-O:IFJI(V)>=ZTHEN810	GI	•1000 POKE56334,PEEK(56334)OR1:A\$="":B\$=""	PC
•809 PRINT"[CLEAR][DOWN] NO MUSIC ASSIGNED TO VOICE";V1:FORX=OTO2000:NEXT:GOTO823	FE	•1005 PRINT"[CLEAR][DOWN][DOWN] INSERT FORMATTED DISKETTE"	GA
•810 PRINT"[CLEAR][DOWN][DOWN][RIGHT]THE NOTES CURRENTLY ARE:":PRINT"[DOWN] NOTES : ";	EP	•1010 INPUT"[DOWN][DOWN] NAME YOUR PIECE";A\$:IFA\$=""THEN1042	KD
•816 FORJ=ZTOJI(V):PRINTCHR\$(CH%(M%(J,V))):NEXT:PRINT	FH	•1016 INPUT"[DOWN] RECOMMENDED TEMPO";B\$:IFB\$=""THEN1042	MD
•817 PRINT"[DOWN] IF OK TYPE <SPACE> ":PRINT" 'B' TO START FROM BEGINNING"	AH	•1018 E=VAL(B\$):IFE=ZANDB\$<>"0"THEN1016	JN
•818 PRINT" 'A' TO CONTINUE ADDING NOTES"	HE	•1020 OPEN15,8,15,"I0":OPEN5,8,5,"0":A\$="+",S,W"	DN
•819 SYSSK:GETA\$:IFA\$=""THEN819	DC	•1030 PRINT#5,E;C\$;JI(Z);C\$;JI(O);C\$;JI(T)	LJ
•820 IFA\$="A"THEN850	OB	•1036 FORV=ZTOT:FORX=ZTOJI(V):PRINT#5,M%(X,V);C\$;R%(X,V):NEXT:NEXT	MK
•821 IFA\$=" "THENTJI=JI(V):GOTO826	GA	•1040 CLOSE5:CLOSE15	BF
•822 IFA\$<"B"THEN817	ME	•1041 PRINT" "A\$" SAVED ON DISK"	DP
•823 PRINT"[DOWN][DOWN] INPUT THE NOTES AS THEY SHOULD BE."	CA	•1042 POKE56334,PEEK(56334)AND254:FORX=ZTO999:NEXT:RETURN	EB
•824 PRINT:GOSUB140:GOSUB386:TJI=JJ-O	FL	•1050 FORV=ZTOT:GOSUB140:NEXT	PP
•825 IFJI(V)<ZTHEN840	JF	•1052 POKE56334,PEEK(56334)ORO:A\$="":INPUT"[CLEAR][DOWN][DOWN] NAME OF PIECE";A\$	NC
•826 PRINT:PRINT"[DOWN] THE RHYTHM CURRENTLY IS:":PRINT:PRINT"[DOWN] RHYTHM: ";	EG	•1054 OPEN15,8,15,"I0":OPEN5,8,5,"0":A\$="+",S,R":INPUT#5,E,JI(Z),JI(O),JI(T)	JI
•827 FORJ=ZTOJI(V):PRINTCHR\$(R%(J,V)+64):NEXT:IFTJI<>JI(V)THEN840	CP	•1060 FORV=ZTOT:FORX=ZTOJI(V):INPUT#5,M%(X,V),R%(X,V):NEXT:NEXT	ID
•832 PRINT:PRINT"[DOWN][DOWN] IF OK TYPE <SPACE> ":PRINT" OTHERWISE 'R'"	FJ	•1062 POKE56334,PEEK(56334)AND254	DN
•833 GETA\$:IFA\$<>" "THEN833	EH	•1065 INPUT#15,E\$	ID
•834 SYSSK:GETA\$:IFA\$=""THEN834	AA	•1066 IFVAL(E\$)>ZTHENPRINT"[DOWN][DOWN] "A\$" NOT ON DISK":FORX=ZTO999:NEXT:GOTO 1074	BN
•835 IFA\$=" "THENK(V)=-1:C=Z:KK=Z:GOSUB435:K(V)=K-O:RETURN	NM	•1067 PRINT"[DOWN] "A\$" LOADED FROM DISK":C=Z:PRINT" RECOMMENDED TEMPO: ";E	PN
•840 JI(V)=TJI:PRINT:PRINT"[DOWN][DOWN] INPUT THE RHYTHM AS IT SHOULD BE."	EM	•1068 FORV=ZTOT:K(V)=-1	JN
•842 C=Z:KK=Z:K(V)=-1:GOSUB420	FL	•1070 PRINT" COMPILING VOICE"V+1:IFJI(V)>-1THENGOSUB435:K(V)=K-O	CN
•845 K(V)=K-O:RETURN	HM	•1073 NEXT	IA
•850 JJ=JI(V)+O:KK=JJ:C=JJ:GOSUB386:JI(V)=JJ-O	MJ	•1074 CLOSE5:CLOSE15:RETURN	NI
•860 IFJJ>KKTHENGOSUB420:K(V)=K-O	AM	•1100 POKE56334,PEEK(56334)OR1:PRINT"[CLEAR][DOWN][DOWN] THIS DISK CONTAINS:":PRINT	GB
•870 S=V+O:GOSUB920:RETURN	FC	•1110 OPEN15,8,15,"I0":OPEN5,8,5,"\$"	AE
•900 PRINT"[CLEAR][DOWN][DOWN] TYPE NUMBER OF VOICE TO BE PLAYED ";	IB		
•910 PRINT:PRINT"[DOWN] OR TYPE <4> FOR ALL VOICES AT ONCE "	BB		

IMPORTANT!

Letters on white background are **Bug Repellent** line codes. Do not enter them! Pages 117 and 118 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

```

PJ  •1114 FORJ=1TO254:GET#5,A$:NEXT
IL  •1117 FORX=OTO8:GET#5,D$,A$,A$:IFSTTHEN11
MA  45
GO  •1130 B$="":FORJ=OTO16:GET#5,A$:IFA$<>CHR
DD  $(160)THENB$=B$+A$
*   •1133 NEXT:IFASC(D$+CHR$(Z))=129THENPRINT
NN  ,B$
K   •1140 FORJ=1TO11:GET#5,A$:NEXT:IFX<8THENG
BG  ET#5,A$,A$
JE  •1142 NEXT:GOTO1117
T   •1145 CLOSE5:CLOSE15:A$="":INPUT"[DOWN] <
DA  RETURN> TO RETURN";A$
DL  •1146 POKE56334,PEEK(56334)AND254:RETURN
IL  •1150 PRINT"[CLEAR]":FORX=QTOQ+23:POKE5,Z
LO  :NEXT
OO  •1151 FORX=ZTOT:IFJI(X)<ZANDXTHEN1313
PC  •1159 PRINT"[DOWN][DOWN] CHOOSE DESIRED S
GA  OUND FOR VOICE:";X+0
"   •1160 PRINT"[DOWN][DOWN] PRESS A NUMBER K
KD  EY [3"."] ";
:   •1161 SYSSK:IFPEEK(SH)THEN1313
MD  •1162 GETA$:IFA$="":THEN1161
JN  •1163 S=VAL(A$):IFS=0ANDA$<>"0"THEN1161
$   •1164 PRINTT$(S):FORJ=ZTOFH:NEXT
DN  •1166 ON-(S=0)-2*(S=1)-3*(S=2)-4*(S=3)-5*
T   (S=4)GOTO1200,1210,1220,1230,1240
LJ  •1167 ON-(S=5)-2*(S=6)-3*(S=7)-4*(S=8)-5*
(   (S=9)GOTO1250,1260,1270,1280,1290
MK  •1200 W=16:AD=144:SR=243:GOTO1300
BF  •1210 W=16:AD=0:SR=240:GOTO1300
DP  •1220 W=16:AD=88:SR=195:GOTO1300
T   •1230 W=32:AD=88:SR=95:GOTO1300
EB  •1240 W=32:AD=0:SR=240:GOTO1300
PP  •1250 W=128:AD=88:SR=195:GOTO1300
U   •1260 W=64:AD=14:SR=86:HP=6:LP=2:GOTO1300
NC  •1270 W=64:AD=9:SR=90:HP=8:LP=8:GOTO1300
+   •1280 W=64:AD=9:SR=90:HP=0:LP=255:GOTO130
JI  0
(   •1290 W=16:AD=9:SR=80
ID  •1300 IFX=ZTHENW1=W
DN  •1310 IFX=OTHENW2=W
ID  •1311 IFX=TTHENW3=W
"   •1312 J=Q+T+7*X:POKEJ,LP:POKEJ+O,HP:POKEJ
L   +3,AD:POKEJ+4,SR
BN  •1313 NEXT:S=10:RETURN
"   •1350 POKE56334,PEEK(56334)OR1:END
PN  •1400 DATA 97,12,120,23,62,20,35,31,36,28
JN  ,37,39,38,36,60,47,51,44,87,55
>   •1410 DATA 65,7,52,2,90,3,83,63,69,10,0,0
CN  ,53,13,82,18,68,21,54,26,67,29
IA  •1500 DATA 70,34,84,37,88,42,55,45,89,50,
NI  71,53,56,1,66,6,72,62,85,9,86,14
E   •1510 DATA 57,17,73,22,74,25,48,30,77,33,
I   75,38,79,41,78,46,43,49,80,54,76,5,45,57
GB  •1600 DATA 46,56,58,59,64,8,44,11,92,16,4
AE  2,19,59,24,115,27,0,0,61,32

