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July 1989
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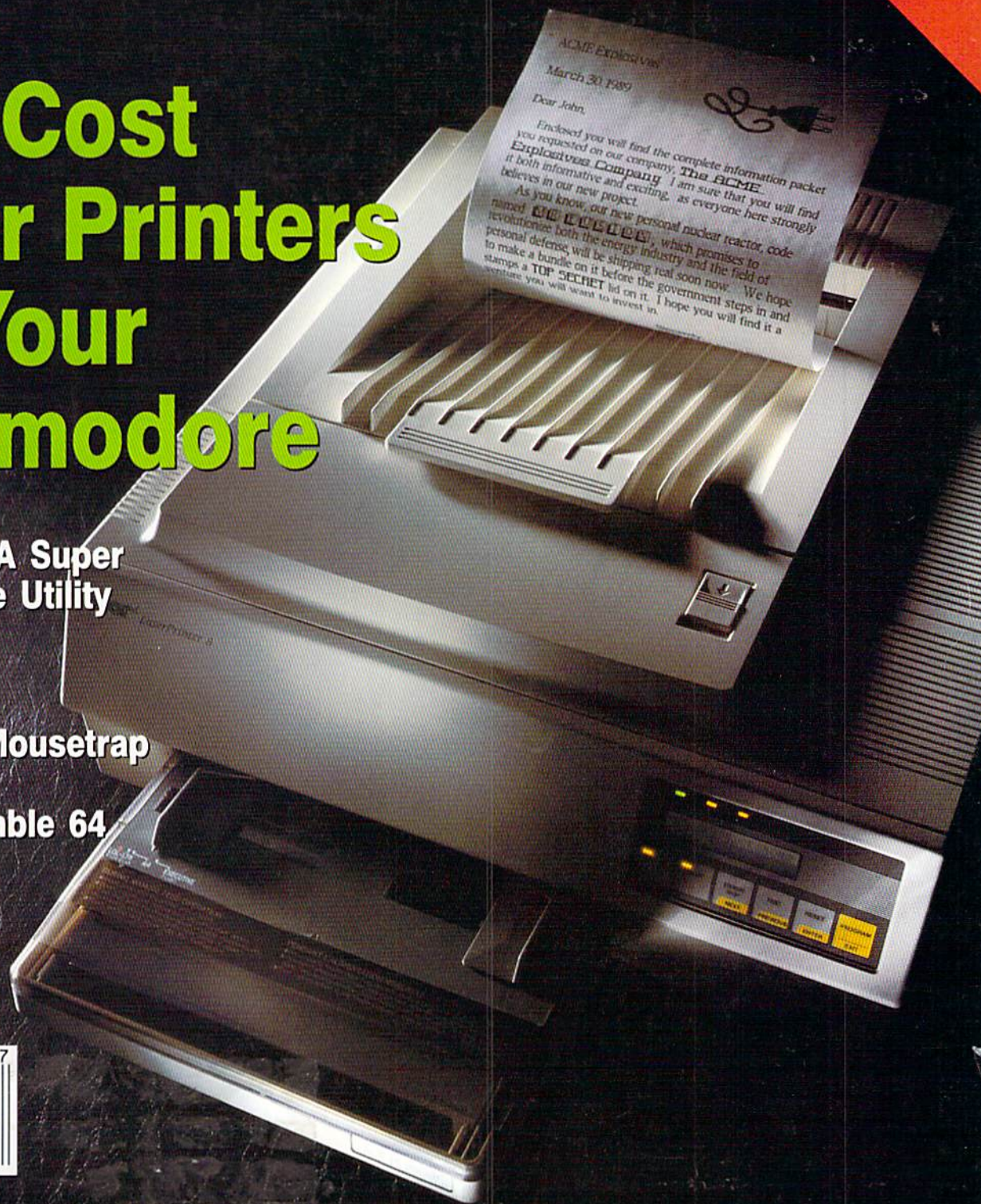
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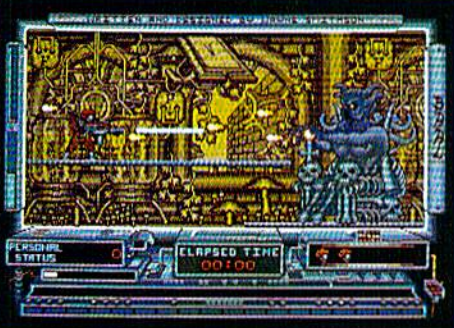
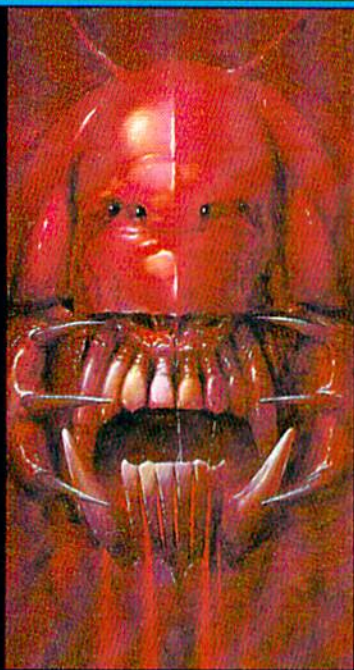
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Screen Shots from the Atari ST version
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The message is simple: co-operate or die! It's double fun and double trouble all the way in Captain Fizz, the most exciting simultaneous two-player game you and a friend are ever likely to play. It's a whole new world of split-screen, high-speed action, as both of you take on the nasty Blaster-Trons infesting the planet Icarus.

Yup, it's a tough mission alright, but you might just win out with the right blend of co-operation, courage, laser-hot reflexes, tactical sense... and brains. The action is fast and furious in Captain Fizz, but if you can't work out the right tactics you'll both be dead meat.

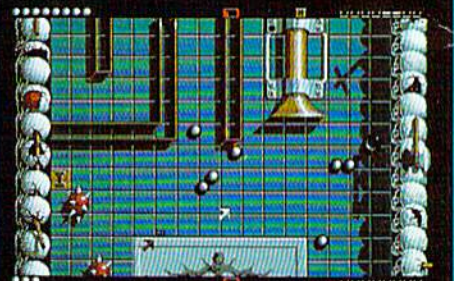
There are 22 levels of savage and relentless action to battle through before you reach your objective, the central computer that's causing the evil infestation. You'll never get there, though, unless you put your heads together and co-operate; your buddy can't do it on his own, and neither can you. This is one program where even the easy games are hard. So remember — united you stand, but divided you fall.

Warning: this game is impossible to beat on your own.

Two joysticks required for two-player game.
Screen shots taken from the Atari ST version
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Two joysticks required for two-player game
Screen Shots are from the Amiga version
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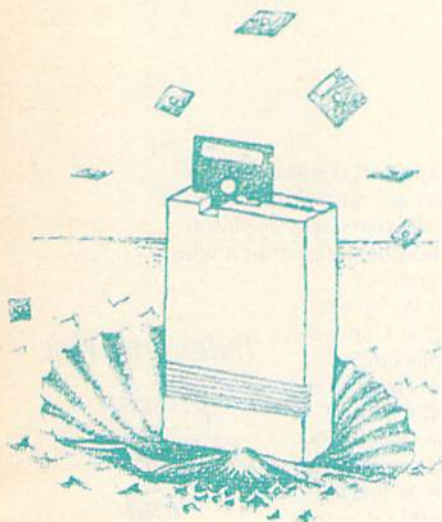
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RUNNING RUMINATIONS

The alliterative former vice-president Spiro T. Agnew once referred to some members of my generation as "nattering nabobs of negativism." This phrase, uttered almost 20 years ago, applies to some members of today's Commodore computer generation who whine about the apparent decline in the market.

Granted, the times they are a changin'. We've witnessed yet another management shakeup at Commodore, and rumors persist about new "replacement" machines coming out of Commodore. But, instead of prematurely planning for the demise of the 64/128 computers, support groups—dealers, manufacturers, user groups, magazines—should be concentrating on how they can fulfill the needs of the current market.

Instead of knocking the Commodore eight-bit market, I prefer to focus on the positive challenges that we face. There is an opportunity here for the Commodore community to rededicate itself to supporting and offering assistance to users to help them learn more about and do more with their computers.

At *RUN* during the past few months, we've noticed a dramatic increase in the number of phone calls and letters from information seekers—particularly new users—asking for sources of software and hardware and about Commodore computer use in general.

RUN recently introduced a new GEOS disk that has met with rave comments—from "It does exactly what you hope it will" to "just what the doc ordered." In the coming months, we will introduce several more disk ideas that, we hope, will breathe new life into the market.

Far from giving up on the market, we see an opportunity here to serve—through the magazine and special disk products—needs that aren't being met. As long as enough people remain interested in the 64 and 128, *RUN* remains dedicated and will continue to meet the needs of its readers. I challenge other support groups to identify needs and introduce products that serve those needs.

The Commodore market is unlike one we have ever seen. Referring to the explosive C-64 market, industry pundits said it couldn't last—that was almost five years ago! Commodore has made a name for itself over the years for quality computing at low cost. Their C-64 represents the most popular, low-end computer in the market. I see no evidence that this will change.

If the market begins to dry up, we'll know it—not from any sales statements from Commodore or speculation in the press—but from the user community. The 64/128 market is *not* over until you, the user, say so. Until the last Commodore user unplugs his power supply, there's life in the market.

The fact is that Commodore continues to churn out computers; people continue to buy them; users continue to purchase software and peripherals for their machines; and they continue to need support groups. With its large installed user base, the Commodore market won't die quickly. Its millions of users won't let it.

*Today's market
presents
challenges. . .
and
opportunities.*



Dennis Brisson
Editor-in-Chief

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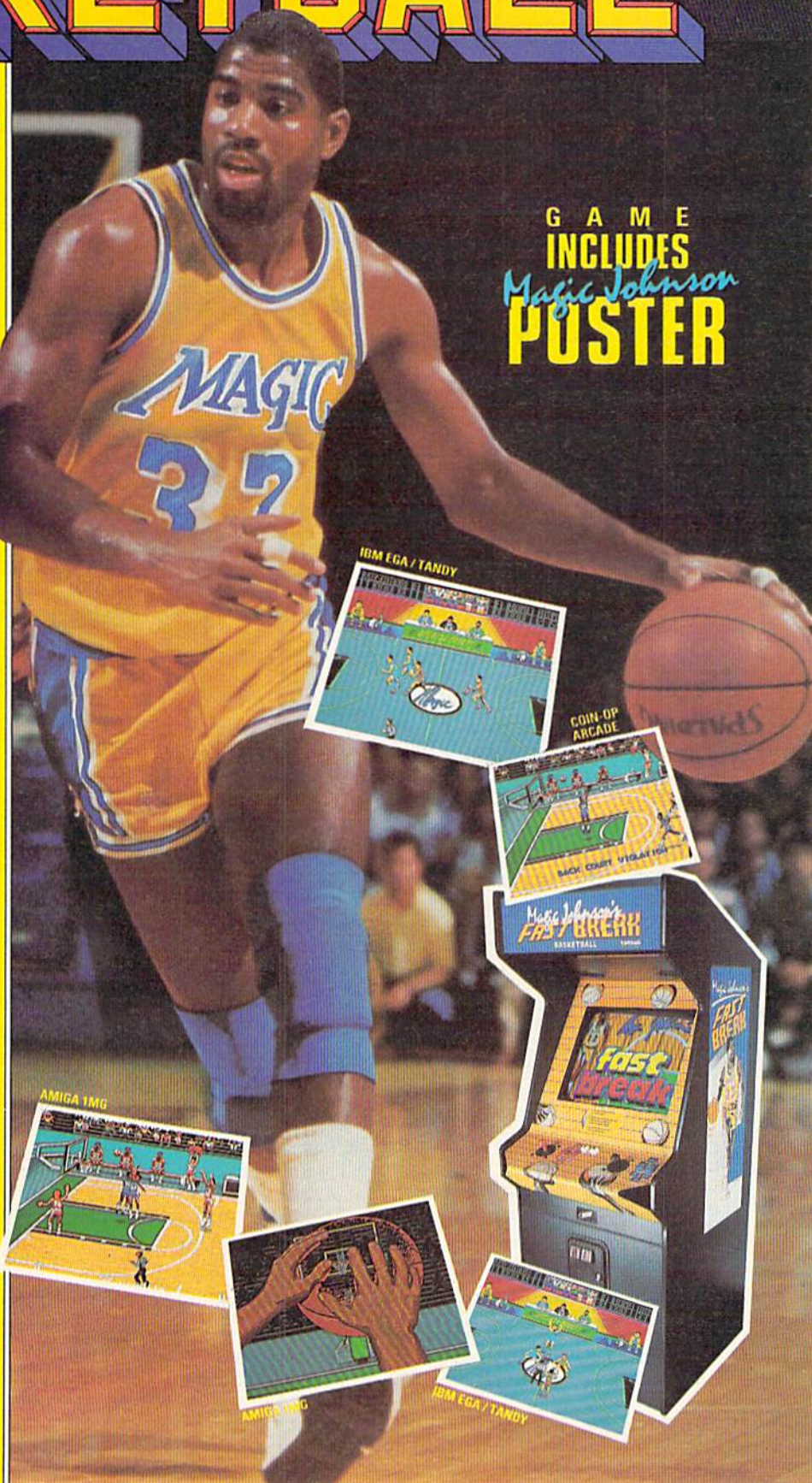
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Compiled by TIM WALSH

\$537 C-64 SPIRAL SCREEN CLEAR

In my search for different ways of clearing the C-64's screen, I wrote Spiral Clear. This interrupt-driven utility can stay in memory until you need it. Then just type in SYS 49152 in Program or Direct mode to run it. The C-64's text screen is cleared of text in a spiral motion beginning at the screen's home position. The program is fully relocatable, so you may use it with other machine language utilities.

```
Ø REM SPIRALCLEAR 64 - TONY EBERLE :REM*7
1Ø PRINTCHR$(147):SA=49152:REM RELOCATABLE :REM*17
2Ø FORI=SATOSA+177:READA:POKEI,A:CK=CK+A:N :REM*92
EXT :REM*92
3Ø IFCK<>2Ø112THENPRINT"ERROR IN DATA":STO :REM*57
P :REM*57
4Ø FOR T=1 TO 24Ø:PRINT"{CTRL 9} {CTRL Ø} :REM*63
";:NEXT :REM*63
5Ø PRINT"{CTRL Ø}{6 SPACES}SYS 49152 TO CL :REM*1Ø8
EAR SCREEN.{5 SPACES}" :REM*1Ø8
6Ø FOR T=1 TO 22Ø:PRINT"{CTRL 9} {CTRL Ø} :REM*37
";:NEXT :REM*37
7Ø DATA 162,39,142,61,3,162,Ø,142,6Ø,3,169 :REM*92
,Ø,141,62,3,169,4,141,63,3,169 :REM*92
8Ø DATA 192,141,64,3,169,7,141,65,3,162,24 :REM*112
,134,2,169,Ø,133,251,169,4,133 :REM*112
9Ø DATA 252,166,2,24Ø,16,24,165,251,1Ø5,4Ø :REM*18
,133,251,165,252,1Ø5,Ø,133,252 :REM*18
1ØØ DATA 2Ø2,2Ø8,24Ø,172,61,3,169,32,145,2 :REM*19
51,172,6Ø,3,145,251,198,2,16,212 :REM*19
11Ø DATA 48,2,2Ø8,2Ø4,16Ø,39,173,62,3,133, :REM*147
253,173,63,3,133,254,169,32,145 :REM*147
12Ø DATA 253,136,16,251,16Ø,39,173,64,3,13 :REM*53
3,253,173,65,3,133,254,169,32 :REM*53
13Ø DATA 145,253,136,16,251,24,169,4Ø,1Ø9, :REM*217
62,3,141,62,3,173,63,3,1Ø5,Ø,141 :REM*217
14Ø DATA 63,3,56,173,64,3,233,4Ø,141,64,3, :REM*72
173,65,3,233,Ø,141,65,3,16Ø,32 :REM*72
15Ø DATA 162,255,2Ø2,2Ø8,253,136,2Ø8,248,2 :REM*4
38,6Ø,3,2Ø6,61,3,173,61,3,2Ø1,26:REM*4
16Ø DATA 2Ø8,159,96 :REM*66
```

—TONY EBERLE, SANDWICH, IL

\$538 HI-SPEED SEQ FILE READER 128

My Hi-Speed Sequential File Reader for the C-128 uses a machine language routine to read a file from disk and display it on the screen. You can freeze the screen at any point with the no-

scroll key and abort the program with the run-stop key.

The program must be typed in as listed here, with no line renumbering or changes in syntax, and it must be reloaded from disk and run each time you use it.

```
Ø REM"ABCDEFGHJKLMNOPQRSTUVWXYZ" :REM*59
1 FAST:TRAP4:INPUT"FILENAME";A$:INPUT"DRIV :REM*176
E #";D :REM*176
2 IF A$>" " AND D>7 AND D<12 THEN OPEN 2,D,2,A :REM*177
$:ELSE:END :REM*177
3 FORI=7176TO7198:READA:POKEI,A:NEXT:PRINT :REM*228
CHR$(14):SYS7176 :REM*228
4 DCLEARU(D) :REM*16
5 DATA162,2,32,198,255,32,2Ø7,255,32,45,19 :REM*68
9,32 :REM*68
6 DATA225,255,24Ø,4,165,144,24Ø,241,76,231 :REM*1Ø
,255 :REM*1Ø
```

—WILLIAM COLEMAN, GREEN COVE SPRINGS, FL

\$539 ANOTHER SEQUENTIAL READER

Here's another program for reading sequential files in both 64 and 128 modes. Not only is it useful for scanning the contents of word processor files, it also helps C-128 users appreciate the greatly enhanced speed of William Coleman's Hi-Speed Reader, listed above.

```
Ø REM 64/128 SEQUENTIAL FILE READER - JOHN :REM*1Ø8
REYNOLDS :REM*1Ø8
1Ø INPUT"ENTER FILENAME";A$ :REM*191
2Ø OPEN 2,8,2,A$+"$,S,R" :REM*154
3Ø GET#2,A$:PRINTA$;:IF ST<>64 THEN 3Ø :REM*1Ø5
:REM*1Ø5
4Ø CLOSE2 :REM*45
```

—JOHN T. REYNOLDS, FORT WALTON BEACH, FL

\$53A STATIC-GUARD

Here at the *RUN* editorial offices, carpeting generates static electricity, particularly in the winter months when the air is dry. When we received one of the first 64Cs to come off the Commodore assembly lines, an editor reached for the on/off switch by feel and—zap!—a static discharge entered one of the joystick ports and fried *all* the internals. The computer was totally useless and needed repair. Now, when the user ports are not in use, we cover them with a three-inch length of electrical tape. To protect the pins from tape glue, we attach a two-inch length of paper to the glue side of the tape before affixing it to the user ports.

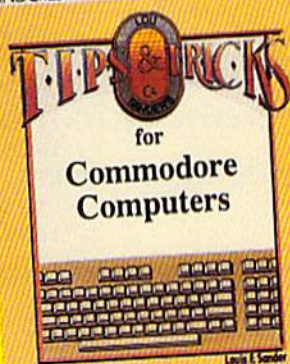
—BUZZ BJORNSEN, EDITORIAL STAFF

\$53B C-64 KEY CLICKER

Spice up your next program with my little C-64 Key Clicker ►

7 GREAT WAYS TO USE YOUR COMMODORE

WINDCREST



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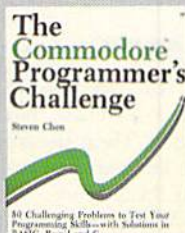
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RM69

MAGIC

program. When you run it, press any key to make the monitor emit a clicking sound. I added a latching routine to permit only one click per keypress.

```

0 REM C-64 KEY CLICKER - RYAN WEAVING
                                :REM*191
10 FORT=49152 TO 49231:READ A:POKE T,A:CK=
  CK+A:NEXT                      :REM*13
20 IF CK<>9467 THEN PRINT "ERROR IN DATA S
  TATEMENTS...":END              :REM*72
30 PRINT"KEY CLICKER ON":SYS 49152:REM*106
40 DATA 120,169,18,141,20,3,169,192,141,21
  ,3,88,169,0,141,252,3,96,172   :REM*49
50 DATA 252,3,192,0,208,21,174,197,0,224,6
  4,208,3,76,49,234,169,1,141,252 :REM*0
60 DATA 3,32,61,192,76,49,234,174,197,0,22
  4,64,208,5,169,0,141,252,3,76  :REM*22
70 DATA 49,234,169,15,141,24,212,160,0,200
  ,192,255,208,251,169,0,141,24  :REM*127
80 DATA 212,96,169              :REM*235

```

—RYAN WEAVING, MODESTO, CA

\$53C GRAPHIC MAGIC

You can design sprites on the glass of your video monitor with dry-erase markers, which you can buy at any art supply store. Then use your graphic program and mouse, joystick or keyboard to trace the graphic beneath the sketch drawn on the screen.

When you're done, wipe the drawing off the screen with a dry cloth, then add the finishing touches to the detail. You'll find that creating sprites this way is much easier and less time-consuming.