```

```

FB  •1610 DATA 94,35,47,40,49,43,95,48,0,0,50
LO  ,51,119,0,0,0,81,0,126,4,0,0
NC  •1700 DATAACCORDIAN,ORGAN,CLARINET,SYNTH
FG  SIZER,KAZOO,DRUM,GUITAR,XYLOPHONE
LD  •1710 DATABANJO,PIANO
AD  •2000 PRINT "[CLEAR][3"[DOWN]]"[BLUE][11"
NP  "] [s U] [s I]"
BM  •2001 PRINT "[11" "] [s G] [s K]"
JN  •2002 PRINT "[3" "] [8" [c T]] [s N] [c T]
BI  •2003 PRINT "[3" "] [7" [c T]] [s N] [s G] [c
HA  T]
JD  •2004 PRINT "[3" "] [6" [c T]] [c M] [s U] [s
BE  G] [s I] [5" [c T]] [RED] M A E S T R O [BLU
IM  E] [5" [c T]]"
LP  •2005 PRINT "[3" "] [6" [c T]] [c M] [s J] [s
FG  G] [c N] [23" [c T]]"
AF  •2006 PRINT "[3" "] [7" [c T]] [s M] [s G] [s
IJ  N] [23" [c T]]"
AH  •2007 PRINT "[11" "] [s G]"
LP  •2008 RETURN
EG  •3000 PRINT"
LA  •3001 PRINT"[27" "] [c M] [3" [c Y]] [s P]
DJ  •3002 PRINT"[PURPLE][4" "] [s Q] ADVANCED[
OM  BLUE][13" "] [c M] [c Y] [s P]
MI  •3003 PRINT"[27" "] [s Q]. [s Q]
IM  •3004 PRINT"[GREEN][6" "] [s Q] MUSIC[BLUE
"   ]
"   •3005 PRINT"
"   •3006 PRINT"[c 2][8" "] [s Q] EDITOR[BLUE]
"   [5" "] [c M] [c M] [c M]
"   •3007 PRINT"[21" "] [c M] [c M] [c M]
"   •3008 PRINT"[21" "] [s Q] [s Q] [s Q]
"   •3009 PRINT:PRINTTAB(8)"BY WILLIAM T. EVE
"   LETH AND"
"   •3010 PRINTTAB(12)"THE AHoy! STAFF"
"   •3011 RETURN

```

PROGRAMMING BIT BY BIT

FROM PAGE 103 THE NAME GAME

```

1 *
2 * THE NAME GAME
3 *
4 *      ORG      $8000
5 *
6 EOL      EQU      $0D      ;RETURN
7 EOF      EQU      $03      ;EOF CHR
8 FILLCH   EQU      $20      ;SPACE
9 BUFLN    EQU      40
10 CHRIN    EQU      $FFCF
11 CHROUT   EQU      $FFD2
12 TEMPTR   EQU      $FB
13 *
14          JMP      START
15 *
16 TXTBUF   DS       40

```



```

17 *
18 TITLE      ASC    'THE NAME GAME'
19            HEX    0D
20 HELLO      ASC    'HELLO, '
21            HEX    03
22 QUERY      ASC    'WHAT IS YOUR NAME?'
23            HEX    0D
24 NAME       ASC    'GEORGE'
25            HEX    0D
26 REBUFF     ASC    'GO AWAY, '
27            HEX    03
28 DEMAND     ASC    'BRING ME GEORGE!'
29            HEX    0D
30 GREET      ASC    'HI, GEORGE!'
31            HEX    0D
32 *
33 * CLEAR TEXT BUFFER
34 *
35 FILL       LDA     #FILLCH
36            LDX     #BUFLEN
37 DOFILL     DEX
38            STA     TXTBUF,X
39            BNE     DOFILL
40            RTS
41 *
42 PRINT      LDY     #0
43 SHOW       LDA     (TEMPTR),Y
44            CMP     #EOF
45            BEQ     DONE
46            PHA
47            JSR     CHROUT
48            PLA
49            CMP     #EOL
50            BNE     NEXT
51            JMP     DONE
52 NEXT       INY
53            CPY     #BUFLEN
54            BCC     SHOW
55 DONE       RTS
56 *
57 * PRINT 'THE NAME GAME'
58 *
59 START      LDA     #EOL
60            JSR     CHROUT
61            LDA     #<TITLE
62            STA     TEMPTR
63            LDA     #>TITLE
64            STA     TEMPTR+1
65            JSR     PRINT
66            LDA     #EOL
67            JSR     CHROUT
68
69 *
70 * PRINT 'HELLO . . .'
71 *
72            LDA     #<HELLO
73            STA     TEMPTR
74            LDA     #>HELLO

```

```

75            STA     TEMPTR+1
76            JSR     PRINT
77 *
78 * PRINT 'WHAT IS YOUR NAME?'
79 *
80 ASK        LDA     #<QUERY
81            STA     TEMPTR
82            LDA     #>HELLO
83            STA     TEMPTR+1
84            JSR     PRINT
85            LDA     #EOL
86            JSR     CHROUT
87 *
88 * INPUT A TYPED LINE
89 *
90            JSR     FILL
91            LDX     #0
92 KEY         JSR     CHRIN
93            STA     TXTBUF,X
94            CMP     #EOL
95            BEQ     COMPARE
96            INX
97            JMP     KEY
98 *
99 * IS THE NAME 'GEORGE'?
100 *
101 COMPARE    JSR     CHROUT ;PRINT RETURN
102            LDX     #0
103 CHECK      LDA     TXTBUF,X
104            CMP     NAME,X
105            BNE     NOGOOD
106            CMP     #EOL
107            BEQ     DUNIT
108            INX
109            CPX     #BUFLEN
110            BCS     DUNIT
111            JMP     CHECK
112 *
113 * NO; PRINT 'GO AWAY . . .'
114 *
115 NOGOOD     LDA     #EOL
116            JSR     CHROUT
117            LDA     #<REBUFF
118            STA     TEMPTR
119            LDA     #>REBUFF
120            STA     TEMPTR+1
121            JSR     PRINT
122 *
123 * PRINT PLAYER'S NAME
124 *
125            LDA     #<TXTBUF
126            STA     TEMPTR
127            LDA     #>TXTBUF
128            STA     TEMPTR+1
129            JSR     PRINT
130            LDA     #EOL
131            JSR     CHROUT
132 *

```



```

133 * PRINT 'BRING ME GEORGE!'
134 *
135     LDA    #<DEMAND
136     STA    TEMPTR
137     LDA    #>DEMAND
138     STA    TEMPTR+1
139     JSR    PRINT
140     LDA    #EOL
141     JSR    CHROUT
142     JMP    ASK
143 *
144 * YES; PRINT GREETING
145 *
146 DUNIT    LDA    #EOL
147           JSR    CHROUT
148           LDA    #<GREET
149           STA    TEMPTR
150           LDA    #>GREET
151           STA    TEMPTR+1
152           JSR    PRINT
153           RTS

```

SHADEYDUMP FROM PAGE 93

```

•100 PRINT "[CLEAR]"CHR$(14)CHR$(8)SPC(13
) "[s S]HADEY[s D]UMP" PK
•110 PRINT SPC(12)"[s V]ERSION 2.0" LM
•120 PRINT SPC(45)"(C) 1985 BY [s M]ICHAEL [s S]CHELL" FJ
•130 FORA=49152 TO 50001:READ B:C=C+B:POK E A,B:NEXT JO
•140 IF C<>86106 THEN PRINT "ERROR IN DATA STATEMENTS":STOP FK
•150 PRINT SPC(120)"[s S]AVING MACHINE LANGUAGE PROGRAM[4"."]" AM
•160 SYS 49872, 49152, 50002, "0:SHADEYDUMP.ML",8 FH
•170 PRINT "[HOME]"SPC(140)SPC(140)"[5" " ] [s T]O RUN [s S]HADEY[s D]UMP ENTER:[6" " ]" ME
•180 PRINT SPC(5) "SYS 49152" OL
•190 END IC
•200 DATA032,104,192,162,000,134 PJ
•210 DATA091,162,001,134,093,032 NJ
•220 DATA203,192,162,000,134,094 BD
•230 DATA032,216,192,173,048,194 NP
•240 DATA240,003,162,024,044,162 MJ
•250 DATA000,134,095,032,035,193 AI
•260 DATA173,048,194,240,003,162 GB
•270 DATA007,044,162,000,134,096 ID
•280 DATA032,178,193,173,048,194 BN
•290 DATA240,012,166,096,202,016 AK
•300 DATA241,166,095,202,016,221 EG
•310 DATA048,014,166,096,232,224 GC
•320 DATA008,208,227,166,095,232 PF

```

```

•330 DATA224,025,208,205,166,094 PM
•340 DATA232,224,002,208,183,166 MM
•350 DATA093,202,016,171,166,091 CH
•360 DATA232,224,040,208,160,076 DH
•370 DATA237,192,173,049,194,240 BI
•380 DATA029,169,255,141,003,221 LL
•390 DATA173,038,003,141,050,194 NC
•400 DATA173,039,003,141,051,194 PM
•410 DATA169,190,141,038,003,169 HI
•420 DATA192,141,039,003,208,024 IB
•430 DATA169,004,174,052,194,172 DL
•440 DATA053,194,032,186,255,169 BG
•450 DATA000,032,189,255,032,192 KG
•460 DATA255,162,004,032,201,255 GB
•470 DATA032,185,192,169,051,032 AG
•480 DATA210,255,169,001,032,210 EI
•490 DATA255,169,013,032,210,255 GC
•500 DATA169,010,076,210,255,169 EN
•510 DATA027,076,210,255,072,141 BI
•520 DATA001,221,169,016,044,013 PH
•530 DATA221,240,251,104,096,032 MG
•540 DATA185,192,169,074,032,210 AP
•550 DATA255,169,013,076,172,192 DH
•560 DATA032,175,192,032,185,192 OH
•570 DATA169,121,032,210,255,169 DG
•580 DATA032,032,210,255,169,003 AI
•590 DATA076,210,255,173,049,194 PC
•600 DATA240,013,173,050,194,141 CO
•610 DATA038,003,173,051,194,141 NN
•620 DATA039,003,096,032,204,255 GB
•630 DATA169,004,076,195,255,169 CC
•640 DATA000,133,105,133,106,162 HA
•650 DATA008,010,038,106,006,107 FF
•660 DATA144,007,024,101,108,144 LA
•670 DATA002,230,106,202,208,239 MC
•680 DATA133,105,096,165,095,133 EN
•690 DATA107,169,040,133,108,032 PJ
•700 DATA007,193,165,091,024,101 AG
•710 DATA105,133,105,144,002,230 DH
•720 DATA106,165,105,133,087,165 DD
•730 DATA106,133,088,173,040,194 KB
•740 DATA024,101,105,133,105,133 HO
•750 DATA089,173,041,194,101,106 IO
•760 DATA133,106,133,090,160,000 LL
•770 DATA177,089,041,015,133,252 MP
•780 DATA177,089,074,074,074,074 BG
•790 DATA133,253,165,088,133,106 MB
•800 DATA165,087,133,105,024,109 NI
•810 DATA044,194,133,105,165,088 AH
•820 DATA109,045,194,133,106,160 LO
•830 DATA000,177,105,041,015,133 GP
•840 DATA251,173,046,194,133,105 IC
•850 DATA173,047,194,133,106,177 IP
•860 DATA105,041,015,133,255,165 PO
•870 DATA088,133,106,165,087,133 NO
•880 DATA105,162,003,006,105,038 HN

```


IMPORTANT!

Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 117 and 118 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

•890 DATA106,202,208,249,173,042
 •900 DATA194,024,101,105,133,105
 •910 DATA173,043,194,101,106,133
 •920 DATA106,096,164,096,177,105
 •930 DATA133,107,165,093,208,007
 •940 DATA162,004,006,107,202,208
 •950 DATA251,160,003,132,092,173
 •960 DATA039,194,210,015,160,004
 •970 DATA165,107,153,108,006,108
 •980 DATA169,000,042,170,232,208
 •990 DATA017,160,002,165,107,133
 •1000 DATA108,006,108,169,000,042
 •1010 DATA006,108,042,073,003,170
 •1020 DATA181,251,170,189,054,194
 •1030 DATA010,024,101,094,010,010
 •1040 DATA101,092,170,173,039,194
 •1050 DATA208,009,189,070,194,074
 •1060 DATA038,109,074,038,109,189
 •1070 DATA070,194,074,038,109,074
 •1080 DATA038,109,136,240,007,173
 •1090 DATA039,194,240,199,208,182
 •1100 DATA165,109,032,210,255,164
 •1110 DATA092,136,016,159,096,255
 •1120 DATA000,092,000,096,000,128
 •1130 DATA033,208,255,000,000,000
 •1140 DATA004,005,015,000,011,004
 •1150 DATA010,006,014,001,009,013
 •1160 DATA005,012,007,002,008,003
 •1170 DATA000,000,000,000,000,000
 •1180 DATA000,000,000,000,001,000
 •1190 DATA000,002,000,000,001,000
 •1200 DATA000,000,000,002,000,000
 •1210 DATA000,001,002,000,001,002
 •1220 DATA000,001,002,001,000,002
 •1230 DATA000,002,001,000,000,003
 •1240 DATA000,000,003,000,000,000
 •1250 DATA003,000,000,000,000,003
 •1260 DATA000,000,001,000,002,000
 •1270 DATA002,000,002,000,000,002
 •1280 DATA000,002,000,002,000,001
 •1290 DATA001,000,002,001,002,001
 •1300 DATA000,002,001,002,000,001
 •1310 DATA002,000,001,002,003,000
 •1320 DATA000,000,000,000,003,000
 •1330 DATA000,003,000,000,000,000
 •1340 DATA000,003,002,001,002,001
 •1350 DATA000,000,000,000,003,003
 •1360 DATA003,003,000,000,000,000
 •1370 DATA003,003,003,003,003,003
 •1380 DATA003,003,032,253,174,032
 •1390 DATA138,173,032,247,183,165
 •1400 DATA020,166,021,096,032,198
 •1410 DATA194,072,138,072,032,198
 •1420 DATA194,072,138,072,032,253
 •1430 DATA174,032,212,225,104,168
 •1440 DATA104,170,104,133,021,104