—JONATHAN LEINONEN, COVINGTON, MI

\$53D PROGRAMMING THE C-128'S ALT KEY

My program, ALT Key, peeks location 211 to detect when the ALT key is pressed. Using this program and the ALT key with a function key, or with a combination of function and shift keys, allows clever programmers to create 16 function keys.

```

0 REM PROGRAMMING THE ALT KEY - RICHARD MI
  LNE                             :REM*6
10 SCNCLR:POKE 828,183:CR$=CHR$(13):R=8:S=
  211:DIM X(144)                  :REM*171
20 SCNCLR:PRINT"PRESS ALT & FUNCTION KEYS
  SIMULTANEOUSLY"                 :REM*114
25 PRINT"PRESS {LB.} TO END"      :REM*34
30 GETKEY$:IF A$=CHR$(92) THENPRINT" ":PO
  KE 828,173:END                  :REM*16
40 T%=ASC(A$):IF T%>132 AND T%<141 GOTO 50
  :ELSE GOTO 140                  :REM*140
50 IF T%=133 AND PEEK(S)= R THEN A$="ALT/F
  1"+CR$                          :REM*10
60 IF T%=134 AND PEEK(S)= R THEN A$="ALT/F
  3"+CR$                          :REM*117
70 IF T%=135 AND PEEK(S)= R THEN A$="ALT/F
  5"+CR$                          :REM*177
80 IF T%=136 AND PEEK(S)= R THEN A$="ALT/F
  7"+CR$                          :REM*242
90 IF T%=137 AND PEEK(S)= R+1 THEN A$="SHI
  FT/ALT/F2"+CR$                  :REM*8

```

```

100 IF T%=138 AND PEEK(S)= R+1 THEN A$="SH
  IFT/ALT/F4"+CR$                 :REM*166
110 IF T%=139 AND PEEK(S)= R+1 THEN A$="SH
  IFT/ALT/F6"+CR$                 :REM*115
120 IF T%=140 AND PEEK(S)= R+1 THEN A$="SH
  IFT/ALT/F8"+CR$                 :REM*64
130 PRINT" ";CHR$(157);A$;CHR$(164);CHR$(1
  57)                             :REM*117
140 IF A$=CR$ OR RIGHT$(A$,1)=CR$ THEN X=X+
  1                               :REM*94
150 A$="":GOTO 30                 :REM*198

```

—RICHARD MILNE, GLENDALE, AZ

\$53E SNAKES ALIVE!

While experimenting with the C-128's 40-Column-mode line-drawing commands, I created a wiggling, squiggling series of lines. With a little refinement, I made an animated snake.

Snakes Alive! has the potential for various applications in C-128 games. Since it is not a sprite, it can operate independently of sprite commands. Experiment with the program to create your own customized snake.

```

0 REM C-128 SNAKES ALIVE! - KEN HUEBNER
                                :REM*130
10 L=30:R=130:T=40:B=160:XB=80:YB=100:GRAP
  HIC 3,1:DRAW 2,XB,YB            :REM*28
20 DO:IF XB>R OR XB<L OR YB<T OR YB>B THEN
  40                              :REM*109
30 DD=30:IF RND(1)<.5 THEN DD=-30 :REM*118
40 D=D+DD:IF D<0 THEN D=D+360    :REM*168
50 IF D>360 THEN D=D-360         :REM*45
60 XE=XB:YE=YB:LOCATE 7;D        :REM*177
70 XB=RDOT(0):YB=RDOT(1)         :REM*174
80 DRAW 0,X4,Y4 TO X3,Y3         :REM*70
90 DRAW 2,XE,YE TO XB,YB         :REM*154
100 X4=X3:Y4=Y3                  :REM*231
110 X3=X2:Y3=Y2                  :REM*247
120 X2=XE:Y2=YE                  :REM*9
130 LOOP                          :REM*111

```

—KEN HUEBNER, WATERTOWN, WI

\$53F COUNTERFEIT FILENAMES

Certain keyboard characters, such as the asterisk and question mark, cannot be used as parts of filenames when saving files to disk. The dollar sign, however, can be added to filenames to work with most Basic 7.0 disk commands. It can also be used in C-64 filenames, provided you place a zero and a colon in front of the filename as follows:

SAVE "0:FILENAME \$\$\$\$.8.

—RICHARD PENN, MONTREAL, QUEBEC, CANADA ■

Magic is a forum for RUN's imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to: Magic, RUN Magazine, 80 Elm St., Peterborough, NH 03458.

RUN pays \$10 to \$40 for each trick published in the column. If you'd like a copy of the latest edition of RUN's Magic Trick Writer's Guide, send your request with a self-addressed, stamped, business-size envelope; you'll receive a copy in two or three weeks.

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RUN PAINT

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NEWS AND NEW PRODUCTS

Posters, a weather database and the RUN Special Issue contest winner make this month's column hotter than July.

Compiled by HAROLD R. BJORNSEN

RUN SPECIAL ISSUE WINNER!

YORK, PA—Congratulations to **Norman Abramson** of York, Pennsylvania. He was selected as the grand prize winner in the *RUN Special Issue* giveaway contest.

When contacted, Abramson was incredulous. "I can't believe it. I've never won anything before in my life."

As the winner of the contest, Abramson will receive a complete 128D system, including a 1084 monitor, 1750 RAM expander ("Where did you get one of those?" he asked), 1581 disk drive, color printer, 1351 mouse, 1670 modem and an assortment of *RUN* productivity software. Total value is over \$1400.

Abramson, a long-time *RUN* reader and Commodore user, operates a bulletin board system with his 128D computer and also uses his system for word processing and other home applications. His six-year-old son uses his dad's system to practice his typing and spelling skills.

We extend our congratulations to the Abramson family and our appreciation to the thousands of *RUN* readers who entered the contest.

POSTER ROSTER

KUTZTOWN, PA—Free Spirit Software (PO Box 128, Kutztown, PA 19530) has released **Poster Maker 128** for the C-128. The package lets you design and print out posters of various sizes and save your creations to disk. Included is a utility for reducing the size of graphics to create clip art. A 64K video RAM upgrade, a 1351 or compatible mouse and a 1571 disk drive are required. It's available for \$29.95.

Check Reader Service number 401.

SOCK 'ER TO 'EM

HUNT VALLEY, MD—**Keith Van Eron's Pro Soccer**, a game for the C-64, follows the action from an overhead point of view. Constant vertical and horizontal scrolling ensure that the ball and the players around it never



MicroProse's Pro Soccer has a slow-motion, instant replay feature that lets you see critical moments leading up to a goal.

leave the screen. A wide variety of shots is allowed, including a "banana" shot, which curves over and around defenders, and a Pele-style backwards overhead kick.

Also, Pro Soccer includes both indoor and outdoor games. The indoor game features rebounds off the boards and gives players the opportunity to play a Major Indoor Soccer League schedule. In the outdoor game, a weather option lets you produce high winds and wet turf to create havoc for the ball footers. \$34.95. MicroProse, 120 Lakefront Drive, Hunt Valley, MD 21030.

Check Reader Service number 402.

LOOKS JUST LIKE KEENE, NEW HAMPSHIRE!

SUNNYVALE, CA—**Hometown, USA**, a creativity/learning software package from Publishing International (333 West El Camino Real, Suite 222, Sunnyvale, CA 94087) is available for the C-64. The package includes a series of plans for model buildings (houses, store, church, railway station, bakery, hotel, gazebo, bank, garage, grocery, library, gas station and theater) from a typical small American town. The buildings may be as simple or complex as the user desires, and can be designed from the software and built by hand by children and adults. When finishing assembly, the models may be used as dec-

orations for Christmas (under the tree or as ornaments), with train sets, or as gift boxes. Accessories include windows, doors, signs and store fronts. \$39.95.

Check Reader Service number 407.

PREDICT THE FUTURE

PLEASANTVILLE, NY—Sunburst Communications (Pleasantville, NY 10570) has released a C-64 database program for use in the classroom. **Climate and Weather** contains databases that provide climatic information for 62 weather stations in the United States and 72 others around the world. It also has a starter database in which students may record information about local weather. To gain an understanding of weather patterns, students assume the role of employees of a travel and relocation agency. As the "employees" answer letters from clients, they form inferences and test generalizations about world climate patterns while solving problems related to their clients' climatic needs. \$59.

Check Reader Service number 403.

FORMAT EXECUTIVE, V4.0

BRADENTON, FL—Powersoft (PO Box 7333, Bradenton, FL 34210) has released **Format Executive**, version 4.0, a format conversion program for the C-128. It allows the computer with a 1571 or 1581 disk drive to read, write and format over 150 3½- or 5¼-inch, MS-DOS, CP/M-80, CP/M-86, Commodore CP/M and Commodore DOS disk formats. The accompanying manual shows how to use the program to transfer files from other computers, such as the Commodore Amiga, Atari ST and the Apple Macintosh. Features of Format Executive include "burst" file-transfer technique; file transfers between all formats; conversion from Commodore PETASCII to true ASCII; linefeed adjustment; wild-card support; single, dual, multiple, RAM-disk and hard-drive support; and 1581 partition support. It's available for \$59.95.

Check Reader Service number 404. ■

SOFTWARE GALLERY

July reviews include the snap, crackle and pop of war games and the red, white and blue of sports simulations!

Compiled by BETH S. JALA

STAR WARS B+

May the Force Be With You

Just as Hollywood is not reluctant about borrowing from its past, software companies have also begun releasing remakes. Star Wars, an update of a 1984 Parker Brothers C-64 cartridge, is one of the first.

Both the hit film and a coin-op contest are the inspirations for the current program. In it, you assume the role of Luke Skywalker, who faces three challenges.

The first is a deep-space dogfight near the evil empire's Death Star. You must eliminate the enemy TIE fighters that defend the interstellar dreadnought, and you must also survive their barrage of deadly fireballs.

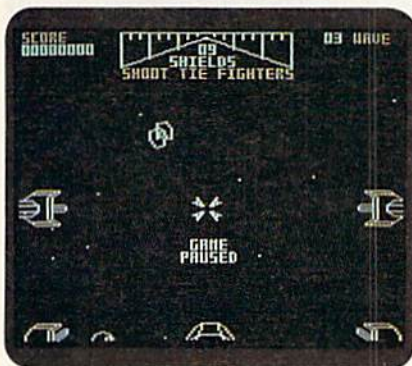
The second game sequence takes place on the Death Star's surface, which bristles with laser towers. Here you must destroy their lethal energy bolts while attempting to blast away their tops.

In the third software segment, Luke dives into the Equatorial Trench that runs across the enemy vessel. The hazards in this area are more fireballs and catwalks, which can only be avoided by precision flying. Your goal is to find and shoot the ship's exhaust port and cause the Death Star to explode. If you successfully bring about the "big bang," it's on to the next, more difficult level.

The Broderbund program is far superior to the 1984 game in a number of ways. For instance, the colorful new graphics are more spectacular, greatly enhancing the excitement. The fluid control system and the sound of the current version also surpass those of the original. Another clever addition is a sound-chip device on the box that, when pressed, plays the movie's theme.

However, no matter how much it is embellished, Star Wars still remains a product of the early 80s. And, like most space shoot-'em-ups from that period, it is basically a test of reflexes and stamina. So, players who prefer exercising their gray matter may find little of interest in Skywalker's exploits.

Nonetheless, arcade warriors who en-



Your first mission in Star Wars is to destroy the hostile TIE fighters.

joy traditional cosmic confrontations will love the new Star Wars. With its cinema, coin-op and C-64 forebears, its illustrious fast-action pedigree outshines that of any other home computer game. (Broderbund Software, Inc., 17 Paul Drive, San Rafael, CA 94903. C-64/\$29.95.)

—WALT LATOCHA
OAK PARK, IL

HOLIDAYS AND SEASONS B-

Choose Your Colors

For Christmas, Easter

And Other Special Events!

What would happen if you took a children's coloring book and transformed it into a program for the C-64? Chances are good that you'd come up with something very close to Polarware's Electric Crayon series. The Holidays and Seasons edition includes pictures for lots of holidays and "major" events.

Loading the program takes a long time, especially with a 1541 disk drive. Since the program is suggested for youngsters of age three or older, you might want to load it before children sit down at the computer, or they'll become bored before they even begin.

The operation is very simple, with movement controlled via mouse, joystick or keyboard. What you see on the screen is an outlined picture that's almost identical to what you'd find in a traditional paperback coloring book. In the lower right-hand corner are the colors from which you select one of 16 "crayons." You can also mix colors.

Anyone who has used a multi-colored drawing program is probably familiar with the Fill command. Holidays and Seasons works on the same premise: You move the pointer, which looks like a crayon, to the area you wish to color and press the button. Everything enclosed within that area becomes that color.

The mouse activates the pointer smoothly, but slowly. This is irritating to me, but younger users might find it an advantage, because it makes it easy for them to pinpoint an area to work on.

As to printouts, the program supports—and the package, to Polarware's credit, is so marked—only the Okimate 20 or Commodore 1200. Unless you own the Okimate, a color printer, you probably won't find the printing features very helpful. You can, of course, use a Commodore 1200 to print the ▶

REPORT CARD

A Superb!

An exceptional program that outshines all others.

B Good.

One of the better programs available in its category. A worthy addition to your software library.

C Average.

Lives up to its billing. No major hassles or disappointments here.

D Poor.

This program has some problems. There are better on the market.

E Failure.

Many problems; should be deep-sixed!

SOFTWARE GALLERY

pictures in black and white and then color them in by hand, but in that case a book would be considerably cheaper. I was unsuccessful in making it work with the other printers I own.

Holidays and Seasons does have a variety of options. You can print a picture alone or with a calendar. You can add a pre-programmed description to the picture or create your own message. The picture can also be printed sideways rather than vertically. Finally, you can turn the picture into a banner and include a message. (Note: The instructions warn that printing banners with an Okimate 20 will use almost an entire ribbon!) Stickers are included to enhance the final product.

Overall, Holidays and Seasons works as advertised. If you want to expose young children to computer graphics, give this program some serious consideration. If you're thinking about purchasing it for an older child or yourself, I suggest you consider one of the many



Birthdays and other events become even more special with Holidays and Seasons.

other drawing programs available, especially one with special applications that let you create and color cartoon characters. (Polarware, Inc., 1055 Paramount Parkway, Suite A, Batavia, IL 60510. C-64/\$29.95.)

—JIM GRUBBS
SPRINGFIELD, IL

JACK NICKLAUS' GREATEST EIGHTEEN HOLES OF MAJOR CHAMPIONSHIP GOLF C+

*The Golden Bear
Lends His Name
To This Sport on Disk*

Accolade has finally added golf to their list of C-64 sports simulations. However, despite a gallant effort, this



Can you compete with Jack Nicklaus on his Greatest 18 Holes of Major Championship Golf?

game doesn't live up to the standards set by other Accolade sports titles.

Greatest Eighteen lets you play on three different golf courses. The first is an imaginary course consisting of holes selected from 18 of Jack's favorite courses in the U.S. and the British Isles. The other two simulate real courses that Nicklaus actually designed—Castle Pines Golf Club at Castle Rock, Colorado, and the Golf Club at Desert Mountain, in Scottsdale, Arizona.

You can play a Skins game, where individual holes pay specific dollar amounts, or you can compete for the lowest overall score after 18 holes. Up to four players can tee off, and there are even eight different computer opponents of varying skill (including J. N. himself) who you can call upon for competition. Each player has a choice of a male or female on-screen golfer, two skill levels and three tees (Pro, Men's and Ladies'). Other options let you adjust the prize money, practice individual holes or train on the driving range.

When you play at the Expert level, Greatest Eighteen lets you choose your own club from an assortment of one driver, two woods, eight irons, two wedges and a putter. A power bar lets you control the strength of your shot and the amount of hook or slice. In addition, gauges that indicate wind speed and direction or the break of the green are displayed so that golfers can compensate.

Unfortunately, three aspects of the Greatest Eighteen make it disappointing. First, the animation of your golfer is spoiled by an inexplicable pause right in the middle of his stroke. To be honest, this is more noticeable when you're watching someone play than when you're making the shot yourself, but it is disconcerting. Second, the graphics of the fairways are unimpressive, with different areas separated by blocky, jag-

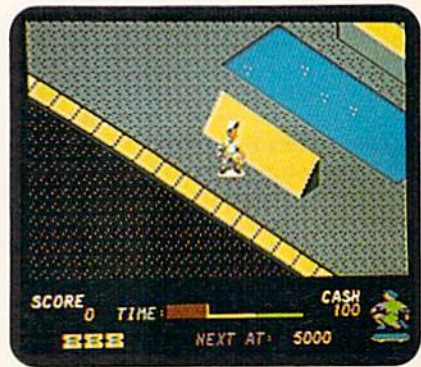
ged lines. Finally, the program includes an identification sheet printed with black ink on dark red paper. I realize that this color combination is used to prevent photocopying, but there are better ways of protecting a program, and while there are many Accolade programs I'd risk my eyesight for, Greatest Eighteen isn't one of them. (Accolade, 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128. C-64/\$29.95.)

—BOB GUERRA
SOUTH BOSTON, MA

720° B

*Outrageous Stunts
And the Hottest
Skateboarding Equipment!*

I won't be doing much skateboarding in the near future; the broken leg that



Score points and win cash with radical skateboarding moves in 720°.

I'm recuperating from guarantees that. But at least I have Mindscape's 720°, which lets me fantasize about all sorts of astounding feats on four flashing wheels.

Adapted from a coin-op program, this one-player C-64 game supports either a joystick or the keyboard and has four difficulty levels. Each begins in the Main Park, where runaway cars, disc-throwing thugs and other dangers threaten to make you eat concrete.

At the Park's edges are entrances to four events. While the slalom challenges you with an obstacle course of flags, the downhill contest is packed with twists and turns on a track built upon stilts. In the jump event, you time your take-offs to avoid water hazards and to land on bonus targets. And you strut your stuff with some amazing spins, slides and handstands on the U-shaped free-style ramp.

Performing well in the contests earns medals, points and even cash, which can be spent in shops that sell the latest equipment. With hot new boards, skates, shoes and helmets, you race faster, fly higher and recover more quickly from spills and collisions.

More important than money is your point total, which determines how far in the game you can go. Aside from doing well in the contests, you can increase your score with stunts like the incredible 720, which is four complete airborne turns. The Main Park is littered with ramps and other structures that serve as launching pads for your spectacular tricks.

Time is also vital in 720°, since there are deadlines for skating from one event to another. If you miss them, a swarm of killer bees materializes to steal one of your three lives.

However, the deadlines and bees were both accidentally omitted from the first batch of disks that the manufacturer shipped. If you bought one of these software packages and wish to receive a replacement, Mindscape will furnish one at no charge. But be advised that the corrected version is more difficult than the original.

About the only other problem with the program is the relatively long pause that occurs as each event is brought to the screen. Even with a software accelerator, these waits can be almost as long as the contests themselves.

But neither the game's graphics nor its sound can be faulted, and best of all is the excellent animation. I give it full credit for turning me into a skateboarding champ, if only through an on-screen surrogate. (Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/\$29.95.)

—WALT LATOCHA
OAK PARK, IL

CHOP 'N' DROP B-

*Everybody was
Kung-Fu Fighting!*

Mediagenic bills Chop 'n' Drop as a derivative of Karate Champ, a popular Data East title from the mid-1980s. Both programs share a number of characteristics: similar control systems and methods of assigning points; use of bonus challenges and the 30-second clock; and the presence of an on-screen referee. Chop 'n' Drop, however, is no clone of its older cousin. In most ways, it is a definite improvement over the original.

In this game, you can battle two computer opponents simultaneously; or, you and a friend can go against each other and a computer foe. When one person dies, the computer takes his or her place. In that way, the survivor continues battling two others, which makes Chop 'n' Drop more complex, interesting and enjoyable than Karate Champ.

In both games, 16 possible actions can be accessed via joystick input. A variety of kicks and punches are the primary attack movements. My favorite offensive ploy—the head butt—is only available in Chop 'n' Drop. Also, joystick response is quicker and more accurate in the newer game.



Employing a variety of karate kicks and punches helps you move into the black belt ranks in Chop 'n' Drop.

Sixteen possible options might be a dozen too many for the average player to remember, however. Using the same handful of offensive moves might prove effective in lower levels, but survival becomes problematic for the novice warrior when opponents begin employing sophisticated move combinations.

Winning a combat round requires making a certain number of hits. If you can achieve these before the allotted 30 seconds run out, you're awarded bonus points. You're eliminated if you're not in second place when an enemy wins the round, no matter how well you did in previous levels.

Every third level is a bonus round, where you're given a shield that deflects bouncing balls coming from both directions, but what this activity has to do with karate is beyond me. Furthermore, it's nearly as difficult and even more frustrating than the main challenge.

Chop 'n' Drop comes close to being arcade quality because of its sharply etched figures, graceful and fluid animation and realistic sound effects. Unlike Karate Champ, which offered different graphic scenes from level to level, Chop 'n' Drop's background re-

mains the same. Successfully completing new levels is not as much fun without this incentive.

By way of compensation, a player can move all the way up the ranks from white to black belt by scoring certain numbers of points. High scores and rankings, unfortunately, can't be saved to disk. Your adversaries gain in skill over the course of the game's 25 levels, so it's difficult to accumulate points and stay alive. A record of your successes and the ability to restart the game at the most recently attained level would make this game more appealing.

Chop 'n' Drop offers nothing revolutionary in game play; however, for fans of martial arts contests, it should prove a worthy diversion. (Activision; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/\$29.95.)

—LEN POGGIALI
SYRACUSE, NY

DOUBLE DRAGON C+

*Commodore
Kung-Fu Combat*

This translation of a very popular coin-op doesn't differ much from the multitude of martial arts simulations that preceded it. The idea behind most of them is simple: kick butt or get kicked.

Double Dragon's main distinction is that it can be played simultaneously with a friend. In that respect, it's definitely an improvement over the others.

The story line is rather unexceptional. The premise is that Billy Lee, and his twin brother Jimmy, must find Billy's girlfriend, who has been kidnapped by a local street gang. They must first defeat, through hand-to-hand combat, the gang members who are determined to stop them from searching the city.

The search takes place on a monitor screen that scrolls horizontally from one part of the city to the next. Billy and Jimmy can't run away from trouble because the screen won't scroll until all opponents on it are defeated. They can, however, circle around it. The brothers can move up, down, left or right or jump in one of three directions. This is an improvement over some martial arts games where the protagonists can only move left or right.

But, since all of the movements and fighting techniques are controlled by joystick, there are fewer fighting techniques to choose from than some other

martial arts games. Billy and Jimmy are supposed to have six techniques to choose from, but no matter how hard I tried, I couldn't get either of them to throw a whirlwind kick.

Other than that, joystick response is fairly good. It's easy to throw a kick, punch or head butt. It's not as easy, however, to see exactly what technique worked, because the animation and graphics are not particularly good.

Although the foes change and their weapons vary, it seems as though the same fighting techniques are effective on all opponents. Yet the twins take so much punishment that it's difficult to advance beyond the first one or two of five possible city-street scenarios.