CD •1450 DATA133,020,169,020,076,095
 MD •1460 DATA225,032,198,194,072,138
 IC •1470 DATA072,032,253,174,032,212
 CH •1480 DATA225,104,168,104,170,169
 MA •1490 DATA000,133,010,076,117,225
 BB •1500 DATA000,242,255,015,032,198
 BG •1510 DATA194,141,042,194,142,043
 AL •1520 DATA194,032,198,194,141,040
 IH •1530 DATA194,142,041,194,169,255
 HH •1540 DATA141,039,194,096,032,198
 EO •1550 DATA194,141,042,194,142,043
 KG •1560 DATA194,032,198,194,141,040
 JE •1570 DATA194,142,041,194,032,198
 NP •1580 DATA194,141,044,194,142,045
 FM •1590 DATA194,032,198,194,141,046
 DK •1600 DATA194,142,047,194,169,000
 DP •1610 DATA141,039,194,096

1541 DISK DRIVE CLEANING UTILITY FROM PAGE 59

DJ •1 REM 1541 DISK DRIVE CLEANING UTILITY JE
 PI •2 REM AUTHOR - JOHN DEROSA & THE AHOY!
 CD STAFF EK
 GC •3 PRINT"[HOME][CLEAR]":POKE53280,11:POKE
 PJ 53281,11 DB
 HO •4 PRINT"[4"[DOWN]]"[5"[RIGHT]]"[YELLOW]T
 AI HE 1541 DISK CLEANING UTILITY[PURPLE]" EO
 FG •5 PRINT"[PURPLE][9"[RIGHT]]"[DOWN][DOWN]
 FN [s U][19"[s *]]"[s I]" JG
 HH •6 PRINT"[9"[RIGHT]]"[s B][14" "]1541 [s
 KA B]" CN
 GA •7 PRINT"[9"[RIGHT]]"[s B] [c A][4"[s *]"
 EE]"[6"[c U]]"[5"[s *]]"[c S] [s B]" AD
 FA •8 PRINT"[9"[RIGHT]]"[s B] [c Q][4"[s *]"
 FP]"[6"[c I]]"[5"[s *]]"[c W] [s B]" GH
 GA •9 PRINT"[9"[RIGHT]]"[s B] [s B][s R][14"
 OH "] [s B] [s B]" OB
 HE •10 PRINT"[9"[RIGHT]]"[s B][s Q][c Z][15"
 FF [s *]]"[c X] [s B]" PN
 DD •11 PRINT"[9"[RIGHT]]"[s J][19"[s *]]"[s
 NI K]" LE
 HO •12 PRINT"[YELLOW][DOWN][DOWN][13" "]BY J
 FP OHN DEROSA" FM
 NL •13 PRINT"[11" "]FOR AHOY! MAGAZINE[PURPL
 FB E]" OA
 GA •19 FORZ=1TO6000:NEXT
 MA •20 D\$=" ":AA=0 OD
 HE •30 PRINT "[CLEAR][8"[DOWN]] ENTER CURRE
 CK NT DATE? "; CO
 CP •40 GET A\$:IF A\$="" THEN 40 EH
 IM •50 IF A\$=CHR\$(13) THEN 100 EE
 AN •60 PRINT A\$;:D\$=D\$+A\$:GOTO 40 FD
 AL •100 REM INITIALIZE SCREEN ID
 PD •110 GOSUB 1200 FA
 EL •120 PRINT "[DOWN][DOWN]DO YOU WANT TO RE

des ms!	AD DATA FROM DISK?(Y/N)"	FA	•550 PRINT " ENTER NEW TRACK (1-35)";:IN	
	•130 GOSUB 2500	FA	PUT TR	HP
OC	•140 GOSUB 1200	FA	•560 IF TR<1 THEN PRINT "[4"[UP]]":GOTO	FH
EP	•150 IF AN\$="N" THEN 340	LF	540	
GO	•200 REM READ DATA FROM DISK DRIVE	JC	•570 IF TR>35 THEN PRINT "[4"[UP]]":GOTO	FJ
OE	•210 PRINT "[3"[DOWN]]"[11" "]INSERT DATA		540	
FL	DISK"	AO	•590 PRINT "[DOWN] CURRENT CLEANING TIME	NA
KD	•220 PRINT "[8"[DOWN]]"[7" "]PRESS ANY KE	KB	IS ";SC	
BE	Y TO READ DATA"	EP	•600 PRINT " ENTER NEW TIME (< 300)";:IN	FH
IN	•230 GET AN\$:IF AN\$="" THEN 230		PUT SC	
FE	•240 OPEN15,8,15:OPEN2,8,2,"CLEANDATA,S,R	OJ	•610 IF SC>300 THEN PRINT "[4"[UP]]":GOT	JH
JA	"	FB	0 590	
BE	•250 GOSUB 1300	JA	•620 IF SC<1 THEN PRINT "[4"[UP]]":GOTO	BM
IN	•260 IF A <> 0 THEN 300	KM	590	
OP	•270 INPUT#2,DT\$,TR,SC,NC,NM	FB	•630 PRINT "[DOWN] NUMBER OF TIMES DISK U	EK
DI	•280 GOSUB 1300	AG	SED IS ";NC	
JD	•290 IF A = 0 THEN 390		•640 PRINT " ENTER NEW NUMBER ";:INPUT N	FP
LI	•300 PRINT "[DOWN][DOWN][5" "]DATA NOT RE	FE	C	
MB	AD FROM DISK"	MP	•650 PRINT "[DOWN] MAXIMUM CLEANINGS PER	JM
	•310 PRINT "[DOWN][DOWN][5" "]TRY AGAIN ?	FA	DISK IS";NM	
	(Y/N)"	BN	•660 PRINT " ENTER NEW MAXIMUM ";:INPUT	OC
	•320 GOSUB 2500	EP	NM	
	•330 IF AN\$="Y" THEN CLOSE 2:GOSUB 1200:G	PH	•670 PRINT "[4"[DOWN]]"[3" "]DO YOU WANT	LC
JE	OTO 200	JG	TO CHANGE DATA? (Y/N)"	
EK	•340 GOSUB 1200:DT\$=D\$:TR=2:SC=30:NC=0:N	LA	•680 GOSUB 2500	FA
DB	M=15	EJ	•690 IF AN\$="Y" THEN 500	OO
	•350 PRINT "[9" "]DATA NOT READ FROM DISK	BI	•700 PRINT "[DOWN][3" "]SAVE THIS DATA ON	BA
	"	CB	DISK (Y/N)"	FA
EO	•360 PRINT "[DOWN][11" "]DEFAULT VALUES U	HH	•710 GOSUB 2500	KK
	SED"	AN	•720 IF AN\$="Y" THEN GOSUB 1400	BB
JG	•370 PRINT "[9"[DOWN]]"[9" "]PRESS ANY KE	HO	•800 REM AUTO CLEANING	PH
	Y TO CONTINUE"	NK	•805 GOSUB 1200:GOSUB 1000	CM
CN	•380 GET AN\$:IF AN\$="" THEN 380	GA	•810 NL=N-M-NC	HJ
	•390 CLOSE 2:CLOSE 15	GE	•815 IF NL>0 THEN 870	
AD	•400 REM DISPLAY AUTO DATA	KA	•820 PRINT "[DOWN][12" "][5"*"]WARNING[5"	LP
GH	•410 PRINT "[CLEAR]"	AA	*"]"	
	•420 PRINT "[3"[DOWN]]"[6" "]CURRENT DATE	DA	•825 PRINT "[DOWN][7" "]CLEANING DISK IS	LH
	IS [RVSON]";D\$;"[RVSOFF]"	DN	USED UP"	
OB	•430 PRINT "[DOWN][DOWN] LAST DATE CLEAN	IJ	•830 PRINT "[7" "](;NL;" CLEANINGS LEFT	PG
	E D IS: ";DT\$	HH	ON DISK)"	
PN	•440 PRINT "[DOWN] CURRENT TRACK IS: ";TR	AL	•835 PRINT "[DOWN] DO YOU WANT TO CONTINU	LG
	•450 PRINT "[DOWN] CURRENT CLEANING TIME	KH	E CLEANING? (Y/N)"	FA
LE	IS (SEC): ";SC	HK	•840 GOSUB 2500	
FM	•460 PRINT "[DOWN] NUMBER OF TIMES DISK U		•845 IF AN\$="Y" THEN GOSUB 1200:GOSUB 100	JC
	SED IS: ";NC		0:GOTO 870	
OA	•470 PRINT "[DOWN] MAXIMUM CLEANINGS PER		•850 PRINT "[DOWN][4" "]DO YOU WANT TO CH	II
OD	DISK IS: ";NM		ANGE DATA? (Y/N)"	FA
CO	•480 PRINT "[DOWN][DOWN] [RVSON]NUMBER OF		•855 GOSUB 2500	OO
	CLEANINGS LEFT IS: ";NM-NC;"[RVSOFF]"		•860 IF AN\$="Y" THEN 500	DF
PN	•490 PRINT "[5"[DOWN]]"[4" "]DO YOU WANT		•865 GOTO 955	FH
EH	TO CHANGE DATA? (Y/N)"		•870 GOSUB 2200:GOSUB 1200:GOSUB 1000	DA
EE	•495 GOSUB 2500:IF AN\$="N" THEN 800		•875 PRINT "[DOWN][DOWN][6" "]INSERT CLEA	MA
FD	•500 REM CHANGE AUTO DATA		NING DISK IN DRIVE"	FF
ID	•510 PRINT "[CLEAR]"		•880 PRINT "[9"[DOWN]]"[5" "]PRESS ANY KE	PH
FA	•520 PRINT "[DOWN] LAST DATE CLEANED IS "		Y TO START CLEANING"	
	;DT\$		•885 GET AN\$:IF AN\$="" THEN 885	
	•530 PRINT " ENTER NEW DATE";:INPUT DT\$		•890 GOSUB 1200:GOSUB 1000	
	•540 PRINT "[DOWN] CURRENT TRACK IS ";TR		•895 PRINT "[DOWN][DOWN][4" "][RVSON]CLEA	

NING[RVSOFF]"	HE	* ";B\$	KG
•900 PRINT "[DOWN][DOWN][4" "]PRESS ANY K	GP	•1360 CLOSE 15	AB
EY TO MANUALLY STOP"	KP	•1370 RETURN	IM
•905 IF ET>SC THEN 920	FN	•1400 REM SUBROUTINE-SAVE AUTO DATA	PH
•910 GOSUB 1700	DK	•1410 GOSUB 1200:GOSUB 1000	PH
•915 GET AN\$:IF AN\$="" THEN 905	GF	•1420 PRINT "[DOWN][11" "]INSERT DATA DIS	KB
•920 GOSUB 2000:GOSUB 1200:GOSUB 1000	OO	K"	PE
•925 PRINT "[DOWN] UPDATE DATA DISK? (Y/	FA	•1430 PRINT "[9"[DOWN]""] [4" "]PRESS ANY K	GM
N)"	LH	EY TO SAVE AUTO DATA "	ID
•930 GOSUB 2500	PH	•1440 GET AN\$:IF AN\$="" THEN 1440	GH
•935 IF AN\$="N" THEN 955	ID	•1450 OPEN 15,8,15:OPEN2,8,2,"@:CLEANDAT	MA
•940 NC=NC+1:TR=TR+2:DT\$=D\$	FK	A,S,W"	GH
•945 IF TR>35 THEN TR=1	DK	•1460 GOSUB 1300:IF A <> 0 THEN 1500	ON
•950 GOSUB 1400	CA	•1470 PRINT#2,DT\$;"",TR\$;"",SC\$;"",NC\$;"	GO
•955 PRINT "[CLEAR][DOWN][DOWN] PROGRAM	IP	"",NM	JK
ENDED":END	KP	•1480 GOSUB 1300:IF A <> 0 THEN 1500	LJ
•1000 REM SUBROUTINE-UPDATE STATUS LINE	FN	•1490 CLOSE2:CLOSE15:RETURN	LF
•1010 IF MF=1 THEN 1040	BE	•1500 PRINT "[3"[DOWN]""] [5" "]DATA NOT SA	FO
•1020 POKE 1266,143:POKE 1267,134:POKE 12	CP	VED!"	EL
68,134	AP	•1520 PRINT "[3"[DOWN]""] [5" "]TRY AGAIN?	HF
•1030 GOTO 1050	IE	(Y/N)"	DE
•1040 POKE 1266,143:POKE 1267,142:POKE 12	KA	•1530 GOSUB 2500:CLOSE 2:CLOSE 15	BE
68,32	IF	•1540 IF AN\$="N" THEN RETURN	LE
•1050 T=TR/10:IF T<1 THEN T2=-144:T1=TR:G	EC	•1550 GOTO 1400	KK
OTO 1070	DI	•1700 REM SUBROUTINE-MOTOR ON	GG
•1060 T1=INT(T):T2=TR-10*T1	AN	•1710 IF MF=1 THEN 1730	CA
•1070 POKE 1277,T1+176:POKE 1278,T2+176	OM	•1720 Z=54272:TT=TI:FOR L=Z TO Z+24:POKE	PO
•1075 S=SC/100:IF S<1 THEN S0=0:GOTO 1077	CJ	L,0:NEXT L	DB
•1076 S0=INT(S)	HB	•1730 POKE Z+5,9:POKE Z+6,0:POKEZ+24,15:P	AM
•1077 SA=SC-S0*100	DP	OKE Z+4,33	EC
•1080 S=SA/10:IF S<1 THEN S2=SA:S1=0:GOTO	LF	•1740 ET=INT((TI-TT)/60)	ME
1100	KH	•1750 IF SW=1 THEN 1770	IL
•1090 S1=INT(S):S2=SA-10*S1	JC	•1760 POKE Z+1,25:POKE Z,170:SW=1:GOTO 17	CE
•1100 POKE 1287,S0+176:POKE 1288,S1+176:P	IM	80	LN
OKE 1289,S2+176	HO	•1770 POKE Z+1,20:POKE Z,150:SW=0	IM
•1105 E=ET/100:IF E<1 THEN E0=0:GOTO 1107	JM	•1780 GOSUB 1000:POKE Z+4,32	JP
•1106 E0=INT(E)	FJ	•1790 IF MF=1 THEN RETURN	IC
•1107 EA=ET-E0*100	HE	•1800 OPEN15,8,15	AM
•1110 E=EA/10:IF E<1 THEN E2=EA:E1=0:GOTO	JN	•1810 PRINT#15,"M-R"CHR\$(0)CHR\$(28)	CE
1130	IM	•1820 GET#15,X\$:X=ASC(X\$+CHR\$(0))	KO
•1120 E1=INT(E):E2=EA-10*E1	KI	•1830 BI=XOR4	IM
•1130 POKE 1298,E0+176:POKE 1299,E1+176:P	OD	•1840 PRINT#15,"M-W"CHR\$(0)CHR\$(28)CHR\$(1	AC
OKE 1300,E2+176	ON	)CHR\$(BI)	JG
•1140 RETURN	PH	•1850 MF=1:CLOSE 15	
•1200 REM SUBROUTINE-SET UP SCREEN		•1860 RETURN	
•1210 PRINT "[CLEAR][DOWN]"SPC(4)"1541 DI		•2000 REM SUBROUTINE-MOTOR OFF	
SK DRIVE CLEANING UTILITY"		•2010 Z=54272:FOR L=Z TO Z+24:POKE L,0:NE	
•1220 PRINT "[DOWN][DOWN] DRIVE[4" "]HEAD		XT L	
AT[5" "]TOTAL[5" "]ELAPSED"		•2020 OPEN15,8,15	
•1230 PRINT " MOTOR[5" "]TRACK[5" "]SECON		•2030 BI=X	
DS[4" "]SECONDS"		•2040 PRINT#15,"M-W"CHR\$(0)CHR\$(28)CHR\$(1	
•1240 PRINT "[3"[DOWN]""] [40"[s C]""]"		)CHR\$(BI)	
•1250 RETURN		•2050 MF=0:CLOSE 15	
•1300 REM SUBROUTINE-READ ERROR CHANNEL		•2060 RETURN	
•1310 INPUT#15,A,B\$,C,D		•2200 REM SUBROUTINE-MOVE HEAD TO TRACK	
•1320 IF A=0 THEN RETURN		•2220 PRINT "[DOWN][8" "]INSERT ANY FORMA	
•1340 GOSUB 1200:GOSUB 1000		TTED DISK"	
•1350 PRINT "[3"[DOWN]""] [5" "]DISK ERROR		•2230 PRINT "[9"[DOWN]""] [8" "]PRESS ANY K	