Unfortunately, there's no provision in Double Dragon for beginning a new game where the old one ended. I think it's about time software designers started making that option standard in all coin-op translations. It is, after all, one way in which the home version could be better than the arcade original. Another option that's lacking and should be standard fare is the ability to save high scores to disk as a permanent record.

On the plus side, like most good arcade translations, Double Dragon is simple enough to begin playing right away, yet challenging enough to make you come back for more. You always think you can do better than the last time, and it's nice not to have to sink any quarters into a coin box to prove yourself wrong. (*Arcadia*; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/\$34.99.)

—SCOTT WASSER
WILKES-BARRE, PA

CONTRA A+

This game is not a political statement about the situation in Central America. It's a science-fiction battle in which you become a commando who desperately strives against the Red Falcon. You attack this cruel alien at his jungle base, where there are three-dimensional mazes, underground security systems and tropical forests surrounded by giant waterfalls and cannons from another world. Unless you survive these killing zones and vanquish the vile war monger, his hordes of ruthless soldiers will swarm forth to conquer the globe with extraterrestrial weapons.

You begin with a rifle and three lives. You earn more powerful armament by shooting and capturing falcon symbols, which hold lasers, force fields and other

power-ups. You gain an additional life whenever you blast your way through one of the game's defense perimeters.

Although it has a two-player option, Contra is most suitable for one-person play. Fortunately, Konami's programmers included a pause button, which lets you rest—and you'll need it! Contra creates a level of excitement that's both exhilarating and tiring, with each of the game's components contributing to an atmosphere of desperate warfare.

The graphics are excellent, beautifully depicting both the primitive and the futuristic hazards you face. The pounding beat of the background music spurs you on to a frenzied pace. Most compelling is the game's animation: figures and projectiles constantly burst out from both sides of the screen and force you to match their energy level just to survive.

While arcade players will enjoy making the tactical decisions that Contra demands, they'll be absolutely ecstatic over the thrills it provides. The nonstop action of the program makes it the finest current example of shoot-and-run games for the C-64. (*Konami, 815 Mittel Drive, Wood Dale, IL 60191. C-64/\$29.95.*)

—WALT LATOCHA

PURPLE HEART B

The top brass wants you to go on a secret mission. If you don't accept, you'll miss out on the danger!

Originality is somewhat lacking in this game, unless the idea of picking up weapons, shooting at different fire powers, surging through enemy lines and winding your way into various encampments seems new to you. Nevertheless, there are some novel touches, such as a "blanket" bomb, with its radiation whirling in different directions on the screen, or the way your soldier pulsates when hit.

Animation, in the form of crackling bullets, roving enemy fighters, sprinkling explosions, speeding tanks and colorful fireworks is smooth. The graphics deserve extra praise. If you like crisp detail, you'll enjoy the orange, flashing fire gushing out of your flamethrower; enemy soldiers collapsing to the ground like puppets; and concrete buildings, futuristic hardware and intricate gadgets.

A few of Purple Heart's antics seemed decidedly arbitrary. Sometimes, a single bullet wiped me out; at other times, I received a constant hammering without slowing down. I haven't figured out if

this was just random madness, or perhaps the program honestly kept track of my energy-levels and responded accordingly.

Enemy movement patterns are repeated over and over, so each time you boot the program, you know what to expect. I know this happens in most arcade games, but it doesn't necessarily make playing any easier.

Think of it as inspired chaos. All in all, Purple Heart is a pleasurable playing experience. (*Scorpion, 19 Harbor Drive, Lake Hopatcong, NJ 07849. C-64/\$29.95.*)

—JOHN DIPRETE

VICTORY ROAD B+

You'll need sharp reflexes when you play this sequel to Ikari Warriors. Victory Road has five phases, and your goal is to complete each one before going on to the next. As you move, the terrain scrolls downward and various structures appear that force you to take detours.

Movement is via joystick: You must dodge or destroy vile things like Winged Man-Beasts, Yellow Crabs, Trolls and Green Gremlins who come scurrying, and possibly even shooting, at you.

You start out with a total of four lives. When you die, your figure shimmers eerily, and you resume your new life in the same spot. You can gain extra lives by earning points. Losing all your lives means that you will have to begin again at phase one.

Now and then, you come across human corpses in your path. If you step on one, you get a nifty flamethrower, which you're allowed to keep until you die—then it's back to shooting bullets. I found that I preferred using a flamethrower even to getting a new life, because my gun and grenades couldn't hold a candle to the heat weapon's billowy destruction. Your enemies won't be able to cope with its frothy, boiling globs of energy.

When you walk on a lightning-bolt symbol, a blaze of light erupts that electrocutes all nearby pursuers. Melting monsters this way is fun, but remember to keep moving!

As you travel, pulsating noises split the air. The program's music is worthy of an award.

Enjoying Victory Road isn't just a phase you go through: it's a way of . . . death. (*Data East USA, Inc., 470 Needles Drive, San Jose, CA 95112. C-64/\$29.95.*)

—JOHN DIPRETE ■

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MAIL RUN

More kudos for RUN Paint and concerns about Commodore's support of educational software.

A GLARING PROBLEM

Your article, "R for Healthy Computing" (April 1989), was most interesting. However, I'd like to comment on the cover illustration, which shows the desk near a window and the monitor screen aimed directly at the operator's eyes.

My desk is arranged similarly, and the glare makes it difficult to see the screen clearly. To solve the problem, I tilted the monitor down to reflect the glare below eye level.

—JOHN T. LIVINGSTON
WEST PALM BEACH

METHINKS THOU DOST PROTEST TOO MUCH

I agree with Josh Jacoby's letter ("Much Ado About Nothing," Mail RUN, March 1989) concerning the cost of using QuantumLink's telecommunications service. I live in Canada near the U.S. border and closer to Q-Link than most Canadians and Americans. One hour on Q-Link costs \$9.95 per month, 15 cents per minute, and eight cents per minute "Plus" time. There are no "free hour" or "bonus month" reductions in Canada.

And it amuses me that Mr. Dougherty of Berkeley Softworks, publishers of GEOS, suggests that any GEOS questions can be answered by contacting Q-Link. That solution is more expensive than the program itself.

—WILLIAM MITCHELL
STONEY CREEK, ONTARIO,
CANADA

A LONE STAR FOR COMMODORE

I'm an English teacher who supported the C-64 for education. My school district decided, however, to go with the Apple computer because of lack of educational support from Commodore, which has now lost this market to Apple. If Commodore had pushed C-64s, they'd now be in a position to push Amigas. Instead, they failed miserably while Apple was there, ready to go.

At a computer education conference, I told a gentleman that I was interested in educational software for the C-64. He literally threw an old copy of lesson-drill programs on the table and stated that "this is about all that is left of software for the C-64—if it's still available!"

Apple has not let us down or abandoned us, but Commodore can't make the same claim. No one believes that Commodore is serious or competitive in the education market.

—DOROTHY HEMME
SUGARLAND, TX

See last month's article, "Truant No Longer?," which reports on Commodore's revived efforts to support the education market.

—EDITORS

POSEIDON ADVENTURE

I enjoyed the letter from Major Keith H. Hodges ("Servicing Our Soldiers," Mail RUN, April 1989) regarding mail order businesses and their dealings with the servicemen and women, particularly overseas. Poseidon Electronics (103 Waverly Place, New York, NY 10011), a CP/M-only mail order house, has been dealing with APO/FPO accounts for years.

To answer the Major point by point:

1. Our phone number is a non-800 number (212-777-9515).

- 2 and 3. One of three people is manning the phone at all times. If the information requested requires special assistance not immediately available, we will write back or call within 24 hours.

4. If you're already a client, we have your name and zip code on our database for quick identification.

5. All postal charges to APO/FPO are first class.

6. We don't service credit cards, but we do accept checks and money orders, which are immediately honored. Orders are shipped within 24 hours.

7. Return a defective disk along with a description of the problem. We'll either refund the cost (minus ship-

ping) or send a reduplicated disk at no charge.

8. We do not advertise. We depend on mention in computer magazines, BBSs and word of mouth.

—RALPH S. LEES, JR., PRESIDENT
POSEIDON ELECTRONICS
NEW YORK, NY

FUN PAINT

Your RUN Paint program (March 1989) deserves praise and plaudits from readers. The program puts you in front of other Commodore publications because of your willingness to go over the "magazine length" barrier. Congratulations on meeting highest reader expectations.

—JOHN LOCKE
CENTRAL POINT, OR

RUN Paint is a fantastic program. I own several paint-and-draw programs, but never have I seen a program like yours. It's comparable to KoalaPaint and more user-friendly than OCP Art Studio. I also want to congratulate programmer Robert Rockefeller for his magnificent program.

—MANUEL MARTINEZ
SPRING HILL, FL

WHAT A DELIGHT-FUL IDEA!

The Fontastic 64 program (RUN, April 1988) will give the paint-and-draw program, RUN Paint, nine more fonts. Just rename a Fontastic font program to the RUN Paint font format (e.g., change COMPUFONT to RPE.COMPUFONT).

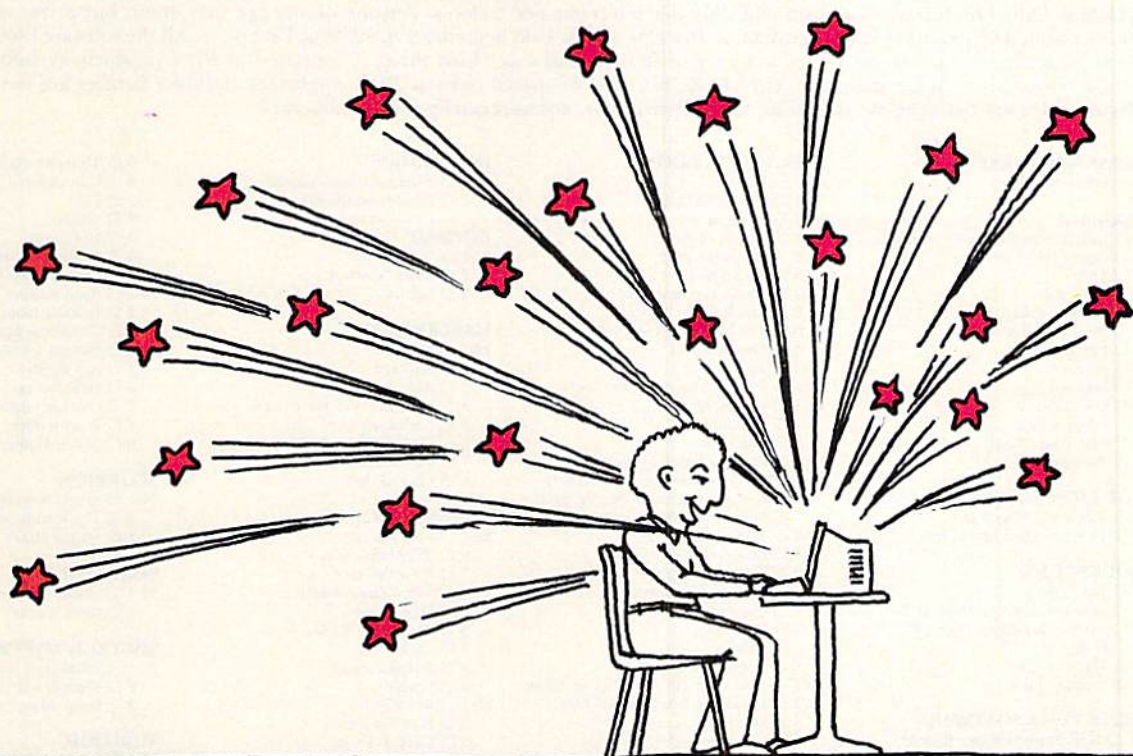
—SHANE HILL
DELIGHT, AR

A CALL TO READERS

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

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YOU COULD WIN ALL OF THE SOFTWARE LISTED ON THIS PAGE

WELCOME TO RUN'S SECOND ANNUAL READER CHOICE CONTEST. This is an opportunity for you—the reader—to vote for your favorite entertainment software developed over this past year. You must choose from among almost 200 entries.

The rules for this contest are simple. You select your five favorite games from the ballot listed below. Tear out the entire ballot and send it in. That's all there is to it! Be sure to include your name and address to be eligible for our drawing. We will select one lucky RUN reader as the winner of a fabulous grand prize—all of the game software listed on the ballot!

To enter, simply choose your five top games from the list below and send in your selections before August 10, 1989. There will be ten prize winners in all. The winners, as well as the results of the voting, will be published in the December 1989 issue of RUN.

RULES: ▶ Only one ballot per person and only five selections per ballot. ▶ Anyone of any age may enter, but prizes won by a minor must be claimed by parent or legal guardian. ▶ Drawing will be held September 8, 1989. ▶ First prize: All the software listed on the ballot, subject to availability. ▶ Second prize: A library of ReRUN disks. ▶ Third prize: A collection of RUN productivity software. ▶ Fourth through tenth prizes: Subscriptions to RUN, ReRUN or RUN's special disks. ▶ RUN employees and their families are not eligible. Software titles are listed below according to the distributor, not necessarily the manufacturer.

ACCESS SOFTWARE

- 5-1 ☐ Heavy Metal

ACCOLADE

- 6-1 ☐ Jack Nicklaus' Greatest 18 Holes
2 ☐ Grand Prix Circuit
3 ☐ TKO
4 ☐ Rack 'Em
5 ☐ Serve & Volley
6 ☐ Steel Thunder
7 ☐ Fast Break
7-1 ☐ Jet Boys
2 ☐ Bubble Ghost
3 ☐ Card Sharks
4 ☐ Power at Sea
5 ☐ The Train: Escape to Normandy
6 ☐ Plasmatron

BLUE LION SOFTWARE

- 8-1 ☐ Ticket to Hollywood
2 ☐ Ticket to Washington, D.C.

BRODERBUND

- 9-1 ☐ Star Wars
2 ☐ Arcade Game Construction Kit
3 ☐ Carmen Sandiego—Europe
4 ☐ Ultima V
5 ☐ Times of Lore
6 ☐ Tangled Tales

BUENA VISTA SOFTWARE

- 10-1 ☐ Who Framed Roger Rabbit?

CALIFORNIA DREAMS

- 11-1 ☐ Vegas Craps
2 ☐ Vegas Gambler
3 ☐ Club Backgammon
4 ☐ TrianGO
5 ☐ Mancala

CINEMAWARE

- 12-1 ☐ The Three Stooges
2 ☐ Rocket Ranger
3 ☐ Sinbad: Throne of the Falcon

COSMI

- 13-1 ☐ Triple Crown Challenge
2 ☐ The President is Missing
3 ☐ Chernobyl
4 ☐ NavCom 6
5 ☐ Grand Slam Baseball
6 ☐ Navy Seal
7 ☐ Chomp!

DATAEAST

- 14-1 ☐ Ikari Warriors
2 ☐ Victory Road
3 ☐ Platoon
4 ☐ Speed Buggy
5 ☐ Q*bert
6 ☐ TNK III
7 ☐ Kid Niki
8 ☐ RoboCop
9 ☐ Karnov

DIGITEK

- 15-1 ☐ Vampire's Empire
2 ☐ Western Games
3 ☐ Miniature Golf

DISCOVERY SOFTWARE

- 16-1 ☐ Zoom!

ELECTRONIC ARTS

- 17-1 ☐ Lancelot
2 ☐ Time and Magic
3 ☐ Firezone
4 ☐ Annals of Rome
5 ☐ Borodino 1812
6 ☐ BattleDroidz
7 ☐ Global Commander
8 ☐ The Rubicon Alliance
9 ☐ The Hunt for Red October
0 ☐ Cosmic Relief
x ☐ Tobruk
y ☐ Alternate Reality: The City
18-1 ☐ Double Dragon
2 ☐ Rockford
3 ☐ Roadwars
4 ☐ Battles of the Civil War: Vol. I
5 ☐ Battles of the Civil War: Vol. II
6 ☐ Rommel Battles for North Africa
7 ☐ MacArthur's War
8 ☐ Pool of Radiance
19-1 ☐ First Over Germany
2 ☐ Typhoon of Steel
3 ☐ Battles of Napoleon
4 ☐ Questron II
5 ☐ Overrun
6 ☐ Hillsfar
7 ☐ Demon's Winter
20-1 ☐ Powerplay Hockey: USA vs. USSR
2 ☐ Jordan vs. Bird: One on One
3 ☐ Deathlord
4 ☐ Caveman Ugh-Lympics
5 ☐ Modem Wars
6 ☐ Mars Saga
7 ☐ Bard's Tale III
8 ☐ Project Firestart
9 ☐ Patton vs. Rommel
0 ☐ Wasteland

- 20-1 ☐ Powerplay Hockey: USA vs. USSR
2 ☐ Jordan vs. Bird: One on One
3 ☐ Deathlord
4 ☐ Caveman Ugh-Lympics
5 ☐ Modem Wars
6 ☐ Mars Saga
7 ☐ Bard's Tale III
8 ☐ Project Firestart
9 ☐ Patton vs. Rommel
0 ☐ Wasteland

EPYX

- 21-1 ☐ Mind-Roll
2 ☐ Technocop
3 ☐ The Legend of Blacksilver
4 ☐ Street Sports Football
5 ☐ Dive Bomber
6 ☐ L.A. Crackdown
7 ☐ Battleship
8 ☐ Space Station Oblivion
9 ☐ The Games—Winter Edition
22-1 ☐ The Games—Summer Edition
2 ☐ Tower Toppler
3 ☐ Metrocross
4 ☐ Sports-a-Roni
5 ☐ Final Assault
6 ☐ Street Sports Soccer
7 ☐ 4x4 Off-Road Racing
8 ☐ Impossible Mission II
9 ☐ Sporting News Baseball

FIRST ROW SOFTWARE

- 23-1 ☐ Star Empire
2 ☐ The Honeymooners

GAMETEK

- 24-1 ☐ Double Dare
2 ☐ Hollywood Squares

HI-TECH EXPRESSIONS

- 25-1 ☐ Matterhorn Screamer
2 ☐ Chase on Tom Sawyer's Island
3 ☐ Win, Lose or Draw

INTRACORP

- 26-1 ☐ Ultimate Casino Gambling
2 ☐ Murder on the Atlantic

KONAMI

- 27-1 ☐ Boot Camp
2 ☐ Rush 'N Attack
3 ☐ Contra

MASTERTRONIC

- 28-1 ☐ Monopoly
2 ☐ Scrabble
3 ☐ Risk
4 ☐ John Elway's Quarterback
5 ☐ Barbarian
6 ☐ Skate Crazy
7 ☐ Raw Recruit
8 ☐ CA Pro Golf

MEDIAGENIC

- 29-1 ☐ F-18 Hornet
2 ☐ Zak McKracken
3 ☐ Neuromancer
4 ☐ Faery Tale Adventure
5 ☐ MainFrame
6 ☐ Black Jack Academy
7 ☐ Corruption
8 ☐ Enlightenment
9 ☐ Jinxter
30-1 ☐ BattleTech
2 ☐ F-14 Tomcat
3 ☐ Chop & Drop
4 ☐ Take Down
5 ☐ USS Ocean Ranger
6 ☐ Rampage
7 ☐ Predator
8 ☐ Star Rank Boxing II
9 ☐ Last Ninja 2

MICROPROSE

- 31-1 ☐ Keith Van Eron's Pro Soccer
2 ☐ Pure-Stat Football
3 ☐ Red Storm Rising
4 ☐ Master Ninja

MINDSCAPE

- 32-1 ☐ Aussie Joker Poker
2 ☐ Out Run
3 ☐ Alien Syndrome
4 ☐ Space Harrier

5 ☐ Thunder Blade

- 6 ☐ International Team Sports
7 ☐ 720°
8 ☐ Willow
9 ☐ Uninvited
0 ☐ Winter Challenge
x ☐ Captain Blood
33-1 ☐ Road Runner
2 ☐ Indiana Jones
3 ☐ Clubhouse Sports
4 ☐ Harrier Combat Simulator
5 ☐ Blockbuster
6 ☐ MISL Soccer
7 ☐ Combat Course
8 ☐ Road Raider
9 ☐ Action Fighter

SCORPION

- 34-1 ☐ Alien Destruction Set
2 ☐ The Android Files
3 ☐ Purple Heart

SHAREDATA

- 35-1 ☐ Classic Concentration
2 ☐ Card Sharks

SIR-TECH SOFTWARE

- 36-1 ☐ Wizardry I
2 ☐ Wizardry II
3 ☐ Deep Space

SUBLOGIC

- 37-1 ☐ Stealth Mission

SPECTRUM HOLOBYTE

- 38-1 ☐ Zig-Zag
2 ☐ Tetris
3 ☐ Soko-Ban

TAITO

- 39-1 ☐ Operation Wolf
2 ☐ Alcon
3 ☐ Arkanoid
4 ☐ Bubble Bobble
5 ☐ Rastan
6 ☐ Renegade
7 ☐ Sky Shark

THREE-SIXTY

- 40-1 ☐ Dark Castle

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A DYNAMITE COMBO!

Laser printers and your Commodore computer—an exciting and relatively inexpensive partnership that blows conventional printing out of the water.



BOTH HOME AND SMALL-BUSINESS users of the C-64 and C-128 are aware of the power and versatility these amazing low-cost computers offer. However, the smooth and efficient operation of your computer is in some cases less important than the appearance of the final printed output. There may well have been times when you've found yourself envious of the high-quality documents more expensive personal computers produce with laser printers, and you've wished your Commodore could do the same. Well, you

should know that there's no reason why it can't!

Practically speaking, I don't recommend buying a \$6000-\$7000 PostScript printer to use with your \$100 C-64, but it's possible to purchase a laser printer for a lot less money. Hewlett-Packard (H-P) LaserJet compatibles (the type of laser printer most widely used) can be had for \$2000 to \$3000, depending on where you buy them. Some models are much cheaper (see sidebar). While still a lot of money, this is within the reach of most small or home businesses. ►

By LOU WALLACE

HIGH-RESOLUTION IS THE SECRET

The reason a laser printer produces such impressive output is the dot resolution it's capable of using. While still basically a dot matrix printer, it can generate output—text or graphics—with resolutions from as low as 75 dots per inch (dpi) to as high as 300, thus allowing fonts of higher resolution and graphics far sharper in appearance.