IMPORTANT! Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 117 and 118 explain these codes and provide other essential information on entering **Ahoy!** programs. Refer to these pages **before** entering any programs!

EY TO MOVE HEAD"
 •2240 GET AN\$:IF AN\$="" THEN 2240
 •2250 OPEN 15,8,15:OPEN 2,8,2,"#"
 •2260 PRINT#15,"U1 2 0";TR;"0"
 •2270 GOSUB 1300
 •2280 IF A=0 THEN CLOSE 2:CLOSE 15:RETURN
 •2290 PRINT "[DOWN][5" "]MOVE HEAD FAILED
 "
 •2300 PRINT "[DOWN][5" "]HEAD NOT ON PROP
 ER TRACK"
 •2400 PRINT "[4"[DOWN]"][8" "]TRY AGAIN?
 (Y/N)"
 •2410 GOSUB 2500:CLOSE 2:CLOSE 15
 •2420 IF AN\$="Y" THEN GOSUB 1200:GOSUB 10
 00:GOTO 2220
 •2430 RETURN
 •2500 REM SUBROUTINE - GET (Y/N) ANSWER
 •2510 GET AN\$:IF AN\$="" THEN 2510
 •2520 IF AN\$="Y" THEN RETURN
 •2530 IF AN\$="N" THEN RETURN
 •2540 GOTO 2510

GRAVINAUTS* FROM PAGE 32

Starting address in hex: C000 SYS to Start: 49152
 Ending address in hex: C83A

C000: A9 00 8D EE 07 8D EF 07 B1
 C008: 20 FD C3 AD 11 D0 10 FB 85
 C010: AD 1F D0 29 01 F0 05 A2 70
 C018: 00 20 6B C1 AD 00 D0 8D 71
 C020: B8 02 AD 01 D0 8D E8 07 D7
 C028: AD 00 DC 29 1D A8 29 10 DA
 C030: F0 0D A2 0B 8E F8 07 A9 14
 C038: 80 8D 0B D4 4C 63 C0 A2 39
 C040: 0D 8E F8 07 AD E8 07 8D 07
 C048: 08 D4 A9 14 8D 07 D4 A9 F5
 C050: 00 8D 0C D4 A9 F0 8D 0D F3
 C058: D4 A9 81 8D 0B D4 A9 04 73
 C060: 8D 18 D4 98 CD B5 02 F0 E9
 C068: 05 A2 FE 8E B4 02 C9 09 27
 C070: D0 1A EE B4 02 D0 15 CE B5
 C078: A9 02 CE AE 02 CE EC 07 66
 C080: D0 05 A2 00 20 84 C2 A2 03
 C088: FE 8E B4 02 C9 05 D0 1A 86
 C090: EE B4 02 D0 15 EE A9 02 B6
 C098: CE AE 02 CE EC 07 D0 05 B0
 C0A0: A2 00 20 84 C2 A2 FE 8E DA
 C0A8: B4 02 C9 0D D0 17 EE B4 C1
 C0B0: 02 D0 12 CE AE 02 CE EC D0
 C0B8: 07 D0 05 A2 00 20 84 C2 9F
 C0C0: A2 FE 8E B4 02 8D B5 02 EC
 C0C8: AD A9 02 30 0D 38 C9 05 66
 C0D0: 90 12 A2 05 8E A9 02 4C A1
 C0D8: E4 C0 38 C9 FA B0 05 A2 D3
 C0E0: FA 8E A9 02 AD AE 02 30 A4
 C0E8: 0D 38 C9 05 90 12 A2 05 47