It takes a lot of RAM to generate these high-resolution images, and just about all laser printers come with a considerable amount built in, with the option of adding more. Because Commodores are limited to relatively small amounts of RAM for text and pictures (64–640K), it isn't really necessary to add more to your laser printer. In my experience, 512K to 1MB has usually been enough.

To connect a laser printer to your C-64 or C-128, all you need is a standard Centronics printer interface, the same type you'd use for any non-Commodore printer.

THE CRUCIAL QUESTION

The key question isn't the physical connection between the printer and computer, but one of software compatibility. If you're seriously thinking about getting a laser printer, the first question you should ask is whether it'll work with your software. If the answer to that is yes, then go for it. But if the answer is no, you'll need to add to your total investment the cost of buying the necessary software.

If you're skeptical as to whether there's *any* currently available C-64 or 128 software that's designed to be used with a laser printer, you might be surprised to find that the answer is a definite yes!

WORD PROCESSING

Since word processing is just about the most common application in personal computing, we'll start with that. First, although few word processors in the C-64 or 128 market come already set up for H-P (or compatible) laser printers, many of them do allow you to create special printer-command sequences for customizing your word processor to

your printer. In preparing this article, I used *RUN*'s own *RUN Script* word processor, which has the ability to use printer macro commands that are created by a separate program called *Define Macros*, which is in the January 1987 issue of *RUN* (page 70) and can be downloaded from QuantumLink.

To take advantage of the features of your laser printer, you'll have to do some homework, looking up in the printer's manual the control sequences for a function and then instructing your word processor to use them. For example, to turn on Bold mode, you'd need to send the five values 27, 40, 115, 5 and 66 to your printer, and to turn it back off, you'd send 27, 40, 115, 0 and 66. (Of course, these numbers must be in the form of a printer-control sequence—not just embedded in the document.)

You can also generate other text-styling commands, such as italics or underlining. Even more exciting, laser printers usually come with several built-in fonts (more can be added via plug-in cartridges or downloaded by proper software), and you can generate printer macro commands to switch back and forth between them, mixing different fonts, character sizes and styles on the same page.

As I mentioned, our *RUN Script* works very well with the laser printers, but will *your* word processor work as well? Other programs with the printer macro feature include PaperClip III, Pocket Writer 2, VizaWrite, Superscript and The Write Stuff. To determine if others will work, look in the documentation for the word processor and see if it supports embedded printer-control sequences. Also, the word processor should have the option of outputting true ASCII, not just Commodore ASCII.

GEOS

Since many Commodore owners use GEOS, it was natural to check for H-P laser compatibility in using GEOS applications. Berkeley Softworks wisely created a system of using installable printer drivers for their bit-mapped operating system. With the GEOS package comes a wide variety of printer drivers, including one for the H-P LaserJet.

To test it, I created a letter with geoWrite (GEOS 2.0) and,

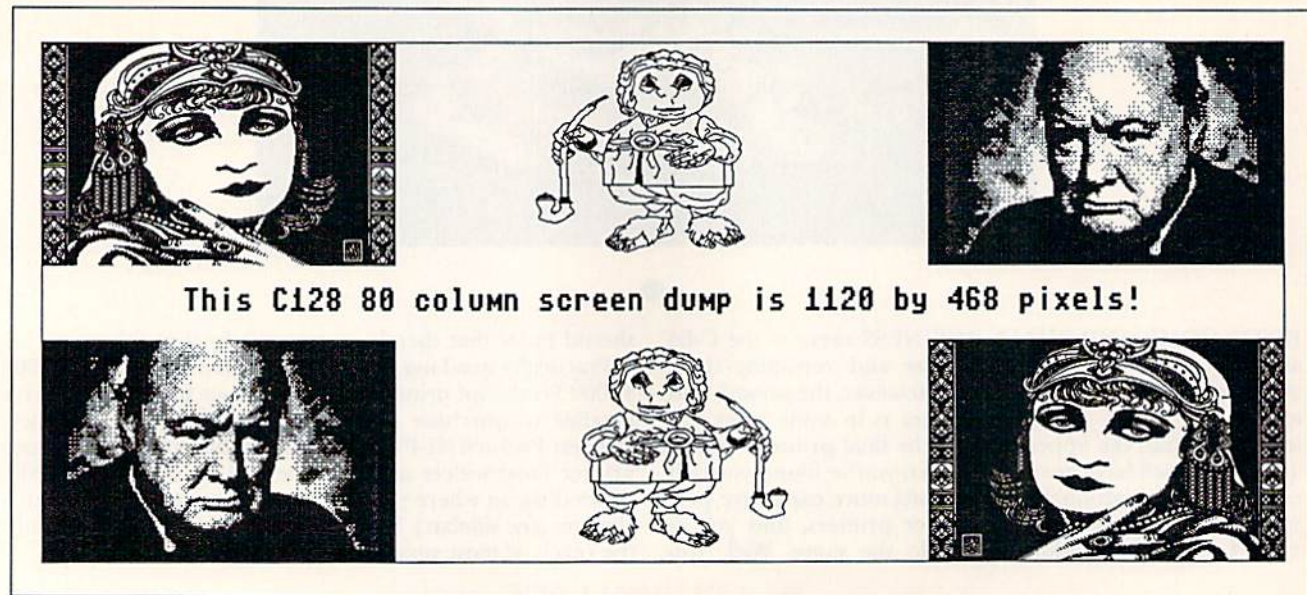


Figure 1. Graphics images produced with the Star LaserPrinter 8.

using a paint driver, converted the word processor output to geoPaint, where I added graphics. With the LaserJet printer driver installed, I was easily able to output a beautiful GEOS document on all three of the laser printers I tested.

When you select the Print option in a GEOS application, the GEOS laser driver asks you what dpi setting you want, within the range of 75 to 300. Normally, you'd use 75 dpi, which generates output properly sized to a geoPaint/geoWrite page, but there may be times when higher densities are useful. For example, you can print a full-page geoPaint drawing at 300 dpi, which shrinks it to about one-eighth of its normal size. This is a great way of making high-quality, camera-ready art.

C-128 GRAPHICS

For C-128 80-column graphics users, Basic 8 (distributed by Free Spirit Software) also uses installable printer drivers

and offers H-P LaserJet compatibility in its OkiLaser printer driver. Basic 8 allows you to generate custom graphics screens from 640 to 2540 dots wide, and it also supports the full range of dot densities offered by the laser.

While Basic 8 is a Basic programming language, user applications written in it can take full advantage of any H-P-compatible laser printer. And, because it allows very high-resolution graphics screens, Basic 8 makes it possible to generate and print graphics images that reach the full 300-dpi mode of the laser printer.

PRINTERS

To find out just how well a Commodore computer would work with these printers, we asked several manufacturers of low- to medium-cost laser printers to send in evaluation units. The three companies that responded were Brother Industries, Tandy Corporation and Star Micronics, sending ▶

Dear John,

Enclosed you will find the complete information packet you requested on our company, **The ACME Explosives Company**. I am sure that you will find it both informative and exciting, as everyone here strongly believes in our new project.

As you know, our new personal nuclear reactor, code named **MR FUSION**, which promises to

Figure 2. Beginning of a letter printed with the Tandy LP 1000.

RUN

THE COMMODORE 64/128 USER'S GUIDE

TO: *Developers of Commodore game software*
FROM: *RUN Magazine*
RE: *RUN's Reader Choice*

Once again, it's time for RUN's reader choice awards, which, this year, will be devoted exclusively to games software. Readers will be encouraged to cast their ballots for their five favorite games released within the last year.

Figure 3. One of the fonts available with the Brother HL-8.

us their HL-8, LP 1000 and LaserPrinter 8, respectively. I put each of these printers through various tests and found that all were indeed compatible with the H-P.

Basically, the output they generated was very similar, with the biggest difference being in the Text modes. This is mainly

due to the fact that each printer comes with a different assortment and number of built-in fonts. (Since adding additional fonts beyond those supplied will cost you more money, I advise buying a printer with as many fonts as possible.)



BROTHER HL-8



TANDY LP 1000



STAR LASERPRINTER 8

The Brother HL-8 is very similar to the H-P LaserJet II. Fully compatible, it comes with 30 fonts and a minimum of 1 MB of RAM. There are two font-cartridge slots, so you can add more fonts by purchasing standard H-P font cartridges. Downloading fonts is possible, but you'd probably prefer using the cartridges.

Its Text mode is rated at 8 PPM, and, because it is so H-P-compatible, it worked well with RUN Script, GEOS and Basic 8. In Text mode, it had both bold and italic styles available with some of the supplied fonts.

The toner cartridge is the standard used with the H-P, which gives you about 4000 pages per cartridge. The other printers it emulates are Brother Twinriter, IBM Proprinter XL, Epson FX 80 and Diablo 630.

I really liked the HL-8. It was dependable and compatible, and it produced excellent output. It comes with two good manuals (but no index), one for users and the other a more technical reference guide.

Tandy Corporation's H-P-compatible printer, the LP 1000, has 1 MB of memory and eight fonts. Since it has no font-cartridge slot, you can add additional fonts only by using software to download them to the printer, and all the software for this is, of course, MS-DOS based. Experienced programmers can write their own font-downloading software, but this is not a viable alternative for most users.

The LP 1000 is rated at 6 pages per minute (PPM), meaning it will print multiple copies of a single page at that rate. It worked very well with GEOS, Basic 8 and RUN Script, although it is limited in not having built-in bold or italic fonts, as did the other two printers I tested. Besides the H-P LaserJet printer, it also emulated the Tandy DMP 2110, the IBM Wheelprinter and the IBM Prowriter.

Since the LP 1000 does not use the same type of toner cartridge as the H-P LaserJet, you'll have to get replacements from Radio Shack, rather than from your local computer store. These cartridges are cheaper than those for the H-P LaserJet, but you get only about 1500 pages per cartridge.

All in all, I found the LP 1000 to be a decent, workable Commodore-compatible laser printer. It was the least expensive of the three I tested, but had the fewest supplied fonts, and adding more would probably be difficult. The user's manual was adequate, but lacked an index.

Star Micronics' new H-P-compatible laser printer is an all-around winner. Like the others, it has 1 MB of RAM as standard, and comes with 16 built-in fonts. There are two font-cartridge slots, but these do not use standard H-P font cartridges; instead, they use a format available only from Star Micronics. While that's a bit of a drawback, it is worth noting that each of the Star cartridges has more fonts than a comparable H-P cartridge.

Text output is rated at 8 PPM, and the Star worked as expected with Basic 8, RUN Script and GEOS. Styles such as bold and italic were available without adding more fonts.

The toner cartridge is standard H-P, and you can expect about 4000 text pages per cartridge. Additional printers it emulates are Diablo 630, Epson EX-800 and the IBM Proprinter.

I have to admit that of the three printers tested, I liked the Star LaserPrinter the best. It generated high-quality output, was dependable and had two excellent (and indexed) manuals. If I had to choose one for my desk, this would be it. ■

Two Low-Cost Alternatives

By LOREN LOVHAUG

THE OKIDATA LASERLINE 6 and the Centronics Pageprinter 8 are both low-cost laser printers that many Commodore computerists might want to consider. Both have recently been discontinued by their manufacturers, but can be purchased for under \$1000 through a variety of outlets.

THE OKIDATA LASERLINE 6

The Laserline 6, 6 PPM and H-P compatible, is based on the increasingly popular Ricoh engine, by virtue of which it is one of the least expensive laser printers to maintain and operate. Toner cartridges, for instance, are readily available for under \$30 and generally last for 1500-2000 pages, depending on the composition of your printing. The Laserline 6 comes with 14 fonts, making it a highly versatile text printer right out of the box.

Perhaps its only drawback is its limited memory capacity of 128K, expandable only to 512K. This makes the Laserline 6 incapable of producing a full-page, 300x300 dpi graphics bitmap. In reality, this limitation may not be crucial for many C-64 and 128 owners, as I am not aware of any Commodore software that produces such large bitmaps.

However, you should bear this limitation in mind if you think you might want to use your laser printer with software on other computer systems that utilize full-page bitmaps in order to render pages (such as most desktop publishing programs on IBM PC-compatibles). Although the Laserline 6 is not being manufactured any more, Okidata has pledged to support the printer well into the 1990s, and they still market a variety of add-on font cartridges.

THE CENTRONICS PAGEPRINTER 8

The Centronics Pageprinter 8 is an 8-PPM laser printer based on a Centronics engine. In its basic configuration, it comes with 512K of RAM and only one resident font, 10-point Courier.

In this standard configuration, the Pageprinter 8 can emulate only an Epson FX-80 or a Diablo 630, but these emulations make it compatible with just about every piece of Commodore software available today, at least as far as printing text is concerned.

Curiously, even though the Epson FX-80 is certainly graphics capable, the Pageprinter 8 will not allow you to output bitmap graphics of any resolution unless you expand the Pageprinter's memory beyond 512K. This was a strange decision on the part of the printer's designers, as 512K is certainly adequate for most FX-80 Graphics modes.

Genicom, the company that purchased Centronics a few years ago, has promised to continue to support the Pageprinter 8 through 1992, and they market a variety of add-on font and emulation cartridges, including an H-P emulation board and a 2-megabyte memory upgrade. Recently, I have seen the Pageprinter 8 priced as low as \$600, which makes it an excellent value for someone looking for a very fast letter-quality text printer. [R]

Table 1. Manufacturers and prices of products referenced in text.

RUN Script

RUN Back Issues
80 Elm St.
Peterborough, NH 03458
March and
April 1986; \$3.50 ea.
plus \$1 p & h (C-64)
December 1986 and
January 1987; \$3.50 ea.
plus \$1 p & h (C-128)
Productivity Pak III, \$19.97

GEOS

Berkeley Softworks
2150 Shattuck Ave.
Berkeley, CA 94704
\$59.95 (64)
\$69.95 (128)

Basic 8

Free Spirit Software
PO Box 128
58 Noble St.
Kutztown, PA 19530
\$29.

LP 1000

Tandy Corporation
1700 One Tandy Center
Fort Worth, TX 76102
\$2634.

HL-8

Brother International Corp.
8 Corporate Place
Piscataway, NJ 08855
\$2895.

LaserPrinter 8

Star Micronics, Inc.
200 Park Ave., Suite 3510
New York, NY 10166
\$2799.

Laserline 6

Okidata
532 Fellowship Rd.
Mount Laurel, NJ 08054
\$1945.

Centronics Pageprinter 8

Genicom
Waynesboro, VA 22980
\$699.

Table 2. Manufacturers and prices of products not referenced.

HL-8e

Brother International Corp.
address in Table 1
\$2895.

(According to sources at Brother, this laser printer will be replacing the HL-8; the price is the same, but the board and fonts will be different.)

MT905

Mannesmann Tally Corp.
8301 South 180th St.
Kent, WA 98032
\$1995.

PC Laser 6000

Ricoh Corp.
5 Dedrick Place
West Caldwell, NJ 07006
\$2495.
also: PC Laser 6000/EX, \$1895.

Lou Wallace is RUN's technical manager. Loren Lovhaug frequently authors our Telecomputing Workshop column.

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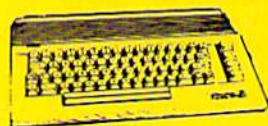
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RUN Shell

Here's the versatile disk- and file-handling utility that Commodore should have included with every C-64 and C-128.

By JOHN RYAN

With the introduction of the 1581 disk drive and RAM expansion modules, I've developed a DOS utility compatible with both the C-64 and C-128 and all three disk drives. Called RUN Shell, it's the newest and most powerful DOS shell to date.

RUN Shell is a file-maintenance and disk-archiving utility that runs in both 64 and 128 modes. It also supports both 40- and 80-column output; Burst mode; all three Commodore RAM expansion modules, to a limited degree; and partitioning and subdirectory access on the 1581 drive.

GETTING STARTED

Type in, save and run Listing 1 (call it Listing 1 or anything *except* RUN Shell), which creates the RUN Shell machine language program. Then, for the C-64, type in and save to the same disk the following small boot program.

```
10 IF A=0 THEN A=1:LOAD "RUN
   SHELL",8,1           :REM*197
20 SYS 4864              :REM*157
```

To use RUN Shell, just load and run the boot program.

For the C-128, enter BOOT "RUN SHELL" or BLOAD "RUN SHELL", B0:SYS4864. If you intend to employ a RAM expansion module, be sure it's installed before power-up.

The program can be loaded in either 64 or 128 mode, but don't try to load it in one mode and switch to another, because it configures itself to fit the particular machine. You may, however, toggle between 80- and 40-Column modes.

Although it's a stand-alone program, RUN Shell will operate with many machine language programs that don't occupy memory from \$1300 to \$5000. However, due to the way it configures itself under the Basic of both machines,

it won't operate with many Basic programs. This limitation affects users of RAM expansion modules, but more on that later.

Almost all of the options available in RUN Shell bring to the shell window a directory from which you can select files to work on. To choose a file for some operation, use the cursor keys to move the directory arrow to your selection. Then highlight the filename by pressing the space bar. If you change your mind, just deselect the file with the F5 key.

When you're finished highlighting all the files you want for any particular operation, you activate the operation by pressing the F7 key. In many cases (but not all), a Y/N prompt will ask you to verify your selection before pressing F7.

You can usually abort to the main menu by pressing the stop key. If not, there'll *always* be a Y/N prompt later to abort the operation.

There will be instances where RUN Shell expects a keypress from you to continue an operation (when swapping disks during a file copy, for example). The rule here is to press the space bar to continue or the stop key to abort to the main menu.

To exit RUN Shell, press the F1 key, and press it again to re-enter. C-64 owners must reinitialize the program after using the run-stop/restore combination by entering SYS 4864.

THE OPTIONS

Disk Setup—You can configure RUN Shell to operate under two different logical drives (logical meaning that device numbers and drives are handled internally with the shell program). As you'll see, these logical drives—drive A and drive B—can be set up for any combination of disk or RAM drives, as well as device numbers 8–11. To keep things straight, I'd suggest that you set

the lower device number to drive A and the higher device number (including RAM drives) to drive B.

You can also configure RUN Shell for single-drive operation by setting both the A and B drives to the same device number.

Rename a File—With the Rename utility, you can rename all the files in a directory. The directory is displayed in the shell window, and you select and highlight the filename you want to change by using the cursor keys and space bar as described above. When the highlight bar appears, enter a new filename that's no longer than 16 characters; then press return and continue the operation. When you're ready to activate all the new names for the directory, press the F7 key.

Scratch a File—This option operates much like Rename. Use the cursor keys and space bar to select and highlight filenames you wish to scratch. When all selections are made, press F7. The F5 key deselects a file if you change your mind after highlighting, and the stop key aborts to the verification prompt. Neither the Rename nor Scratch option works with RAM drives.

Format a Disk—Formatting is one of the most frequently used options in RUN Shell. First, the Format routine attempts to read a disk header from the selected drive. If an error occurs, it assumes the disk hasn't been formatted before and prompts for a header name and two-letter ID. If the disk has been formatted before, the header name appears in the input window. Then you can reformat with the same header name by pressing the return key, or you can type in a new name, with or without a two-letter ID.

If the drive selected is a RAM device, you needn't enter a header name, but you do have to specify the type of device ▶

RUN it right: C-64; C-128 (in both 40- and 80-Column modes); 1541, 1571 or 1581 disk drive

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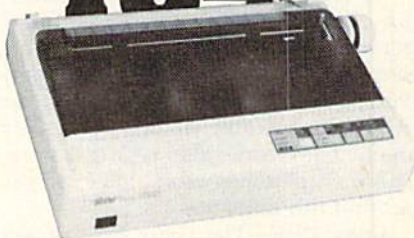
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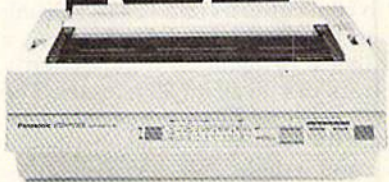


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R U N S H E L L

at the prompt. *All* modules must be formatted before being used as a logical drive or you'll get a RAM Disk Full error message.

Clean Up a Disk—This is a collect operation, and no verification is involved, so be sure the disk is in the proper drive.

Copy File—Using this option, you can copy files (except relative files) between any two disk drives other than a RAM expander (see RAM, below). Just highlight the files you want to copy and then press F7.

Commodore 64 users are limited to copying files of 90 disk blocks or less, while C-128 users can go up to 180 blocks. Use the Copy Disk routines to copy disks with larger file sizes.

To copy files from a 1581 subdirectory, you must first open the subdirectory with the Directory routine. With a single 1581 drive, you can copy only 90/180 disk blocks at a time, because RUN Shell won't detect previously opened directories after each disk swap. (RAM expansion users have a way around this limitation.)

Copy Disk—The Copy Disk option completely reproduces a disk. It works best with two drives, although it can be used with one. If you have a 1581, keep in mind that trying to single-copy 800K of data with a C-64 takes about 26 disk swaps (16 for the C-128), so use the Copy File routine when appropriate. It's very important that 1541/1571 users format the target disk either before entering the Copy Disk routine or while in the routine to ensure faithful data reproduction; 1581 users must format their disks beforehand.

To contrast C-64 and C-128 copying times, the C-64 option single-copies a 1581 disk in about 50 minutes and a 35-track disk in about 25 minutes. The C-128, with its Burst protocol, single-copies the same disks in about 12 minutes and a little over seven minutes, respectively. These times are slightly lower in dual-drive operation.

You can't copy from a 1581 drive to a 1541/71, because of the different formats involved.

Create Dir/RAM—These two options are for 1581 and RAM expansion module owners only. With Create Dir, you can create partitions and subdirectories on the 1581 disk drive more easily than with the utility supplied on the demo disk. Just select the starting track of your partition with the + or - key (pressing the space bar to lock in the selection); then use + or - to scroll through the size of directory desired, and RUN Shell will automatically make

the calculations for creating the partition. Press the space bar again to lock in the block size, and then answer the prompts as they appear.