DG C0F0: 8E AE 02 4C 00 C1 38 C9 40
 HH C0F8: FA B0 05 A2 FA 8E AE 02 86
 EI C100: AD 00 D0 18 6D A9 02 38 E7
 GF C108: C9 18 B0 05 A2 02 8E A9 7C
 FB C110: 02 8D 00 D0 AD 01 D0 18 08
 EJ C118: 6D AE 02 38 C9 32 B0 05 20
 JC C120: A0 02 8C AE 02 8D 01 D0 5F
 C128: EE B3 02 D0 08 A9 F6 8D D3
 C130: B3 02 EE AE 02 AE 04 DC 15
 HF C138: 8E 26 D0 AD B2 02 85 A2 48
 C140: A5 A2 D0 FC 20 B8 C1 20 11
 BF C148: 92 C3 AD 15 D0 A8 29 01 05
 LJ C150: F0 0B 98 29 FE D0 03 20 01
 C158: 64 C5 4C 0B C0 A9 00 85 C9
 LP C160: C6 20 E4 FF C9 85 D0 F9 46
 IM C168: 4C 08 C0 8A 0A A8 BD B8 31
 BH C170: 02 99 00 D0 BD E8 07 C8 53
 IN C178: 99 00 D0 8A 48 20 97 E0 4E
 OG C180: 68 AA BD E8 07 38 C9 DB 1F
 LF C188: 90 16 BD B8 02 38 C9 98 42
 FL C190: 90 03 4C 9A C1 38 C9 66 35
 C198: B0 06 20 84 C2 4C B7 C1 7C
 C1A0: A5 8D 10 0B BD A9 02 49 A1
 C1A8: FF 9D A9 02 4C B7 C1 BD 75
 C1B0: AE 02 49 FF 9D AE 02 60 59
 C1B8: AD 11 D0 10 FB AE AD 02 B2
 C1C0: BD 4B C6 2D 1F D0 F0 03 A1
 C1C8: 20 6B C1 20 10 C3 B9 00 C3
 C1D0: D0 9D B8 02 C8 B9 00 D0 4D
 C1D8: 9D E8 07 88 8A 48 98 48 A2
 C1E0: 20 97 E0 68 A8 68 AA A5 43
 C1E8: 8D 30 12 BD B8 02 38 CD 37
 C1F0: B8 02 B0 06 FE A9 02 4C 59
 C1F8: FD C1 DE A9 02 BD E8 07 F0
 C200: 38 CD E8 07 B0 06 FE AE 5A
 C208: 02 4C 0F C2 DE AE 02 BD 75
 C210: A9 02 10 0D 38 C9 FC B0 88
 C218: 12 A9 FC 9D A9 02 4C 2B 91
 C220: C2 38 C9 03 90 05 A9 03 2A
 C228: 9D A9 02 BD AE 02 10 0D FC
 C230: 38 C9 FC B0 12 A9 FC 9D 36
 C238: AE 02 4C 47 C2 38 C9 03 44
 C240: 90 05 A9 03 9D AE 02 B9 8A
 C248: 00 D0 18 7D A9 02 99 00 F3
 C250: D0 C8 B9 00 D0 18 7D AE B8
 C258: 02 99 00 D0 BD B8 02 38 75
 C260: C9 18 B0 05 A9 02 9D A9 EA
 C268: 02 BD E8 07 38 C9 32 B0 FC
 C270: 05 A9 02 9D AE 02 E8 8E E6
 C278: AD 02 E0 04 D0 05 A9 01 8D
 C280: 8D AD 02 60 A0 18 A9 00 80
 C288: 99 00 D4 88 10 FA A9 F0 25
 C290: 8D 06 D4 A9 0F 8D 18 D4 2C
 C298: A9 81 8D 04 D4 A9 0F 9D 80
 C2A0: F8 07 A0 14 AD 04 DC 9D 81
 C2A8: 27 D0 A9 0A 8D 01 D4 A9 61

*To enter Gravinauts, you must use our Flankspeed machine language entry program (see page 118).

AHOY! 143

C2B0: FE 85 A2 A5 A2 D0 FC AD 9B
 C2B8: 04 DC 8D 25 D0 A9 01 8D 55
 C2C0: 00 D4 A9 FE 85 A2 A5 A2 AE
 C2C8: D0 FC AD 04 DC 8D 26 D0 A9
 C2D0: 98 8D 18 D4 A9 FE 85 A2 B4
 C2D8: A5 A2 D0 FC 88 D0 C5 8C 9A
 C2E0: 25 D0 8C 18 D4 A9 80 8D 08
 C2E8: 04 D4 BD 4B C6 49 FF 2D 08
 C2F0: 15 D0 8D 15 D0 E0 00 F0 1C
 C2F8: 0E AD A7 02 18 69 FA 8D 68
 C300: A7 02 90 03 EE A8 02 AD 84
 C308: 1E D0 A9 0D 9D F8 07 60 AB
 C310: AD 11 D0 10 FB AD 1E D0 48
 C318: 8D B6 02 8E B7 02 A2 03 4C
 C320: BD 4B C6 48 2D B6 02 F0 0F
 C328: 03 20 6B C1 68 A8 C8 98 EA
 C330: CD B6 02 D0 1D BD E8 07 52
 C338: 38 CD E8 07 08 20 6B C1 83
 C340: 28 90 06 20 84 C2 4C 52 05
 C348: C3 8A 48 A2 00 20 84 C2 E8
 C350: 68 AA CA 10 CB A2 07 BD 71
 C358: 4B C6 A8 C8 98 CD B6 02 FA
 C360: D0 24 A9 07 9D 27 D0 20 BB
 C368: FC C5 BD 4B C6 49 FF 2D 71
 C370: 15 D0 8D 15 D0 AD EC 07 6B
 C378: 18 7D 4F C6 8D EC 07 90 36
 C380: 05 A9 FF 8D EC 07 CA E0 5C
 C388: 03 D0 CC AE B7 02 8A 0A 26
 C390: A8 60 AD A8 02 38 CD EE E6
 C398: 07 F0 04 90 19 B0 0B AD A7
 C3A0: A7 02 38 CD EF 07 F0 02 3A
 C3A8: 90 0C AD A8 02 8D EE 07 21
 C3B0: AD A7 02 8D EF 07 A2 04 33
 C3B8: A0 20 18 20 F0 FF A9 9F EB
 C3C0: 20 D2 FF AD EE 07 AE EF F5
 C3C8: 07 20 CD BD A9 05 20 D2 1D
 C3D0: FF A2 0A A0 20 18 20 F0 67
 C3D8: FF AD A8 02 AE A7 02 20 A9
 C3E0: CD BD A2 12 A0 20 18 20 1A
 C3E8: F0 FF A9 00 AE EC 07 20 46
 C3F0: CD BD A9 20 20 D2 FF A9 E2
 C3F8: 20 20 D2 FF 60 A9 0B 8D AE
 C400: 20 D0 AD 11 D0 29 EF 8D 27
 C408: 11 D0 A9 93 20 D2 FF A2 BC
 C410: 03 A0 07 18 20 F0 FF A2 86
 C418: 00 BD CD C6 20 D2 FF E8 46
 C420: E0 19 D0 F5 A2 07 A0 10 3B
 C428: 18 20 F0 FF A2 00 BD 57 09
 C430: C6 20 D2 FF E8 E0 4A D0 CE
 C438: F5 A2 0F A0 09 18 20 F0 B2
 C440: FF A2 00 BD A1 C6 20 D2 FB
 C448: FF E8 E0 2C D0 F5 A2 11 B8
 C450: A0 16 18 20 F0 FF A2 00 D2
 C458: BD CD C6 20 D2 FF E8 E0 67
 C460: 19 D0 F5 A2 18 A0 00 18 B3
 C468: 20 F0 FF A2 00 8E ED 07 9F
 C470: BD E6 C6 20 D2 FF E8 E0 98
 C478: 24 D0 F5 A2 00 A0 1D 8A 4E