To create a subdirectory from the partition, answer the formatting prompts as they come on-screen. You don't need to format a subdirectory within this option. You can format the partition by opening it within the Directory option and then using the Format option. Formatted partitions will always be 40 blocks less than your selected number in order to accommodate the partition directory.

Use this option only on new disks, as the partition routine overwrites any data already in the selected tracks of the disk.

You can create nested directories (directories within directories) as long as each encompasses at least three tracks and doesn't fall on the directory track (the first track of the directory) of the previous partition. Consider the following mock directory:

Main subdirectory #1: tracks 1-20

Subdirectory #2: tracks 2-5 (within main)

Subdirectory #3: tracks 6-18 (within main)

Notice that all the directories are at least three tracks long (minus nested subdirectories), and none starts on the first track of the other.

Once a directory is in place, you must access the "root" directory by pressing the stop key (see Directory, below). Then you must reopen the directory in which you want to nest the new subdirectory before you access the Create Partition option. I'd advise you to play around with this option before attempting any serious partitioning, and to refer to the 1581 user's guide for more information on partitions and subdirectories.

RAM—This option for owners of RAM expansion modules is a supplement to Commodore's RAMDOS utility, not a replacement. It includes three suboptions and requires that your RAM expander must be previously formatted.

The System to Expansion suboption lets you load disk files into the RAM drive. When RUN Shell asks you which logical drive to use, always select the logical RAM drive as the target (to load to) and a disk drive as the source (to load from). Then highlight the desired files and press F7 to initiate the load. *Don't* attempt to load files containing more than 90 disk blocks on the C-64 or 180 blocks on the C-128, or you might corrupt the computer's memory. You'll notice that the number of blocks the drive has free corresponds to the bytes available in each RAM expansion module

(less the overhead directory space that's maintained in each module).

The second suboption loads files from the RAM drive into system memory. Here again, select whichever logical drive is assigned to the RAM drive. (This may sound confusing, but you'll get the hang of it.) With this suboption, you never load from a disk drive.

Plan on this operation handling only sequential files and machine language programs. Since Basic is reconfigured to accommodate RUN Shell, many Basic programs won't work properly with it.

With this option, you don't have to load a word processor to examine a sequential file. Just load the file into the RAM drive and download it into system memory; then, using the cursor keys, scroll through it in the directory window. If you have a machine language file that doesn't occupy the same memory area as RUN Shell (\$1300-\$5000), you can download it, then exit the Shell and SYS to the program.

Machine language programmers might like to know that the Power Assembler can function when RUN Shell is active, since Basic memory is moved up to location \$5000. This may be true for other assembler systems, as well.

The third RAM suboption lets you "dump" all RAM directory files to disk and provides a handy way of copying files from one subdirectory to another. Just open a subdirectory on your 1581 drive and select Disk to Expansion to load the files into memory. Then close the subdirectory (see Directory, below), open the target subdirectory and select Expansion to Disk.

Select the logical RAM drive as the source and the logical disk drive as the target for this suboption. There's no need to select files here, since the entire RAM directory is dumped to disk.

This suboption will appeal to those who want to make multiple copies of disk files without a multitude of disk swaps, and it's handy for cataloging disks. Normally, grouping similar programs together on a single disk involves dozens of disk swaps and a big headache. With this RUN Shell feature, you can selectively load files from several dozen disks into the RAM drive, then dump them all to a single disk.

Disk Log—The Disk Log option reports the starting and ending addresses of a selected file, as well as the total number of bytes it contains. It handles only one filename at a time, and, with sequential files, only the total number of bytes is significant, since the starting and ending addresses reported are those used by RUN Shell.

RUN SHELL

Directory—This option displays a disk directory in the directory window, and, if the device is a 1581 drive, it lets you open a partition, as well. Anytime a partition is the active directory, you'll see a message to that effect. You can access the root directory whenever you want by pressing the stop key. Don't deselect a 1581 drive or change disks without first returning to the root directory.

ERRORS AND OTHER THINGS

As with any disk-intensive program, there's always the possibility that an important disk or file will get lost or corrupted—through either carelessness or distraction. RUN Shell is designed to avoid such disasters through extensive error checking and verification, but, since I couldn't anticipate every user error that could occur, you should know about the following RUN Shell strengths and limitations.

All normal DOS errors are displayed in the message window during disk access (press the space bar to recover from the error), except during Copy Disk routines. If you attempt to copy a disk

with track errors or a nonstandard GRC format (copy-protected), RUN Shell will just skip over the bad track, or worse, freeze up.

RUN Shell won't detect Device Not Present errors and will seem to lock up while trying to access a drive that hasn't been turned on. If this occurs, press the run-stop/restore combination, turn on the offending drive, then reinitialize the program.

Be sure you set up the logical drives according to the disk drives you actually have connected to your computer. If you have a 1541 and tell RUN Shell it's a 1581, you'll be in for an unpleasant surprise as the program tries to access track 41! If this, or something similar, happens, quickly turn off your drive or reset the computer! Likewise, don't attempt to set up a logical RAM device without a RAM expansion module connected.

All files in a RAM expansion device will remain intact unless you turn off your computer or reload RUN Shell, which resets important expansion directory pointers.

Pay close attention to which are the source and target disks during disk copies. There's nothing worse than staring at a Writing to Destination Disk message while you're holding the destination disk in your hand!

If you're a fan of using "flippies" (disks that have been double-notched to allow writing to both sides), be prepared to have occasional problems with the 64-mode Copy Disk routine. The routine attempts to read track 41 of the disk to determine whether the disk is single- or double-sided (35 or 70 tracks).

Occasionally, RUN Shell will interpret a "flippie" track as a 1571 disk and attempt to copy 70 tracks of data. This won't hurt your drive; all you do is press run-stop/restore if the drive seems to stop, then re-enter RUN Shell and clean up the target disk. You should find that all the copied files have been faithfully reproduced. ☐

John Ryan, RUN's frequently contributing editor, has become a disk operating system expert.

Running Instructions: Type in, save and run Listing 1 and then the boot program in the text. To use RUN Shell with the C-64, just load and run the boot program. With the C-128, enter **BOOT "RUN SHELL"**.

Listing 1. Machine language creator program. (Available on ReRUN disk. See page 37.)

```

0 REM THIS LIST 1 CREATES (AND
  SHOULD NOT BE CALLED) RUN SHE
  LL                                :REM*184
5 OPEN 8,8,8,"RUN SHELL,P,W"
  :REM*69
6 CT=0:PRINT "{SHFT CLR}":REM*56
10 READ A$:IF A$="-1" THEN CLOS
  E8:PRINT:PRINT"ALL DONE!":EN
  D                                :REM*129
12 PRINT "{HOME}READING LINE "+S
  TR$(CT):CT=CT+1                :REM*141
15 IF LEN(A$)<62 THEN 55
  :REM*254
20 B$=MID$(A$,1,20)+MID$(A$,22,
  20)+MID$(A$,43,20) :REM*242
25 FOR I=1 TO 30 :REM*181
30 C$=MID$(B$, (I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
  :REM*209
35 H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55 :REM*85
40 L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55 :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
  :REM*67
50 NEXT:GOTO 10 :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
  O 70 :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
  A$,20)+RIGHT$(A$, (LEN(A$)-21
  )):GOTO 70 :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
  0)+RIGHT$(A$,LEN(A$)-42)
  :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$, (I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
  :REM*140
80 H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55 :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55 :REM*84
90 BY=H*16+L:PRINT#8,CHR$(BY);
  :REM*148
95 NEXT:GOTO 10 :REM*160
100 REM RUN'S C64 & C128 DOS SH
  ELL :REM*167
101 DATA 00134C43134CA0130000*0
  0000000000000000000000000000
  0000000000000000 :REM*220
102 DATA 00000000000000000000*0
  0000000000000000000000000000
  0000000000000023 :REM*22
103 DATA 3124303A5A2D5C3D55A2*0
  88E4E388E4F388E5238*8E5338A
  2008E50388E51 :REM*171
104 DATA 388EAC38AD0A0F02120*E
  416A9008D3B3820A516*20F916A
  900852BA95085 :REM*33
105 DATA 2CA9008D00502042A64C*A
  01320E416A9018D3B38*208F162
  0F916A900852D :REM*148
106 DATA A950852EA9008D005020*D
  951782081FF5820D332*20E7FFA
  9B78D3C03AD3B :REM*89
107 DATA 38D008A9808D8A024CCA*1
  3A5D7302B20F91620C4*7720E41
  6A9D5859EA938 :REM*213
108 DATA 859FA9008D3238A9288D*3
  438A90F8D21D0A90E8D*20D0201
  02B4C0E1420F9 :REM*183
109 DATA 1620B37720E416A9C185*9
  EA938859FA9018D3238*A9508D3
  438A90FA21A20 :REM*181
110 DATA 7716AD32388D3338A900*8
  D60388D4D388D63388D*54388D6
  8388D6B388D67 :REM*60
111 DATA 388D6C388D6E388D6F38*8
  D70388D75388D78388D*81388DA
  E388DBA388D85 :REM*76
112 DATA 38AA9D004AE8D0FA202C*1
  6AD7638F014201A2B0*0B2BAE3
  238BD893FA8A2 :REM*75
113 DATA 07A91F20111AADAC38D*0
  34CE514AD04DF48AD05*DF48AD0
  6DF4820112D20 :REM*88
114 DATA 5A28A9008DAC38688D06*D
  F688D05DF688D04DF4C*E514AD3
  B38D022A5CBC9 :REM*181
115 DATA 04F0FAA90085C6A99320*D
  2FFA9068D21D0201A2B*A90E8D8
  60220A5164CCD :REM*18
116 DATA 16A9AD8D3C0320F91678*2
  056E02009E12000C058*207A412
  0034A20F206B :REM*5
117 DATA FF8D00FF6C000A20E1FF*D
  010AD7638F00B200F20*A9008D7
  63820062E20CC :REM*48
118 DATA FF20E4FFF0E3C985F094*C
  920F0052078154CE514*AD3E38D
  00620312D4CA0 :REM*127
119 DATA 13C909D00620471A4CA0*1

```

Continued on p. 49.

A-Z Scramble

The letters are mixed up, and you may be, too, when you play this alphabet strategy game.

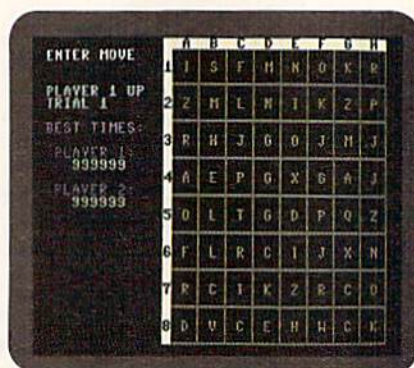


By BRIAN MELCHER

Alphabetizing a grid of random letters in as few moves as possible is the goal in Scramble, a strategy game that's educational for the young and just plain fun for grown-ups. Each of one to five players gets one to five grids to alphabetize by making letter swaps. When there's more than one player, they take turns.

Your score for a grid is the number of swaps it takes you to complete the alphabetizing of the letters, and your final score is your lowest grid score. The grid size for a game can range from two-by-two, with only four letters, all the way to eight-by-eight, with sixty-four letters. Duplicate letters must be grouped in order.

The program starts by asking for the number of players, the number of grids (chances) per player and the grid size. Then the game screen appears, with the grid columns lettered and the rows numbered. To swap two letters, just enter their coordinates in any order. For example, A1B2, B2A1, 1AB2, B21A, A12B, 2BA1, 1A2B and 2B1A will all



Your children will have hours of educational fun while you'll have hours of blissful quiet.

make the same swap.

The area within which you can make swaps varies with the size of the grid. If it has two to four squares on a side, you're limited to adjacent letters, vertically, horizontally or diagonally; with a grid that's five to seven squares on a side, you can swap adjacent letters or those separated by one other; with an eight-by-eight grid, you can exchange

over two intervening letters. You can change the swap areas by modifying line 100 in the program.

Before entering the last coordinate, you can abort a swap and get a chance to reenter the coordinates by pressing the delete key. The program checks for invalid coordinates, but doesn't count them against you; it just lets you try again.

If you decide to give up on a grid, press the £ key. You'll lose that turn, and the program will continue to your next grid, the next player or the final screen, as the case may be.

Each player's lowest score for the game so far is constantly displayed on the screen. As I mentioned, those lowest scores then become the final scores at the end of play. The game concludes with the choice of playing again or quitting. **®**

Brian Melcher, who plans to enter the University of Illinois this fall to pursue computer engineering, has about four years of C-64 programming under his belt.

Running Instructions: Type in Listing 1, save it and run it.

Listing 1. Scramble program. (Available on ReRUN disk. See page 37.)

```

1 REM THE GAME OF SCRAMBLE
2 REM BY BRIAN MELCHER
5 POKES3280,0:POKES3281,0:PRINT
  "{SHFT CLR}{2 CRSR DNs}{5 SPA
  CEs}{CTRL 5}{31 SHFT *s}"
  :REM*67
10 PRINT"{5 SPACES}{CTRL 7}{31
  SHFT *s}"
  :REM*119
15 PRINT"{2 CRSR DNs}{CTRL 8}{5
  SPACES}{CTRL 9}{3 SPACES}{C
  RSR RT}{3 SPACES}{CRSR RT}{3
  SPACES}{CRSR RT}{3 SPACES}{
  CRSR RT}{SHFT -}{CRSR RT}{
  3 SPACES}{CRSR RT}{3 CRSR R
  Ts}{3 SPACES}"
  :REM*108
20 PRINT"{5 SPACES}{CTRL 9}{2
  SHFT *s}{CRSR RT}{3 SPACES}{
  CRSR RT}{SHFT -}{CRSR RT}{
  {SHFT -}{CRSR RT}{3 SPACES}{
  {CRSR RT}{SHFT -}{CRSR RT}{
  {3 CRSR RTs}{2 SHFT *s}"
  :REM*205
25 PRINT"{5 SPACES}{CTRL 9}{3 S
  PACES}{CRSR RT}{2 SHFT *s}{
  CRSR RT}{2 SPACES}{SHFT *}{C
  RSR RT}{3 SPACES}{CRSR RT}{C
  OMD M}{COMD G}{CRSR RT}{2 S
  PACES}{SHFT *}{CRSR RT}{3 C
  RSR RTs}{3 SPACES}"
  :REM*117
30 PRINT"{5 SPACES}{CTRL 9}{2 S
  HFT *s}{CRSR RT}{3 SPACES}{
  CRSR RT}{SHFT -}{CRSR RT}{
  {SHFT -}{CRSR RT}{COMD M}{
  COMD G}{CRSR RT}{SHFT -}{C
  RSR RT}{3 CRSR RTs}{2 SHFT
  *s}"
  :REM*247
35 PRINT"{5 SPACES}{CTRL 9}{3 S
  PACES}{CRSR RT}{3 SPACES}{C
  RSR RT}{CTRL 0}{COMD J}{CTRL
  9}{CRSR RT}{SHFT -}{CRSR
  RT}{COMD M}{COMD H}{CRSR R
  T}{3 SPACES}{CRSR RT}{3 SPAC
  Es}{CRSR RT}{3 SPACES}"
  :REM*176
40 PRINTSPC(10)"(2 CRSR DNs)THE
  GAME OF SCRAMBLE"
  :REM*82
45 PRINT"{CRSR DN}{5 SPACES}{CT
  
```

RUN it right: C-64



```

RL 7}{31 SHFT *s)" :REM*150 130 PRINTSPC(14)"(CTRL 8){CTRL
50 PRINT"{5 SPACES}{CTRL 5}{31 9}{CTRL 0}{COMD 4}";:FORN=
SHFT *s)" :REM*99 1TOG:PRINT"{2 COMD Ps}{SHFT
55 DIMLS(64),S(5):PRINTSPC(9)"{ @}";:NEXT:IFM<GTHENPRINT
2 CRSR DNs}{CTRL 4}PRESS SPA :REM*123
CE WHEN READY" :REM*40 135 NEXT:PRINT"{HOME}{4 CRSR DN
60 GETAS:IFAS<>" "THEN60 s}{CTRL 4} PLAYER"I"UP":PRI
:REM*110 NT" TRIAL"H:PRINT"{CRSR DN}
65 PRINT"{SHFT CLR}{CTRL 5}{4 S {CTRL 5}BEST TIMES:"
PACES}{8 SHFT *s)":PRINT"{CT :REM*196
RL 4}{4 SPACES}SCRAMBLE":PRI 140 FORM=1TOP:PRINT"{CRSR DN}{C
NT"{CTRL 5}{4 SPACES}{8 SHFT TRL 7}{2 SPACES}PLAYER"M"{C
*s){3 CRSR DNs}{CTRL 8}" :REM*171
:REM*78 270 GOSUB325:Z=0:GOSUB340:IFZ=0
70 PRINT"{4 SPACES}HOW MANY PLA THEN145 :REM*134
YERS (1-5)" :REM*241 275 IFJ<S(I)THENS(I)=J :REM*41
75 GETAS:IFAS<"1"ORAS>"5"THEN75 280 PRINT"{SHFT CLR}{2 CRSR DNs
:REM*91 }{CTRL 4}{2 SPACES}THIS MAT
80 P=VAL(A$):PRINT"{2 CRSR DNs CH IS NOW OVER.":PRINT"{CRS
{4 SPACES}HOW MANY CHANCES ( R DN){CTRL 5}{2 SPACES}PLAY
1-5)" :REM*213 ER:(CTRL 2)"I,J"{CTRL 5}MOV
85 GETAS:IFAS<"1"ORAS>"5"THEN85 ES." :REM*181
:REM*125 285 PRINT"{2 CRSR DNs}{CTRL 7}{
90 C=VAL(A$):PRINT"{2 CRSR DNs 2 SPACES}PRESS SPACE"
{4 SPACES}ENTER GRID SIZE (2 :REM*220
-8)" :REM*140 290 GETAS:IFAS<>" "THEN290
95 GETAS:IFAS<"2"ORAS>"8"THEN95 :REM*87
:REM*210 295 NEXT:NEXT:PRINT"{SHFT CLR}{
100 G=VAL(A$):FORM=1TO5:S(M)=99 2 CRSR DNs}{CTRL 4}THE GAM
9999:NEXT:B=1:IFG>4THENB=2: E IS NOW OVER.":PRINT"{CRSR
IFG=8THENB=3 :REM*152 DN} HERE ARE THE FINAL ";
105 FORH=1TOG:FORI=1TOP:J=0 :REM*34
:REM*209 300 PRINT"SCORES:":FORM=1TOP:PR
110 FORM=1TOG*G:L$(M)=CHR$(INT( INT"{CRSR DN}{3 SPACES}{CTR
RND(0)*26)+65):NEXT:Z=0:GOS L 5}PLAYER{CTRL 2}"M"{CRSR
UB340:IFZ=1THEN110 :REM*94 LF}{CTRL 5}:{CTRL 6}"S(M):N
115 PRINT"{SHFT CLR}"SPC(14);:F EXT :REM*34
ORM=1TOG:PRINT"{CTRL 8}{CTR :REM*36
L 9}{2 SPACES}"CHR$(64+M);: GETAS:IFAS="Y"THEN65:REM*50
NEXT:PRINT"{CTRL 9}" :REM*50
:REM*200 320 PRINT"{SHFT CLR}{CTRL 8}":E
120 FORM=1TOG:PRINTSPC(14)"(CTR ND :REM*223
L 8){CTRL 9}{CTRL 0}{COMD 325 PRINT"{HOME}{COMD 1}{CRSR D
4}";:FORN=1TOG:PRINT"{2 SPA N)":FORM=1TOG:PRINTTAB(14);
CES}{COMD N}";:NEXT:PRINT :REM*122
:REM*197 330 NEXT:IFM<GTHENPRINT"{2 CRSR
125 PRINTSPC(14)"(CTRL 8){CTRL DNs}" :REM*209
9}"CHR$(48+M);:FORN=1TOG:PR :REM*236
INT"{CTRL 0}{COMD 4}{2 SPAC 335 NEXT:RETURN
Es}{COMD N}";:NEXT:PRINT :REM*242
:REM*190 340 FORN=1TOG*G-1:IFL$(N)>L$(N+
1)THENRETURN :REM*84
345 NEXT:Z=1:RETURN

```


Cubix 1

*Unlike some programs that are blockbusters,
this one is a blockbuilder!*



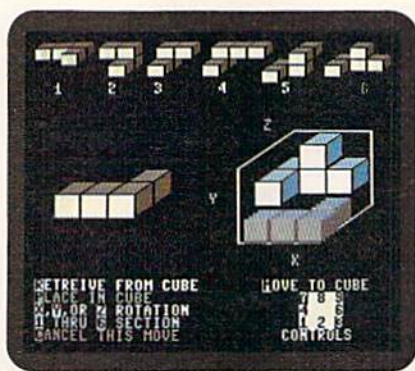
By LEONARD MORRIS

Brain getting rusty? You can exercise it with Cubix 1, a C-128 (40-Column mode only) three-dimensional puzzle that challenges your sense for spatial relationships and your powers of deduction. There's no need for a joystick; Cubix 1 is solved from the keyboard.

Type in the Cubix 1 Basic program (Listing 1) and save it to disk. Then type in, save and run Listing 2 (naming the file "Listing 2"), which generates the machine language program, ML-CUBIX 1. Finally, load and run the Cubix 1 program (Listing 1). In typing in both listings, use RUN's Checksum program to catch any errors you may make.

The goal of the puzzle is to build on the screen a large cube (3x3x3 units) out of six odd-shaped sections composed of unit cubes, three sections having four each and the other three having five. These, numbered 1-6, are displayed along the top of the screen.

Each of the sections must be oriented properly, then moved into the cube construction area and positioned. To work with a section, press its number (on the main keyboard) and a larger version of it will appear on the left side



In this game, your emotions can run the gamut from frustration to elation.

of the screen. There you can rotate it, by pressing the corresponding letter keys, around the X, Y and Z axes until you have it oriented to your satisfaction so it will slide into place in the growing cube.

You fill in the big cube on the right side of the screen with the six sections. When you have a section oriented as you wish, press M to move it into the cube area, then use the numeric keypad to position it. Numbers 1 and 9 will move it in and out along the Z axis, 2 and 8 up and down along the Y axis

and 4 and 6 left and right along the X axis. Finally, you place the section to stay by pressing the P key, which redraws the cube showing the new section in place. It also causes that section's number at the top of the screen to change color, enabling you to keep track of which sections you've used.

To cancel a move into the cube—should you decide to rotate the section further, for instance—press the C key. To retrieve a section that you've already placed, press its number and then the R key. The number at the top of the screen will revert to the original color and the cube will be redrawn with the section deleted.

In addition to rotating the six sections, you can rotate the entire contents of the cube area at any time by pressing the zero key and the X, Y and Z keys.

If you attempt to do something the program doesn't allow, such as place a section in an occupied area of the cube or beyond the cube's boundaries, a tone will sound to remind you. There is no penalty. Good luck. It's not easy. **R**

Leonard Morris is an electronics technician and a free-lance Commodore programmer.

Running Instructions: Type in and save Listing 1. Type in, save and run Listing 2. Then load and run Listing 1.

Listing 1. Cubix 1 Basic program. (Available on ReRUN disk. See page 37.)

```

10 REM CUBIX 1 BY LEONARD MORRIS :NEXT :REM*108 BC0")+T,X:POKEDEC("1BD0")+T,
S :REM*227 50 REM SET MEMORY LOC. FOR ROT Y: NEXT :REM*81
20 FAST:GRAPHIC4,1,19:DIMV(6,6) TION (X,Y,Z) :REM*35 100 ZA(0)=27:ZB(0)=208:ZC(0)=17
,X(6,6),Y(6,6),BZ(6),BY(6),B 60 FORT=0TO31:POKEDEC("19D0")+T :REM*232 6:ZD(0)=DEC("19D0"):FORT1=1
X(6),BU(6):CT=26:C1=2:C2=7:C :1:NEXT :REM*232 TO6:ZA(T1)=26:ZB(T1)=16+(T1
3=15:AD=12240:P1=0 :REM*85 70 FORT=0TO8:READX,Y:POKEDEC("1 B80")+T,X:POKEDEC("1B90")+T,
30 BLOAD"ML-CUBIX 1",B0,P4864:S Y: NEXT :REM*62 1000 ZA(T1)=27:ZB(T1)=208:ZC(T1)=17
YSDEC("15D3"):SYSDEC("15E1") :REM*15 80 FORT=0TO8:READX,Y:POKEDEC("1 BA0")+T,X:POKEDEC("1BB0")+T,
:REM*15 110 FORT=1TOZ(T1):READX(T1,T),Y (T1,T),V(T1,T):POKEZD(T1)+V
40 SPRCOLOR11,3:SPRITE1,0,5,0,1 ,1,1: FORT=2TO5:POKEDEC("1FF 7")+T,56:SPRITET,0,5,0,1,1,1 90 FORT=0TO8:READX,Y:POKEDEC("1

```

RUN it right: C-128 (in 40-Column mode)

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CUBIX 1

```

120 FORT=1TO6:READN$(T),L(T):NE
    XT:REM*214
130 REM DETERMINE BLOCKS LOCATI
    ON:REM*234
140 P1=0:FORV=0TO2:FORU=0TO2:FO
    RT=0TO2:A=AD+T*24-U*64+V*3
    04:GOSUB170:POKEDEC("1B00")
    +P1,A2:POKEDEC("1B00")+P1+1
    ,A1:REM*250
150 A=A-160:GOSUB170:POKEDEC("1
    A00")+P1,A2:POKEDEC("1A00")
    +P1+1,A1:P1=P1+2:NEXTT,U,V
    :REM*53
160 GOTO190:REM*244
170 A1=INT(A/256):A2=A-256*A1:R
    ETURN:REM*86
180 REM CLR SCRIN & DRAW SMALL B
    LOCKS:REM*191
190 COLOR0,1:COLOR1,8:COLOR2,10
    :COLOR3,9:COLOR4,1:GRAPHIC4
    ,0,19:REM*1
200 FORTZ=1TO6:FORT1=1TOZ(TZ):X
    =X(TZ,T1):Y=Y(TZ,T1):REM*75
210 BOX1,X,Y,X+7,Y+7,1:FORT=1T
    O3:DRAW3,X+T,Y-TTO7;90:DRAW
    2,X+7+T,Y-TTO7;180:NEXT:DRA
    W0,X,YTO7;90TO7;180TO4;45:N
    EXT:NEXT:SLOW:REM*30
220 REM SET COLORS AND NUMBERS
    :REM*246
230 X=68:FORY=0TO13:REM*254
240 COLOR1,8:DRAW1,0,X+Y*8TO79;
    90:REM*148
250 COLOR1,C1:DRAW1,80,X+Y*8TO7
    9;90:REM*5
260 COLOR2,10:DRAW2,0,X+Y*8TO79
    ;90:REM*242
270 COLOR2,C2:DRAW2,80,X+Y*8TO7
    9;90:REM*38
280 COLOR3,9:DRAW3,0,X+Y*8TO79;
    90:REM*81
290 COLOR3,C3:DRAW3,80,X+Y*8TO7
    9;90:REM*251
300 DRAW0,0,X+Y*8TO159;90:NEXT
    :REM*92
310 FORZB=1TO6:GOSUB320:NEXT:ZA
    =0:ZC=12:GOTO350:REM*3
320 COLOR1,14:CHAR1,L(ZB),4,N$(
    ZB):COLOR1,2:RETURN:REM*113
330 COLOR1,3:CHAR1,L(ZB),4,N$(Z
    B):COLOR1,2:RETURN:REM*140
340 REM INSTRUCTIONS:REM*165
350 WINDOW0,19,39,24,1:PRINT"{C
    RSR DN}{CTRL 4}THE OBJECT O
    F THIS GAME IS TO USE THESE
    BLOCK SECTIONS":REM*64
360 AA=1:FORZB=1TO6:PRINTZB"(CR
    SR LF)",":GOSUB330:GOSUB620
    :FORN=1TO4:GOSUB400:GOSUB64
    0:NEXT:FORN=1TO4:GOSUB400:G
    OSUB660:REM*171
370 NEXT:FORN=1TO4:GOSUB400:GOS
    UB680:NEXT:GOSUB400:GOSUB32
    0:NEXT:PRINT"{CRSR DN}{CTRL
    2}":GOSUB400:REM*234
380 PRINTTAB(6)"TO MAKE THIS 3X
    3X3 CUBE":GOSUB550:SLEEP5
    :REM*245
390 SYSDEC("15E1"):GOSUB550:FOR
    T=1TO6:ZE(T)=0:FORU=1TOZ(T)
    :POKEZD(T)+V(T,U),T+1:NEXT:
    NEXT:ZB=0:GOTO420:REM*217
400 FORX=0TO50:NEXT:RETURN
    :REM*3
410 REM DISPLAY MENU:REM*101
420 WINDOW0,19,39,24,1:PRINT"{C
    RSR DN}{CTRL 2}{CTRL 9}R{CT
    RL 0}ETREIVE FROM CUBE"TAB(
    25){CTRL 8}{CTRL 9}M{CTRL
    0}OVE TO CUBE":REM*174
430 PRINT"{CTRL 9}{CTRL 6}P{CTR
    L 0}LACE IN CUBE"TAB(29){C
    TRL 8}7{CTRL 9} 8 9":REM*94
440 PRINT"{CTRL 9}{COMD 6}X{CTR
    L 0},{CTRL 9}Y{CTRL 0},OR {
    CTRL 9}Z{CTRL 0} ROTATION"T
    AB(29){CTRL 8}{CTRL 9}4{3
    SPACES}6":REM*220
450 PRINT"{CTRL 9}{CTRL 4}1{CTR
    L 0}THRU {CTRL 9}6{CTRL 0}
    SECTION"TAB(29){CTRL 8}{C
    TRL 9}1 2 {CTRL 0}3":REM*96
460 PRINT"{CTRL 9}{COMD 3}C{CTR
    L 0}ANCEL THIS MOVE"TAB(27)
    "{CTRL 8}CONTROLS":REM*121
470 FORT=0TO31:POKEDEC("19D0")+
    T,0:NEXT:ZB=0:GOSUB640:AA=0
    :REM*58
480 REM MAKE X,Y,Z ROTATION BOR
    DERS:REM*48
490 COLOR1,15:CHAR1,19,13,"Y":C
    HAR1,28,18,"X":CHAR1,25,7,"
    Z":REM*145
500 COLOR1,2:DRAW1,90,136TO34;9
    0TO36;45TO48;0TO35;27TO36;
    225TO48;180:REM*211
510 REM MAKE SELECTION FOR SECT
    ION:REM*101
520 GETY$:REM*196
530 IFY$>"0"ANDY$<"7"THENZB=VAL
    (Y$):GOSUB620:GOTO520:ELSEI
    FY$="0"THEN550:REM*1
540 ONINSTR("RXYZM",Y$)GOTO580,
    640,680,660,560:GOTO520
    :REM*140
550 ZB=0:SYSDEC("1486"):IFAATHE
    NRETURN:ELSE500:REM*79
560 IFZB=0ORZE(ZB)THENSOUND2,80
    0,20:GOTO520:ELSE720
    :REM*133
570 REM RETREIVE SECTION FROM C
    UBE:REM*32
580 IFZB<>0ANDZE(ZB)THEN590:ELS
    ESOUND3,400,30:GOTO520
    :REM*60
590 FORT=0TO26:IFPEEK(ZD(0)+T)=
    ZB+1THENPOKEZD(0)+T,0:POKEZ
    D(ZB)+T,ZB+1:GOTO610:REM*41
600 POKEZD(ZB)+T,0:REM*157
610 NEXT:GOSUB620:ZE(ZB)=0:GOSU
    B320:POKEDEC("14B2"),176:SY
    SDEC("14B1"):POKEDEC("14B2"
    ),16:SYSDEC("1486"):GOTO500
    :REM*237
620 SOUND1,60000,10:POKEDEC("14
    C6"),ZB(ZB):SYSDEC("14B1"):
    SYSDEC("14BD"):RETURN
    :REM*236
630 REM X,Y,Z ROTATIONAL ROUTIN
    ES:REM*111
640 GOSUB700:SOUND1,50000,1:SYS
    DEC("13AA"):IFAATHENRETURN:
    REM ROTATE 'Y' DIR.:REM*2
650 GOTO500:REM*201
660 GOSUB700:SOUND2,25000,1:SYS
    DEC("13DF"):IFAATHENRETURN:
    REM ROTATE 'Z' DIR.:REM*54
670 GOTO500:REM*229
680 GOSUB700:SOUND3,25000,1:SYS
    DEC("141E"):IFAATHENRETURN:
    REM ROTATE 'X' DIR.:REM*56
690 GOTO500:REM*241
700 POKEDEC("1466"),ZB(ZB):POKE
    DEC("1478"),ZA(ZB):POKEDEC(
    "145E"),ZC(ZB):RETURN
    :REM*26
710 REM PLACE SECTION IN CUBE
    :REM*246
720 SP=Z(ZB):ZZ=SP:FORZ=0TO2:FO
    RY=0TO2:FORX=0TO2:PS=Z*9+Y*
    3+X:REM*133
730 IFPEEK(ZD(ZB)+PS)THENMOVSPR
    SP,72+X*24-Z*12,129-Y*16+Z*
    8:BZ(SP)=Z:BY(SP)=Y:BX(SP)=
    X:SP=SP-1:REM*122
740 NEXTX,Y,Z:POKEDEC("D015"),2
    {UP ARROW}ZZ-1:REM*63
750 SOUND2,40000,100,1,300,100,
    0:FORT=1TO159STEP4:FORU=1TO
    ZZ:MOVSPRU,+,+,0:NEXT:NEXT:
    A2=40:REM*56
760 SOUND1,400*A2,20:A2=1
    :REM*45
770 REM MOVE SECTION TO DESIRED
    LOCATION:REM*158
780 VP=- (VP=0):POKEDEC("D01B"),
    VP*255:REM*112
790 GETY$:ONINSTR("462819PC",Y$
    )GOTO800,820,840,860,880,90
    0,920,940:GOTO780:REM*35
800 FORT=1TOZZ:IFBX(T)-1<0THEN7
    60:REM*168
810 NEXT:FORT=1TOZZ:BX(T)=BX(T)
    -1:MOVSPRT,-24,+,0:NEXT:GOTO
    780:REM*139
820 FORT=1TOZZ:IFBX(T)+1>2THEN7
    60:REM*161
830 NEXT:FORT=1TOZZ:BX(T)=BX(T)
    +1:MOVSPRT,+,24,+,0:NEXT:GOTO
    780:REM*106
840 FORT=1TOZZ:IFBY(T)-1<0THEN7
    60:REM*126
850 NEXT:FORT=1TOZZ:BY(T)=BY(T)
    -1:MOVSPRT,+,0,+,16:NEXT:GOTO
    780:REM*99
860 FORT=1TOZZ:IFBY(T)+1>2THEN7
    60:REM*113
870 NEXT:FORT=1TOZZ:BY(T)=BY(T)
    +1:MOVSPRT,+,0,-16:NEXT:GOTO
    780:REM*141
880 FORT=1TOZZ:IFBZ(T)+1>2THEN7
    60:REM*16
890 NEXT:FORT=1TOZZ:BZ(T)=BZ(T)
    +1:MOVSPRT,-12,+,8:NEXT:GOTO
    780:REM*166
900 FORT=1TOZZ:IFBZ(T)-1<0THEN7
    60:REM*49

```


CUBIX 1

```

910 NEXT: FORT=1TOZZ: BZ(T)=BZ(T)
-1: MOVSPRT, +12, -8: NEXT: GOTO
780 : REM*244
920 FORT=1TOZZ: BU(T)=BZ(T)*9+BY
(T)*3+BX(T): IFPEEK(ZD(0))+BU
(T)) THEN 760 : REM*145
930 NEXT: POKED("D015"), 0: FORT
=1TOZZ: POKED(ZD(0))+BU(T), ZB+1
: NEXT: ZE(ZB)=1: SYSDEC("14B1
"): SYSDEC("1486"): SOUND2, 50
00, 20: GOSUB 330: ZB=0: GOTO 970
: REM*26
940 POKED("D015"), 0: GOTO 500
: REM*36
950 POKED("1466"), ZB(ZB): POKED
DEC("1478"), ZA(ZB): POKED("
145E"), ZC(ZB): RETURN
: REM*231
960 REM CHECK FOR COMPLETED CUB
E : REM*198
970 FORT=1TO6: IFZE(T) THEN NEXT: E
LSE 500 : REM*22
980 WINDOW 0, 19, 39, 24, 1: PRINT "C
RSR DN">{CTRL 9}{CTRL 8}{4 S
PACES} CONGRATULATIONS, CUBI
XOR{4 SPACES}": PRINT "{COMD
6} PRESS ANY KEY FOR A NEW
GAME": GETKEY$: GOTO 350
: REM*12
990 REM ROTATIONAL DATA : REM*84
1000 DATA 18, 0, 9, 3, 0, 6, 21, 9, 12,
12, 3, 15, 24, 18, 15, 21, 6, 24
: REM*132
1010 DATA 6, 0, 7, 3, 8, 6, 15, 9, 16, 1
2, 17, 15, 24, 18, 25, 21, 26, 24
: REM*48
1020 DATA 18, 0, 21, 3, 24, 6, 19, 9, 2
2, 12, 25, 15, 20, 18, 23, 21, 26,
24 : REM*57
1030 REM SMALL BLOCKS DATA
: REM*51
1040 DATA 4, 0, 8, 3, 8, 8, 4, 16, 8, 5,
12, 12, 14, 4, 37, 16, 12, 29, 8, 1
3, 37, 8, 10, 33, 20, 19, 4, 54, 16
, 13, 54, 8, 14, 62, 8, 10, 50, 20,
19 : REM*233
1050 DATA 5, 78, 16, 9, 78, 8, 12, 86,
8, 13, 94, 8, 14, 74, 20, 18, 5, 11
6, 8, 7, 104, 20, 16, 112, 20, 12,
112, 12, 13, 100, 24, 21
: REM*114
1060 DATA 5, 132, 16, 12, 140, 16, 13
, 148, 16, 14, 140, 8, 16, 128, 20
, 21 : REM*38
1070 REM{2 SPACES}* NUMBERS AND
LOC.{2 SPACES}* : REM*191
1080 DATA 1, 2, 2, 8, 3, 13, 4, 20, 5, 2
7, 6, 36 : REM*86
1090 DATA 8, 0, 7, 3, 6, 6, 5, 9, 4, 12,
3, 15, 2, 18, 1, 21, 0, 24: REM*46

```

Listing 2. Machine language program generator. (Available on ReRUN disk. See page 37.)

```

0 REM THIS LIST 2 CREATES (BUT
SHOULD NOT BE CALLED) ML-CUBI
X 1 : REM*104
5 OPEN 8, 8, 8, "ML-CUBIX 1, P, W"
: REM*214
6 CT=0: PRINT "{SHFT CLR}": REM*56
10 READ A$: IF A$="-1" THEN CLOS
E8: PRINT: PRINT "ALL DONE!": EN
D : REM*129
12 PRINT "{HOME} READING LINE "+S
TR$(CT): CT=CT+1 : REM*141
15 IF LEN(A$)<62 THEN 55
: REM*254
20 B$=MID$(A$, 1, 20)+MID$(A$, 22,
20)+MID$(A$, 43, 20) : REM*242
25 FOR I=1 TO 30 : REM*181
30 C$=MID$(B$, (I*2)-1, 2): H$=LEF
T$(C$, 1): L$=RIGHT$(C$, 1)
: REM*209
35 H=VAL(H$): IF H$>"9" THEN H=A
SC(H$)-55 : REM*85
40 L=VAL(L$): IF L$>"9" THEN L=A
SC(L$)-55 : REM*136
45 BY=H*16+L: PRINT#8, CHR$(BY);
: REM*67
50 NEXT: GOTO 10 : REM*115
55 IF LEN(A$)<21 THEN B$=A$: GOT
O 70 : REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
A$, 20)+RIGHT$(A$, (LEN(A$)-21
)): GOTO 70 : REM*176
65 B$=LEFT$(A$, 20)+MID$(A$, 22, 2
0)+RIGHT$(A$, LEN(A$)-42)
: REM*140
70 FOR I=1 TO LEN(B$)/2: REM*221
75 C$=MID$(B$, (I*2)-1, 2): H$=LEF
T$(C$, 1): L$=RIGHT$(C$, 1)
: REM*140
80 H=VAL(H$): IF H$>"9" THEN H=A
SC(H$)-55 : REM*56
85 L=VAL(L$): IF L$>"9" THEN L=A
SC(L$)-55 : REM*84
90 BY=H*16+L: PRINT#8, CHR$(BY);
: REM*148
95 NEXT: GOTO 10 : REM*160
100 REM HEX LOADER FOR ML-CUBIX
1 : REM*24
101 DATA 0013A9008DFF1BA5FA18*6
91885FA9002E6FBE6FB*60C8EEF
F1BE6FAD002E6 : REM*143
102 DATA FBADFF1B60A1FA290319*E
01481FA60A1FA290F19*E01481F
A60A1FA293F19 : REM*194
103 DATA E01481FA60A00AA2008E*F
F1BA90081FA201413C9*8D0F5A
5FA1869C085FA : REM*219
104 DATA 9002E6FB88D0E260EAEA*E
AEAEAEAEAA9008DFF1B*ADFE1BA
ABDD019F012AD : REM*162
105 DATA FE1B0AAABD001B85FABD*0
11B85FB206015EEFE1B*ADFE1BC
91BD0DB60A21B : REM*206
106 DATA BDCFF19D5F1BCAD0F760*AA
21BBD5F1B9DCF19CAD0F760205
D14A90085FCA0 : REM*255
107 DATA 09B97F1B1865FCAABD0*1
B8D8C1BB98F1B1865FC*AAAD8C1
B9DD01988D0E3 : REM*128
108 DATA E6FCA5FCC903D0D92067*1
360EAEAEAA205D14A900*85FCA5F
C0AEAEAA1865FC : REM*74
109 DATA 85FDA009B99F1B38E5FD*AA
ABD601B8D8C1BB9AF1B*1865FCA
AAD8C1B9DD019 : REM*186
110 DATA 88D0E3E6FCA5FCC903D0*C
F20671360EAEAEAA205D*14A9008
5FCA5FC0A0A0A : REM*41
111 DATA 1865FC85FDA009B9BF1B*3
8E5FDAABD601B8D8C1B*B9CF1B1
865FCAAD8C1B : REM*136
112 DATA 9DD01988D0E3E6FCA5FC*C
903D0CF20671360EAEAEAA9B08
5FAA92A85FBA2 : REM*76
113 DATA D08E71138ECB138E0A14*8
E4914CA8E9513A91B8D*7C138D8
113209213203F : REM*40
114 DATA 1360A9008DFF1BADFE1B*AA
ABDD019F012ADFE1B0A*AAABD001
B85FABD011B85 : REM*14
115 DATA FB206015EEFE1BADFE1B*C
91BD0DB60A91085FAA9*2A85FB2
03F1360A91A8D : REM*155
116 DATA 9B148DA014A9B08D9014*2
08614A91B8D9B148DA0*14A9D08
D901460FFF0FF : REM*111
117 DATA 00FFF000000000000000003*0
00000030F3FFFFF003F*FFFFFFF
FFFFFF0FFFFFF : REM*114
118 DATA FFFCF2CA00FCF2CA2AAA*A
AAA0015151515151515*0055555
5555555550055 : REM*191
119 DATA 55555555555555552A2A2A*2
A2A2A2AAAAA*AAAAA151
5151515151515 : REM*77
120 DATA 55555555555555555555*5
555555555555555555555555555555
0A8A00000000 : REM*23
121 DATA 0000000000000000000000*A
000A2008EFF1BB9E014*49FF21F
A19E01481FA20 : REM*21
122 DATA 1313C918D0EDA9008DFF*1
BB9E01481FA201313C9*10D0F42
00013B9E01481 : REM*49
123 DATA FA201313C928D0F42000*1
3B9E01481FA201313C9*1DD0F42
0211320131320 : REM*233
124 DATA 2B132013132035132013*1
3B9E01481FA20131320*2113201
313202B132013 : REM*21
125 DATA 1320351360A200BDF015*9
D000EE8E04D0F560A2*00A9009
D0019E8D0F860 : REM*231
126 DATA EAEAEAEAA00000000000*0
000000000000000000000000000000
0000000000 : REM*251
127 DATA 00000000002AAC00AABC0*2
AAFC0557FC0557FC055*7FC0557
FC0557F00557C : REM*48
128 DATA 00557000FFC00003F
: REM*16
129 DATA -1 : REM*240

```


A Better Mousetrap

In which we spring on our readers a routine for using a joystick and a proportional mouse at the same time.