C480: 48 98 48 18 20 F0 FF A9 7C
 C488: DA 20 D2 FF 68 A8 68 AA 7A
 C490: E8 E0 19 D0 EA A2 00 A0 72
 C498: 1E 8A 48 98 48 18 20 F0 93
 C4A0: FF 20 F7 C4 68 A8 68 AA A1
 C4A8: E8 E0 18 D0 EC A2 02 A0 8D
 C4B0: 1E 18 20 F0 FF A2 00 BD 58
 C4B8: 16 C7 20 D2 FF E8 E0 0C 5F
 C4C0: D0 F5 A2 08 A0 1E 18 20 29
 C4C8: F0 FF A2 00 BD 22 C7 20 24
 C4D0: D2 FF E8 E0 0C D0 F5 A2 E2
 C4D8: 10 A0 1E 18 20 F0 FF A2 73
 C4E0: 00 BD 2E C7 20 D2 FF E8 70
 C4E8: E0 0C D0 F5 AD 11 D0 09 35
 C4F0: 10 8D 11 D0 4C 05 C5 A2 2A
 C4F8: 00 BD 0A C7 20 D2 FF E8 64
 C500: E0 0C D0 F5 60 A9 00 8D 4B
 C508: 25 D0 8D A8 02 8D A7 02 6D
 C510: A2 0B 8E F8 07 A2 01 8E 7E
 C518: AD 02 8E 86 02 A9 0D 9D 33
 C520: F8 07 E8 E0 04 D0 F6 A9 5F
 C528: 0E 9D F8 07 E8 E0 08 D0 76
 C530: F6 A9 FF 8D 1C D0 A2 00 ED
 C538: BD 3A C7 9D C0 02 BD 7A 90
 C540: C7 9D 40 03 BD FA C7 9D 07
 C548: 80 03 BD BA C7 9D C0 03 6D
 C550: E8 E0 40 D0 E3 A9 F9 8D 40
 C558: B2 02 A9 32 8D EC 07 A9 14
 C560: F6 8D B3 02 A9 00 8D AE 80
 C568: 02 8D A9 02 A9 B3 8D 08 96
 C570: D0 A9 AF 8D 09 D0 A9 A0 4C
 C578: 8D 0B D0 A9 A5 8D 0C D0 9B
 C580: A9 42 8D 0E D0 A9 3F 8D 4F
 C588: 0F D0 A9 41 8D 0A D0 A9 65
 C590: 5F 8D 0D D0 A9 14 8D 03 A9
 C598: D0 8D 05 D0 8D 07 D0 A9 DB
 C5A0: 46 8D 02 D0 A9 82 8D 04 05
 C5A8: D0 A9 BE 8D 06 D0 A9 01 F0
 C5B0: 8D 2B D0 A9 0B 8D 2C D0 79
 C5B8: A9 0C 8D 2D D0 8D 2E D0 86
 C5C0: A9 0E 8D 28 D0 8D 29 D0 86
 C5C8: 8D 2A D0 A9 7E 8D 00 D0 D7
 C5D0: A9 DF 8D 01 D0 A9 0F 8D FF
 C5D8: 27 D0 A9 FF 8D 15 D0 AD 9B
 C5E0: 1E D0 AD 1F D0 AD B2 02 CF
 C5E8: C9 FF F0 0F EE B2 02 EE 45
 C5F0: ED 07 AC ED 07 B9 44 C6 4C
 C5F8: 8D 21 D0 60 48 8A 48 98 8C
 C600: 48 A0 18 A9 00 99 00 D4 19
 C608: 88 10 FA A9 0A 8D 03 D4 B4
 C610: A9 C8 8D 02 D4 8E 01 D4 4B
 C618: 8A 0A 8D 00 D4 A9 F0 8D 37
 C620: 06 D4 A9 41 8D 04 D4 A9 F5
 C628: 0F 8D 18 D4 A9 FA 85 A2 7E
 C630: A5 A2 D0 FC A9 00 8D 18 95
 C638: D4 A9 40 8D 04 D4 68 A8 6E
 C640: 68 8A 68 60 00 06 0B 08 15
 C648: 09 04 03 01 02 04 08 10 77

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 C670: 20 DF 11 9D 9D 9D 9D 9D 95
 C678: 9D 9D 9D 9D 9D 20 20 20 EC
 C680: 20 20 20 20 20 92 A9 11 6E
 C688: 9D 9D 9D 9D 9D 9D 9D 9D 75
 C690: 9D A9 DF 12 20 20 20 92 BC
 C698: 9 A9 11 9D 9D 9D 9D DF 53
 C6A0: 9 12 A9 11 9D 9D 9D 9D 8D
 C6A8: 9D 9D A9 20 20 20 20 20 2E
 C6B0: 20 20 DF 11 9D 9D 9D 9D 58
 C6B8: 9D 9D 9D 9D 92 DF DF 12 93
 C6C0: 20 20 20 20 92 A9 11 9D 2C
 C6C8: 9D 9D 9D DF A9 9F 12 A9 86
 C6D0: 11 9D 9D 9D 9D A9 20 20 42
 C6D8: 20 20 DF 11 9D 9D 9D 9D 80
 C6E0: 9D 92 DF DF A9 A9 12 1C 52
 C6E8: DC DC DC DC DC DC DC DC CF
 C6F0: DC DC D 90 AB 92 A2 AF A8
 C6F8: AF AF A2 12 B3 1C DC DC 96
 C700: DC DC DC DC DC DC DC DC E6
 C708: DC 90 12 90 DB DB DB DB 87
 C710: DB DB DB DB DB DB 05 47 83
 C718: 52 41 56 49 4E 41 55 54 84
 C720: 53 9F 05 20 20 53 43 4F 3E
 C728: 52 45 20 20 20 9F 05 20 E4
 C730: 20 46 20 55 20 45 20 4C DD
 C738: 20 9F 00 28 00 00 55 00 75
 C740: 00 96 00 01 96 40 01 AA 5A

C748: 40 09 AA 60 0A 69 A0 08 B8
 C750: 55 20 18 96 24 1A 96 A4 ED
 C758: 12 96 84 15 55 54 54 55 ED
 C760: 15 50 AA 05 40 AA 01 40 A1
 C768: 82 01 00 82 00 00 82 00 F0
 C770: 00 82 00 00 41 00 01 41 76
 C778: 40 00 00 28 00 00 55 00 36
 C780: 00 96 00 01 96 40 01 AA 9A
 C788: 40 09 AA 60 0A 69 A0 08 F8
 C790: 55 20 18 96 24 1A 96 A4 2E
 C798: 12 96 84 15 55 54 54 55 2E
 C7A0: 15 50 AA 05 40 AA 01 40 E1
 C7A8: 82 01 C0 82 03 C0 82 03 B8
 C7B0: C0 82 03 C0 41 03 C1 41 FE
 C7B8: 43 00 00 04 00 04 40 10 54
 C7C0: 00 20 00 12 00 84 04 20 9B
 C7C8: 20 43 02 00 08 0C 00 10 52
 C7D0: C0 C0 03 30 04 20 3C C0 A6
 C7D8: 02 FF 20 40 3C 01 08 C0 41
 C7E0: 80 00 30 00 08 83 20 03 40
 C7E8: 00 04 48 08 40 10 80 20 2E
 C7F0: 00 12 00 00 00 00 00 00 03
 C7F8: 00 00 00 00 00 00 00 00 F8
 C800: 00 00 00 00 00 00 00 00 00
 C808: 00 00 00 00 00 00 00 00 08
 C810: 10 00 00 54 00 00 20 00 94
 C818: 00 A8 00 00 54 00 00 98 AD
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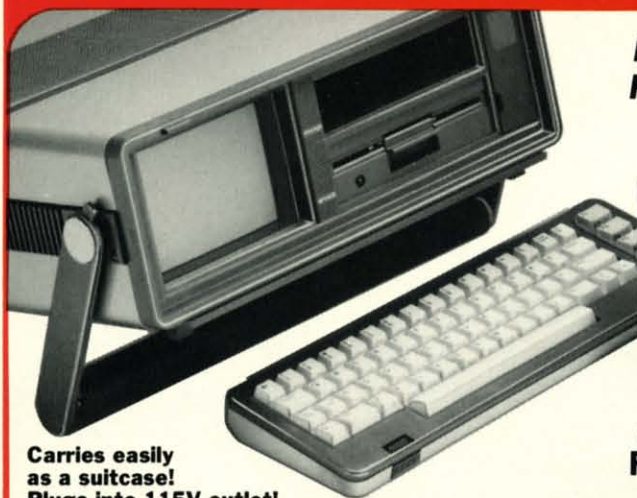
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