By TOM BROWN

Many Commodore users know how to program a joystick; it's easy enough to do, even from Basic. The original 1350 mouse is equally easy, since it works exactly like a joystick. When the 1351 proportional mouse came along, however, it posed a new programming challenge: namely, to make any 1351-compatible program detect, without prompting the user for input, whether a joystick or the 1351 mouse is plugged in, and to respond accordingly. This the program can do by checking the input/output area of memory, but it's difficult to distinguish devices this way. It makes more sense for a program to be able to handle both devices simultaneously.

Interestingly enough, if you plug a joystick into the front joystick port (port 1), it will interfere with the keyboard. Therefore, most programmers prefer to have the joystick work with the rear port (port 2). With the 1351 mouse, the opposite happens: Because of the keyboard operation, it's easier to have the mouse in the front port than in the back. Mousetrap-128 (Listing 1) and Mousetrap-64 (Listing 2) follow this pattern, using the front and rear ports to give the programmer access, respectively, to the 1351 mouse or a joystick—or both at the same time!

INSPECTING THE TRAP

Both Mousetrap programs are interrupt-driven machine language routines that are based in part on the original 1351 mouse reader. They use the built-in IRQ routine, which suspends what the computer is doing 60 times a second to perform housekeeping chores, such as reading the keyboard.

Mousetrap scans each port for movement and updates accordingly a pair of screen-pointer registers (one for the X



position, the other for the Y). The X and Y registers contain 16 bits each, allowing for values ranging from 0 to 65535 (64K) along each axis. These values can be "scaled" to make the pointer move slower for the same amount of mouse or joystick movement.

Note that, while I refer to "pointer movement," Mousetrap simply prints the X and Y screen coordinates. To produce a visible screen pointer, C-64 users must poke those displayed values into the sprite registers, while C-128 users can employ the values directly in Basic 7.0 sprite commands.

Mousetrap lets you set upper limits for both X and Y to prevent the pointer from leaving the visible screen. The program also reads the firebutton on the

joystick or the left button on the 1351 mouse with a single command.

SETTING THE TRAP

Following are descriptions of the commands for using Mousetrap. These are also documented in REM statements in the program listings.

SYS (52500)—Initializes the Mousetrap C-64.

SYS (6400)—Initializes the Mousetrap C-128.

The next four commands return information about the status of the screen pointer or input device.

A = USR(0)—The value of A is 0 if the mouse or joystick hasn't been moved since the last time this command was executed, and it's 128 (high bit set) if it has been moved. This command works a lot faster than comparing old and new values for X and Y using Basic variables.

A = USR(1)—Returns the current X, or horizontal, screen-pointer position in variable A.

A = USR(2)—Returns the current Y, or vertical, screen-pointer position in variable A.

Note that USR(1) and USR(2) both can be scaled if necessary.

A = USR(3)—A is 128 (high bit set) while a joystick or mouse button is being pressed; otherwise it's 0. Since Mousetrap checks the button status 60 times per second, be sure to give the user time to release the button, or multiple presses will register. (Of course, these frequent checks can be handy for certain drop-down menus, which appear only when the button is being pressed and vanish when it's released.)

The following commands give instructions to Mousetrap. Since they must include a dummy variable, A (or an equivalent) must be present, but it will not return a meaningful value.

A = USR(4), X, Y—Lets you set the co- ▶

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MOUSE TRAP

ordinates of the screen pointer, as in A=USR(4),50,100. Note the peculiar syntax of this command.

A=USR(5),X,Y—As above, but allows you to set the highest possible X and Y values for the screen pointer. For example, A=USR(5),319,199 sets the limit of pointer movement to the visible 40-column screen area.

A=USR(6),B—The value of B scales the number of pointer counts per unit of distance the joystick or mouse moves. B should fall in the range 0-7. If it's greater, it's "ANDed" with 7 to mask the higher bits and produce a value in the correct range.

The actual pointer count is divided by 2 raised to the power of the value in B. For example, if B=3, X and Y are divided by 2³, or 8. Be careful here, as only the values returned to you in USR(1) and USR(2) are divided in this way; the X and Y pointer registers remain unaffected.

If you turn off scaling (with a value of 0), the pointer value will immediately appear in full when you next read it. Remember to reset the upper limits of X and Y appropriately if you plan to use scaling in your program.

A=USR(7)—Turns off the Mouse-

trap interrupt by restoring the original address in the computer's IRQ vector.

NOTES ON THE USER COMMAND

Mousetrap provides some good examples of employing the User command to interface with a machine language program. It changes the User-command vector in the computer to point to the appropriate Mousetrap machine language routines. The command to turn off the interrupt routines does not restore the original value of the User-command vector, as that value is normally just a dummy value used by the computer on power-up.

Remember that the User command returns a value, just like any other Basic function, and that value needs to go somewhere. Either assign it to a throw-away variable, as in A=USR(6),B, or include the User command in an If-Then statement. If you don't, your computer may lock up, and you'll have to reset it or turn it off and on again.

NOTES ON INTERRUPTS

When you initialize Mousetrap by changing the computer's IRQ vector, the original vector is saved. Then, after each Mousetrap interrupt, execution

jumps to this old vector and the built-in interrupt routine carries on. Because of this arrangement, you can "chain" Mousetrap with other interrupt routines. When Mousetrap is turned off, the original IRQ vector is restored.

PLACING THE TRAP

Lines 100-200 of Mousetrap demonstrate how to use some of the routine's commands. To use Mousetrap in your own application, just delete these lines and insert your program.

Note that, because sprites are not used, you are free to use the X and Y values any way you wish. You might use them (along with appropriate scale and Poke commands) to manipulate SID chip values or to highlight menu selections, filenames, and so forth, without sprites. You could even create point-and-click Basic programs for the C-128's 80-column screen!

Whatever your programming needs, keep in mind that, with Mousetrap, 1351 programs are always in season. 

Tom Brown is a freelance programmer with both public domain and commercial programs to his credit, among them RUN's telecommunications program, RUN Term 128.

Listing 1. Mousetrap-128 program. (Available on ReRUN disk. See page 37.)

```

5 IF PEEK(6401)=216 THEN100      160 IF(USR(3))THENPRINT"(CTRL 9
                                :REM*220      ) BUTTON PRESSED (CTRL 0)":
10 I=6400                          :REM*60      FORX=1TO30:NEXT      :REM*96
15 PRINT"(SHIFT CLR)128 MOUSE &  165 GETA$:IFA$<>"THEN A=USR(7)
    JOYSTICK READER DEMO":PRINT"  :PRINT"(2 CSR DN)MOUSETRA
    {CSR DN}BY TOM BROWN"        P TURNED OFF":END      :REM*139
                                :REM*161      170 GOTO150      :REM*246
18 PRINT"(2 CSR DN)LOADING ML     180 X=USR(1):Y=USR(2):REM GET T
    ...":REM*199      HE X AND Y POSITION OF THE
20 READ A:IF A=256 THEN 100        POINT      :REM*152
                                :REM*190      190 PRINT"X =";X;"{2 SPACES}Y =
30 POKE I,A:I=I+1:GOTO 20          :";Y:RETURN      :REM*122
                                :REM*231      200 DATA 120,216,173,21,3,201,2
40 :                                :REM*98      5,240,32,173,20,3,141,93,26
100 KEY8,"":REM KEEPS MOUSE BUT  :REM*122      173,21,3,141,94      :REM*122
    TON FROM PRINTING THE F8 TE  210 DATA 26,169,239,141,20,3,16
    XT                            :REM*115      9,25,141,21,3,169,242,141,2
110 ML=6400:REM STARTING LOCATI  :REM*1      5,18,169,26,141      :REM*1
    ON OF MOUSE-READER      :REM*1      220 DATA 26,18,88,96,120,216,17
120 SYS(ML):REM INSTALL THE MOU  :REM*224      3,21,3,201,25,208,12,173,93
    SE INTERRUPT READER:REM*122  :REM*224      26,141,20,3,173      :REM*224
130 A=USR(5),320,200:REM SET RI  230 DATA 94,26,141,21,3,88,96,3
    GHT AND BOTTOM LIMIT OF POI  :REM*84      2,92,121,32,131,25,140,119,
    NTER VALUE                  :REM*165      25,141,120,25,32      :REM*165
140 A=USR(4),100,100:REM SET TH  240 DATA 92,121,32,131,25,140,1
    E CURRENT X AND Y VALUE OF   21,25,141,122,25,96,32,92,1
    THE POINTER                  :REM*254      21,32,131,25,140      :REM*48
145 PRINT"(2 CSR DN)MOUSETRAP    250 DATA 126,25,141,127,25,32,9
    IS ACTIVE. HIT ANY KEY TO   2,121,32,131,25,140,128,25,
    EXIT"                        :REM*68      141,129,25,96,0      :REM*94
150 IF(USR(0))THEN GOSUB180:REM  260 DATA 188,188,97,0,85,0,122,
    IF NON-ZERO, THE POINTER H  188,0,64,1,200,0,0,32,215,1
    AS BEEN MOVED                :REM*233      19,76,12,175,32      :REM*207
                                270 DATA 208,25,173,121,25,208,
                                8,173,122,25,240,6,206,122,
                                25,206,121,25,96      :REM*112
280 DATA 32,140,25,173,119,25,2  08,8,173,120,25,240,6,206,1
    20,25,206,119,25      :REM*132      290 DATA 96,32,160,25,173,121,2
    5,205,128,25,208,8,173,122,
    25,205,129,25      :REM*1      300 DATA 240,8,238,121,25,208,3
    ,238,122,25,96,32,180,25,17
    3,119,25,205,126      :REM*108      310 DATA 25,208,8,173,120,25,20
    5,127,25,240,8,238,119,25,2
    08,3,238,120,25      :REM*156      320 DATA 96,169,255,141,125,25,
    96,120,216,32,194,26,162,0,
    142,116,25,173      :REM*236      330 DATA 25,212,172,123,25,32,1
    49,26,140,123,25,176,3,238,
    116,25,24,109      :REM*50      340 DATA 119,25,141,119,25,138,
    109,120,25,141,120,25,173,2
    6,212,172,124,25      :REM*174      350 DATA 32,149,26,176,3,238,11
    6,25,140,124,25,201,2,144,1
    8,201,255,176,14      :REM*108      360 DATA 72,138,108,8,106,40,106
    ,170,104,108,8,106,40,106,56
    ,73,255,109,121      :REM*33      370 DATA 25,141,121,25,138,73,2
    55,109,122,25,141,122,25,17
    3,116,25,240,6      :REM*234

```


MOUSE TRAP

380	DATA 32,95,26,32,233,25,76, 101,250,162,1,32,105,26,162 ,3,76,105,26,189 :REM*98	173,0,220,160,0 :REM*174	162,0,169,255,141,0,220,14 1,47,208,173,1 :REM*30
390	DATA 119,25,48,30,221,126,2 5,144,24,208,9,202,189,119, 25,221,126,25 :REM*229	200,104,74,176,6,72,32,180, 25,200,104,74 :REM*147	500 DATA 220,32,77,27,162,127,1 42,0,220,88,170,240,1,96,17 3,0,220,162,0,41 :REM*48
400	DATA 144,13,189,126,25,157, 119,25,232,189,126,25,157,1 19,25,96,169,0 :REM*188	450 DATA 176,6,72,32,160,25,200 ,104,74,176,6,72,32,208,25, 200,104,152,240 :REM*40	510 DATA 16,208,2,162,128,138,9 6,120,172,119,25,173,120,25 ,88,32,128,27,76 :REM*207
410	DATA 157,119,25,157,118,25, 96,140,117,25,141,118,25,16 2,0,56,237,117 :REM*159	460 DATA 3,32,233,25,96,169,0,1 33,102,32,12,175,169,0,141, 0,255,152,41,7 :REM*130	520 DATA 3,175,120,172,121,25,1 73,122,25,88,32,128,27,76,3 ,175,32,92,121 :REM*33
420	DATA 25,41,127,201,64,176,8 ,74,240,20,172,118,25,24,96 ,9,192,201,255 :REM*161	470 DATA 170,189,30,27,72,189,2 2,27,72,96,172,125,25,169,0 ,141,125,25,76,3 :REM*254	530 DATA 32,131,25,152,41,7,141 ,130,25,96,174,130,25,240,9 ,74,72,152,106 :REM*51
430	DATA 240,9,56,106,162,255,1 72,118,25,24,96,169,0,56,96	480 DATA 175,10,86,100,37,65,90 ,114,42,27,27,27,25,25,2 7,25,32,47,27 :REM*252	540 DATA 168,104,202,208,247,96 ,256 :REM*227
490	DATA 168,169,0,76,3,175,120		

Listing 2. Mousetrap-64 program. (Available on ReRUN disk. See page 37.)

[illegible]

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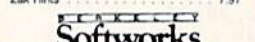
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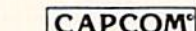
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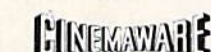
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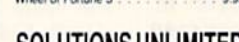
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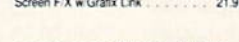
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1541 RAMBOard*

Byte The Copy Protection bullet!

Let's face it - war is hell. And in the Commodore world, one of the ugliest wars of all is being waged by the copy protection industry. They're tough. They're clever. And they're very, very determined. If you've seen some of the current ice out there, you know just how determined they are. Well, we're just as determined. And we've got a way to walk right through the coldest ice out there.

What's our secret? The new RAMBOard, a small card that can easily be installed in your 1541 in 5 minutes using just a screwdriver. With this remarkable piece of firmware in place, backup hassles are a thing of the past!

RAMBOard gives you speed - it comes bundled with a fast copier that can archive an unprotected data disk in under 60 seconds. RAMBOard gives you power - working with our dynamic Maverick software, RAMBOard will back up programs that other systems can't even scratch the surface of. Best of all, RAMBOard won't become obsolete - when newer, even tougher protection schemes come along, we'll create new Maverick/RAMBOard parameters to cut right through them. Backed by our famous R&D, you know that we'll do whatever it takes to keep RAMBOard operating behind enemy lines!

Get your RAMBOard today. And the next time some company tries to charge you for an "authorized" backup of a program you've already paid for, remind them that war IS hell - and you know how to raise a little hell of your own.

1541 & 1541C RAMBOard
ONLY \$34.95

In Most Cases, Plugs Right In-NO Soldering Required
*RAMBOard Is An Optional Accessory For Use With Maverick™

THE 1750 CLONE

Thanks For The Memory

Most Commodore users are content to use their computers within the constraints placed on them by a limited amount of RAM. But some people want more. More speed. More power. And that means just one thing - more memory.

Power users have long known that the ideal solution to their memory problems is out there in the form of Commodore's incredible 1750 RAM expansion module. Just plug it in and you've got a whopping 512k of onboard RAM - the same amount of memory found on most IBM computers! This is the memory cartridge that all serious Commodore power users want. There's only one problem.

You can't find them.
That's right. These RAM units are almost impossible to buy. We've always specialized in finding solutions to Commodore related problems - here's what we came up with.

First, we bought brand new Commodore 1764 RAM expansion units, the ones with only 256k of RAM onboard. Next, we had Chip Level Design engineer and produce a custom upgrade that takes a 1764 to a full 512k! That's the same half meg of RAM as a regular 1750! Finally, we tested each and every cartridge, and warranted them to be free from defects.

Now there's nothing to stop you from taking your Commodore 64 or 128 to levels of power and sophistication that the original designers never even dreamed of! If you're using programs like GEOS from Berkeley, the Pocket Series from Digital Solutions, future versions of Maverick from Kracker Jax, Fleet System IV from Professional Software, or the potent PaperClip III from Batteries Included; if you're using ANY of these programs, you won't believe the difference that the extra memory makes!

IMPORTANT NOTES - READ CAREFULLY

*C-64/64c (but NOT C-128/128D) owners MUST buy a heavy-duty power supply to use these units. The power supply is NOT included - it is available from us separately.

*If you ALREADY own a 1764 RAM cartridge, we can upgrade it for you. Your unit MUST be in perfect working order for us to upgrade it. The turnaround time on upgrades is approx. 2 weeks. It will NOT be necessary for you to purchase a new power supply - the one that came with your 1764 will still work fine.

THE 1750 CLONE
ONLY \$199.95
1764 UPGRADE
ONLY \$124.95

THE 1581 TOOLKIT

Is This Utility Healthy? Get A Second Opinion.

Sure, we're going to tell you that The 1581 Toolkit is incredible. But how about a second opinion? "...ten first-rate 1581 utility programs..." "...added an exhaustive 147 page technical treatise on the internal workings of the 1581 and its DOS..." "...all menu driven and quite easy to use, despite the fact that they are all quite powerful and flexible..." "...dozens of little extras..." "...a pleasure to use..." "...quite outperforms anything released to date..."

The words above are from a review of The 1581 Toolkit in the May/June 1989 issue of INFO Magazine. We received 4 1/2 out of a possible five stars, a very rare achievement for a 1.0 release of a new utility. And as for their expert opinion that The 1581 Toolkit is "...a must for any heavy 1581 user..." we couldn't agree more. Because The Toolkit gives you all this:

- ★ Fast Disk Copier
- ★ Fast File Copier
- ★ Byte Pattern Search
- ★ Partition Creator
- ★ Ultrafast Formatter

- ★ Track and Sector Editor
- ★ Directory Editor
- ★ Error Scanner
- ★ Relocatable Fast Loader
- ★ File Track and Sector Tracer

All 10 of these custom utilities use super fast read/write routines and, where appropriate, allow full access to partitions. We designed The 1581 Toolkit to be the finest set of utilities available for the 1581. But we didn't stop there. Included with the Toolkit is a FREE copy of David Martin's invaluable resource, *The 1581 DOS Reference Guide*. This book holds over 100 pages of information that took more than a year of research and investigation into the inner workings of the 1581 to compile. And we've also added extra utilities like a machine language monitor with DriveMon - the perfect companion to *The 1581 DOS Reference Guide*.

You may own a 1581 disk drive, but you're not really using your 1581 if you don't have The 1581 Toolkit. The Toolkit's strength lies in the fact that, unlike some companies, we took the time to master the 1581 before we began. The reason is simple: we don't care if this is the first utility you buy for your 1581 - we just want it to be the last one.

THE 1581 TOOLKIT (ON 3.5" DISK) IS ONLY \$39.95

Includes Your FREE 1581 DOS Reference Guide

The 1581 Toolkit Works On The C-64 Or The C-128/C-128D In The 64 Mode

SYSRES

Your Last Chance To Own A Classic.

All good things must come to an end. That's true for everything, including software. The time has come to say goodbye to an old friend - SYSRES, the finest BASIC enhancement system ever created for the Commodore computer.

Software Support owns the exclusive rights to produce SYSRES. Reluctantly, we've decided to stop producing this incredible program. Why? The simple fact is that most of the serious BASIC programmers out there already own SYSRES, and there aren't enough new BASIC programmers entering the arena to warrant the expense of continued production of SYSRES.

If you're one of the few serious BASIC programmers out there who isn't yet using SYSRES, maybe you should take a look at some of these features:

- Easy code entry with features like auto line numbering, enhanced key repeat, and fast up and down scrolling of program listings!
- Macros: any shifted key may be set to represent any BASIC or SYSRES KEYWORD. All files may be listed, loaded, run, copied, or scratched by entering a two character command in front of the file name listed in the directory!
- Find/Change any variable phrase or keyword used anywhere in your program. Over 700 search variations are available including pattern matching with wild cards and limitation symbols. Now you can automatically remove spaces and REMS to streamline run-time versions of your programs!

- List BASIC programs and relative and sequential files without loading them into memory first!
- Edit text files and assembler source code without having to leave BASIC!
- Do a partial renumber. Move a subroutine to a more logical starting place while preserving all other line numbers and updating all line references!
- Debug with a variable speed TRACE. Display the current and the five previous operations. Display variables as they change or are defined; send the TRACE to the printer!

We haven't even scratched the surface of SYSRES. With features like screen print, multiple drive support, full printer support, and program merge capabilities, it's easy to see why SYSRES is the most comprehensive BASIC programmers' aid package ever produced. And just as comprehensive is the professional documentation: over 110 pages, bound in an attractive three ring binder. You'll also be pleased to know that SYSRES is UNprotected!

So there you have it. If you use BASIC at all, this is the enhancement system that you need. And this is absolutely your last chance to own this classic. As a going away present, we've even cut the price in half! Now there's no reason for you to limp by on plain vanilla BASIC any more. Get SYSRES today - and get involved with some serious programming power!

SYSRES/NOW ONLY \$19.95

While Limited Supplies Last!

ATTENTION C-128 OWNERS

Solderless 64K Video RAM Upgrade

Now that Commodore has released the C-128D with 64K of video RAM, we should be seeing 128 programs address this fantastic new feature soon.

BASIC 8 already has the capability of using all 64K of video RAM. If you own the C-128 in stock condition, you own all 16K of video RAM that Commodore felt was necessary. Using Basic 8 format and the full 64K of video RAM provides you with the ability to scroll through video memory as well as enhanced color resolution.

Up until now, to upgrade the C-128 to 64K of video RAM you would have to first search out the components, then find a competent repair outlet to desolder and install the parts. What a hassle!

SOLUTION — We have developed a module that simply plugs in to the mother board of your C-128. No splattered solder — No heat damage — No hassle.

This package is available in two different forms. Model A has all parts necessary to complete your upgrade, and Model B is identical except that you supply the RAMs. Again, no soldering is necessary. If you have access to low cost RAMs, we suggest Model B.

Both models include easy to follow installation instructions, a test program to verify proper installation, and the plug in Video RAM Upgrade.

RAM UPGRADE

only **\$49.95**

COMMODORE HEAVY-DUTY

POWER SUPPLIES

WATTS The Matter - Can't Get ample power?

Sorry about that. Actually, it's no laughing matter. Our technicians tell us that the majority of Commodore computer problems can be traced back to an inadequate power supply. When the power supply fails, it can (and often does) cause additional damage to the computer itself - and a computer meltdown is no joke.

This doesn't have to happen to you. We are now selling a heavy-duty power supply that will greatly diminish your fear of a power supply failure. These are NOT aftermarket units - they are made by Commodore, and are ideal for use with RAM expanders. They will provide you with a more stable, dependable source of power. This unit will work on ALL C-64's and 64c's on the market.

If your system is important to you, take the extra step to safeguard your investment by getting a Commodore Heavy-Duty Power Supply today. Power you can depend on - with no unexpected shocks.

COMMODORE HEAVY-DUTY POWER SUPPLY

C-64 Version - Only \$29.95

C-128 Version - Only \$44.95

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DEALERS — WE HAVE THE SUPPORT YOU'RE LOOKING FOR!

GAMES GALLERY

In the grand galaxy of games, this gathering got great grades!

By WILLIAM F. GATES



THE RECENT BOOM in C-64 action titles has left many gamers confused about what to buy. It seems as though every time we turn around, another program emerges and shouts, "Play me! Buy me!" In an attempt to clear up the confusion, I researched over 70 games, and then asked myself which ten I would want if stranded on a desert island with a solar-powered C-64. I compared my notes with those of a 12-year old video-game expert, and together we came up with the following.

AIRBORNE RANGER

Parachute down into enemy territory... crawl through muddy trenches... sneak past enemy bunkers... you're an Airborne Ranger. On any one of a dozen missions, you could be photographing a secret enemy airplane or liberating a POW camp. Armed with a knife, rifle, grenades and a LAW rocket, you must complete your mission in time or the Osprey at the pickup point will leave without you.

By creating and saving a Ranger character to disk, you can keep a cumulative score as you advance through the tasks. Excellent documentation, graphics and design make Airborne Ranger a software library "must."

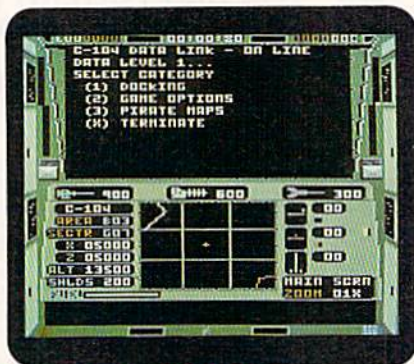
BUBBLE BOBBLE

Adapted from a coin-op game, Bubble Bobble concerns Bub and Bob, two bubble-blowing dinosaurs who must burst bullies by blowing bubbles that box up the bullies and then burst the bullies in the bubbles. (Zounds!) Clearing all the bullies in one level scoots you down to the next. Various items appear to give Bub and Bob many magical maneuvers.

A Two-Player mode allows for simultaneous play. In short, Bubble Bobble is a bubbling good time!

ECHELON

Echelon is not a space-flight simulator or an exploration adventure or a combat



Your control panel in Echelon.

game—it's all of these. This game comes with a keyboard overlay, a map and the LipStik (a microphone headset that lets the player yell "fire" instead of pressing a joystick button). There are two drawbacks to using this device: it's too small to fit post-pubescent heads, and it may cause the user to feel a tad silly.

This aside, Echelon is an intricate, yet elegant, game that lets you explore, patrol and fight—in space.

ARKANOID

Remember the classic, though unsophisticated, game, Breakout? Well, it's grown-up now. Control a "Vaus craft" at the bottom of the screen and deflect a ball against a wall of blocks—you're playing Arkanoid. The destruction of certain blocks releases different capsules that, if caught by your Vaus craft, will



The look and feel of a top-notch race car in Grand Prix circuit.

expand your craft, arm it with a laser, slow down the speed of the ball, enable you to catch the ball, escape to the next level, divide the ball into three components or give you an extra life. Using the proper capsules at the proper time is the key to this most addicting game.

Arkanoid works with all types of input devices, but a mouse is highly recommended.

CALIFORNIA GAMES

Most excellent, dude! Like, it's the Olympics—California style. You and up to seven other dudes can compete in radical events—skateboarding in a half pipe, surfing on a wave, kicking a foot bag, tossing a flying disk, racing a dirt bike and roller-skating down the sidewalk on the beach.

California Games has got totally awesome graphics and animation. Naturally, it's not too stressful, and, you know, it's just like the coolest!

GRAND PRIX CIRCUIT

Want to drive a Ferrari, but you're still making payments on your Yugo? Put on your racing gloves and buckle yourself into your choice of a Williams, McLaren or Ferrari. Choose a track and put your machine in gear! A word of caution—Grand Prix Circuit requires a gentle touch to handle the turns. You must break in, accelerate out and manage the sensitive steering.

Outstanding graphics let you lose yourself in your dream car!

INDIANA JONES AND THE TEMPLE OF DOOM

If you're as much a fan of the movie as I am, you'll enjoy playing the star in this game. You maneuver up ladders and across conveyor belts to rescue imprisoned kids; subdue Thuggee guards with your trusty whip; control an out-of-control mine shaft car by leaning to one side; jump from ledge to ledge using your whip; and, if you're lucky, find the hidden Sankara stones. ►

ALL
NEW**MAVERICK™ v3****Why Is This Program America's Favorite Disk Utility System?**

All over the country, packs of imitators are running themselves ragged trying to answer that question. They want to know why we're so popular. They want to know what makes Maverick so special. Well, guess what - we're going to tell them. Maverick is the physical embodiment of a philosophy that has always been the foundation that Kracker Jax products are built on: Work as hard as you can to create the very best product you can. And then improve it. Such is the case with the new Maverick v3. Maverick is already the most powerful archival system money can buy. So how do you improve on that? By adding exclusive new features like these:

- A new RAM Expansion Unit support module that allows REU owners to enjoy lightning fast response with Maverick's Quick File Copier & Fast Single Data Copier utilities - no more disk swaps!
- 64k video ram support for 128D's or C128's with 64k of video RAM. This provides a memory buffer for enhanced copying capabilities.
- Have you ever lost valuable data to a fatal error on Track 18? Ever done a short "NEW" and then wished you hadn't? Our new Automatic Directory Recovery Utility recreates Track 18 on 1541 formatted disks to recover your files! This does hours of intense, critical recovery work for you automatically! Similar to an item on INFO Magazine's March 1989 "Wish List" of dream utilities they'd like to see!
- An all new Advanced Sector Editor with 100% ML coding for blazing speed and superior performance! Full featured - allows editing in ASCII, HEX, and even disassembly modes! Even includes comprehensive on-line help screens!
- And for GEOS™ 2.0 owners with 1581 drives: Maverick v3's GEOS Toolkit has a new utility that allows you to transfer the incredible GEOS v2.0 over to your high speed, high capacity 1581 drive! This transfers *everything* - which means you can run the 64 or the 128 version from the 1581 alone, WITHOUT using the 5 1/4" disks at all! And the 800K 1581 disk leaves you plenty of room to transfer all your GEOS applications over to the same disk! This is a MUST FOR SERIOUS GEOS users who want to unleash the true power of Berkeley Software's revolutionary operating environment.
- MORE PARAMETERS! Maverick v3 now boasts over 400 parameters that either copy or entirely "break" the potentially destructive protection schemes of some of the world's finest software. Current Maverick owners know how dynamic our parameters have been, but even they will be amazed by the enhancements and additions we've made, including new parameters and special RAMBoard support capabilities exclusive to Maverick v3!
- Enhanced RAMBoard™ Support: Beginning with parameter Module #3, we gave you the ability to copy the Pocket 2.0 series of productivity software. Then Module #4 gave you parameters for 6 V-Max™ protected titles - parameters that left the competition stunned, because OUR parameters did NOT require physical drive speed modifications to work. Now Module #5, included with Maverick v3, will forever separate us from the imitators trying in vain to keep up with us. There are over TWENTY new RAMBoard support parameters that are without equal, plus a large number of special parameters that don't require the use of RAMBoard at all! And our new V-MAX! parameters utilize proprietary read-write verification routines that not only eliminate the need to alter drive speeds, but also save you from having to "copy till it boots", a sure sign of an inferior product.

All of these new features are in addition to the amazing array of utilities that have always been found in Maverick. If there's a better value on the market today, we'd like to see it.

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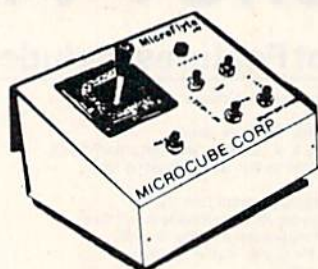
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GAMES GALLERY

Be forewarned: slight miscalculations bring instant death. But, of course, Indy never miscalculates!

OPERATION WOLF

Impressively adapted from the coin-op blockbuster of the same name, Op-



Trigger-happy blasting is the name of the game in Operation Wolf.

eration Wolf places a machine gun in your hands and an endless stream of enemy forces in your face. Your mouse (preferable) or joystick controls an on-screen icon. Pull the trigger: everything in sight is blasted to bits!

Operation Wolf is ultra-violent, non-stop action!

ROAD RAIDER

Take one ATV (Armored Tactical Vehicle) equipped with a high-powered gun and a built-in Ram-Car for demolition derbies. Add several post-Great Biological Holocaust cities, thousands of radioactive mutants and one demented scientist. Mix with abandoned buildings conveniently littered with

food, keys, weapons and other handy items—you've got Road Raider.

This game lacks the touch of a good graphic artist, or any artist, for that matter. But what it lacks in graphics, Road Raider makes up for in mutant-annihilating fun!

TECHNOCOP

Race down the highway in the latest high-speed pursuit-and-destroy vehicle, the VMAX Twin-Turbo Interceptor, but watch out for those nasty DOA thugs that jump on top of your car! After a bit of driving, a message appears on your control panel: There's a crime in progress. Your VMAX pulls over, and you get out and walk into a tenement building, armed with your gun and the determination "to protect and to serve."

Well, there you have it: my joystick paradise. In case you're wondering where to start, my personal two favorites are Arkanoid and Airborne Ranger. If you have all of the above, some other action games you might want to investigate are Skate or Die (Electronic Arts), Out Run (Sega/Mindscape), Tower Toppler (Epyx) and Alien Syndrome (Sega/Mindscape).

Editor's note: This is one man's thoughts on his all-time favorite action games. Let us know what game titles might appear on your 1988-89 hit parade list. See RUN's Reader Choice Contest ballot on page 18—you might win more software than you ever dreamed possible! ■

William Gates, who works for the police department at the University of California, Davis, likes to play games on his C-64.

Table 1. Manufacturers and addresses.

Airborne Ranger

MicroProse
180 Lakefront Drive
Hunt Valley, MD 21030

Arkanoid; Bubble Bobble;

Operation Wolf
Taito Software, Inc.
267 West Esplanade
North Vancouver, B.C.
Canada V7M 1A5

California Games; Technocop

Epyx, Inc.
600 Galveston Drive
PO Box 8020
Redwood City, CA 94063

Echelon

Access Software, Inc.
545 West 500 South, Suite 130
Bountiful, UT 84010

Grand Prix Circuit

Accolade, Inc.
550 S. Winchester Blvd.
San Jose, CA 95128

Indiana Jones and the Temple Of Doom; Road Raider

Mindscape, Inc.
3444 Dundee Rd.
Northbrook, IL 60062

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* Denotes program runs in C-128 mode. ** Denotes both C-64 and C-128 modes. All other programs run in C-64 mode only.

#4 Landlord. Invoices. Money Manager. Teacher. Number Puzzle. Graphmaker. Joystick Artist.

#5 Auto Menu. Disk Doctor. Big Letters. Title Maker. Turtle Graphics. Calculator. Test Maker. Home Run Derby.

#26 Stack 64. Credit Cards 64. Word Jumbler. Lister. * Ultra Hi-Res. Baroque Music.

#27 * Reminder 128. ** Retir'eze. * Twiddle. * Mind Your Mortgage. Keeping Up to Date. Hook Up to a Portable. Monthly Labels. Envelope Maker.

#28 * RUNTerm 128. RUN's Memo Book. Calendar Maker. RUN Copy 64. Time Keeper 64. * Blank-It 128. C-64 Sprite ML Commands.

#46 RUN Script 64. Create Your Own Keypad. Songfest. Autoboot. Automatic Line Numbers. * Gradebook 128. A Modern Metronome.

#47 DataFile 3.6. DFPrint. DFCalc. * C-128 Screen Dump. Commodore in the Kitchen. The Menu Machine.

#48 ** Home Inventory. Commodore Lanes. * Time Keeper 128. Window Construction Set. Fantastic 64. Video Flash Cards. Mister Poster.

#65 Pay the Bills. Ultraquiz. Perfect Pitch. Spirited Sprites. Wedge Utilities. Brainstorming. RUN Assembler. Songfest.

#66 Disk Reader. Swish! Label Maker. Arithme-Sketch. Murder Mystery. * Ultra Hi-Res II.

#67 * Presto Write 128. * 80-Column Custom Windows. PrintRite 64. Disk Stuffer. 64 Notepad Command Center. Puzzler's Choice.

#68 Moving Messages. * Graphix to the Max. * Tick-Tock 128. ** Form Writer. Unlockup. Math Whiz. Now You See It.

#86 * Video Fantasia. Hi-Res Writer. Needlegraph. Extra! Extra! Read All About It! Disk Keeper. * 3-D Object Editor.

#87 Tri-Solitaire. Attention, Shoppers! * Linker 128. Flash Cards. DFClone. * Typing Tachometer 128. Electronic Address Book. Pegboard.

#88 Alphabet Cadet. The Amazing 16-Color Print Machine. * Bill Minder. Travel Tally. ** Loan Analysis. Islands! Video Poker. ** Mom's Kitchen Aid.

#106 ** Loan Arranger. Turtle-Tutor for Tykes. Programmers, Take Note! Sign Maker. Instant Data Statements. 64 Personal Ledger.

#107 * 128 Notepad. Phaser Phire. Screen Genie. DFCopy. * Outline 128. The Money Program. Cursor Commotion.

#108 Programmer's Pager. Knock! ** Vacation List Generator. ** Easy Banners. Joystick

Mouse Emulator. ** Instant Test Maker.

#126 CalcAid 64. Put It on Paper. Dashing Off the Dots. Math Square-Off. * Micro Artist. Extra! Newsletter Graphics. * RUN Script 128.

#127 64 DOS Shell. Wordman. * Color Hi-Res Graphics. Super Sort. Delete 64. Sizzle! Brickout! * RUN Investor. Smart Shopper.

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GEOWATCH

GeoTips reemerge, along with news, comments and handy hints of interest to all GEOS fans.

By TIM WALSH

I'm glad to be back with more hints, tips and general discussion concerning GEOS. The latest news from Berkeley Softworks has been GEOS 128 2.0 (see my review in the May 1989 *geoWatch*). Judging from reader response, this updated 128 version has been warmly received.

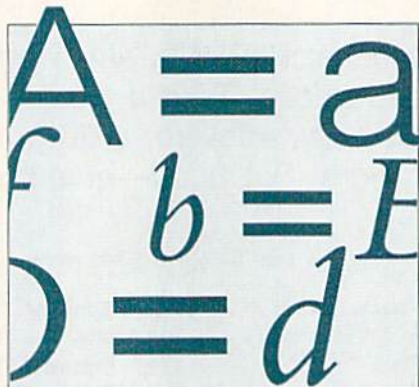
Unfortunately, there are no other new GEOS products to discuss. On the other hand, *RUN* has produced GEOS Power Pak II, a disk that features new GEOS utilities, applications and even a few games, and has the documentation right on the disk. One of the programs, Q & D Edit, helps provide a solution to conversion problems that need more attention now that there are so many more *geoWrite* and *geoWrite Workshop* 128 users.

Robert Savage, of Corpus Christi, Texas, wrote to ask how to convert his more than 200 *Mirage Concepts* word processor files into *geoWrite* files. The question is basically how you go about making *geoWrite* files compatible with any non-GEOS-compatible word processors and vice-versa.

A former *Mirage Concepts* fan myself, I realize that the program has never enjoyed the widespread popularity of other word processors like *Easy Script*, *PaperClip* or *RUN Script*. While GEOS' Text Grabber supports many word processor formats, it does not include a *Mirage Concepts* converter utility. If you have files created with a not-so-popular word processor, try converting those files with Text Grabber's Generic I and Generic II. If that fails, load the files into *RUN Script* 64 or 128 (available on Q-Link and *ReRUN's Productivity Pak II*).

Your conversion then becomes a two-step process. Because *RUN Script* can handle program, sequential and user files, you can usually read most files from other word processors into it. Once you've read a file into *RUN Script*, you can save it to disk as a sequential file and then load it into Text Grabber as an *Easy Script* file.

Q & D Edit allows you to convert existing *geoWrite* files into either true ASCII or Commodore ASCII text files



and vice-versa. For this reason alone, many users will find it an indispensable utility, especially if they use a non-GEOS-compatible word processor along with *geoWrite* and want to exchange files between the two formats.

Now to some *geoTips*.

RENAMING GEOS FILES

Eventually every GEOS user encounters a problem renaming files created with GEOS (most likely *geoWrite* files). If, for example, you created a *geoWrite* file and saved it to disk as "Letter", it would appear on the directory as

14 "LETTER" usr

You can use various public domain and GEOS utilities to convert it into a text file, but most will retain the filename "LETTER". Should you want to load the converted file into a word processor such as *RUN Script*, you'd get nothing but a "file not found" error. This is because the uppercase *geoWrite* letters in the filename become lowercase, and the lowercase become uppercase, and the Commodore DOS can't recognize these characters. If you try to rename it using Commodore DOS commands, you'll get a "file not found" error again. Even substituting wild cards for the filename characters won't work.

The solution is surprisingly simple if you take the following steps. Just be certain to save in all uppercase letters any GEOS files that may later need conversion. The filenames can then be read by the Commodore DOS and many

word processors. For easy reading, even existing GEOS files can be renamed, from within GEOS, to all uppercase characters. This tip is also helpful for anyone who has downloaded GEOS files from QuantumLink, only to discover they cannot be renamed.

—HERB WETZLER
KEW GARDENS, NY

REBOOTING GEOS 128

If you use a 1750 RAM expander unit (REU) with your GEOS 128 or GEOS 128 2.0, you can sometimes reboot GEOS from the REU (after performing a reset) without disturbing the contents of the REU. Provided you have the 1750 configured as a RAM disk and the deskTop copied over to it, try rebooting by entering the following:

BANK 1: SYS 49152

If this method fails, try the "128 RBOOT" program included on the GEOS system disk. Either method usually enables GEOS without affecting the REU's contents or the system date and time.

Finally, if you own any version of GEOS 128 and a Commodore 1902A monitor (this trick won't work with most other monitors), here's a hint to improve the video image. Power up your C-128 in 80-Column mode. Then place the GEOS system disk in the drive and enter the following:

SYS 52684,8,9
BOOT

Once GEOS is activated, you'll have a slightly clearer, sharper screen image.

—RALPH G. SCHWARZ
ETOBICOKE, ONTARIO, CANADA

GEOS PHOTO MANAGER

Viewing a GEOS-created photo album can be a little confusing. Don't try to click on the album icon; rather, double-click on the Photo Manager. Next, open the album you wish to view, and you can page through the pictures. Space permitting, you can create more

than one album and incorporate graphics from other programs into it.

Another handy trick I discovered involves versions of GEOS that pre-date 2.0 and are used with two-drive systems. To facilitate copying a file from one drive to the other, don't bother moving a file icon to the border. Instead, click twice on the icon, drag the ghost of it to the icon of the other disk drive and click again to drop it. The file copying will begin immediately.

—MARY WILSON
CLEARWATER, FL

GEOCALC GRIDS

GeoCalc 128 offers the added advantage of printing forms that contain almost any type of grid. Simply create a blank spreadsheet with the number of vertical and horizontal lines desired, and print it out. With a little imagination, you'll find that geoCalc can be used to create grids for all types of

forms, from bowling score sheets to inventory lists.

—JAMES GIBSON
COLUMBUS, OH

HEADER WARNING

The manual doesn't warn you about this, but if you use geoSpell to check the spelling in your geoWrite documents, make sure you don't have a header in the document before you begin the process. On several occasions, I tried to check a document with geoSpell, only to have nothing print out but the header.

I'm not sure whether it was the format of the header or some other problem. In any case, the printer repeatedly advanced the paper, but no document was printed after the spelling check was performed. Also the computer occasionally locked up, and I had to reboot the system disk.

To be on the safe side, I now incor-

porate headers into my documents only after they've been checked for spelling.

—J. SUTTON
ADDRESS UNKNOWN

PARTNER 128 AND GEOS

If you have Timeworks' Partner 128 cartridge, I advise you to disconnect it from the computer before you attempt to use GEOS 128. After an anxiety-ridden experience of disk returns and complaints to Berkeley Softworks, I discovered that all my problems were caused by the presence of Partner 128. You won't find this mentioned in the GEOS manual, so beware of problems if you use other cartridges with GEOS.

—EDWARD C. WULFF
SALEM, OR ■

Send your GEOS-related questions, applications or geoTips to Tim Walsh, RUN Magazine, 80 Elm St., Peterborough, NH 03458.

St. Louis



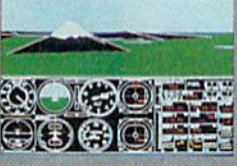
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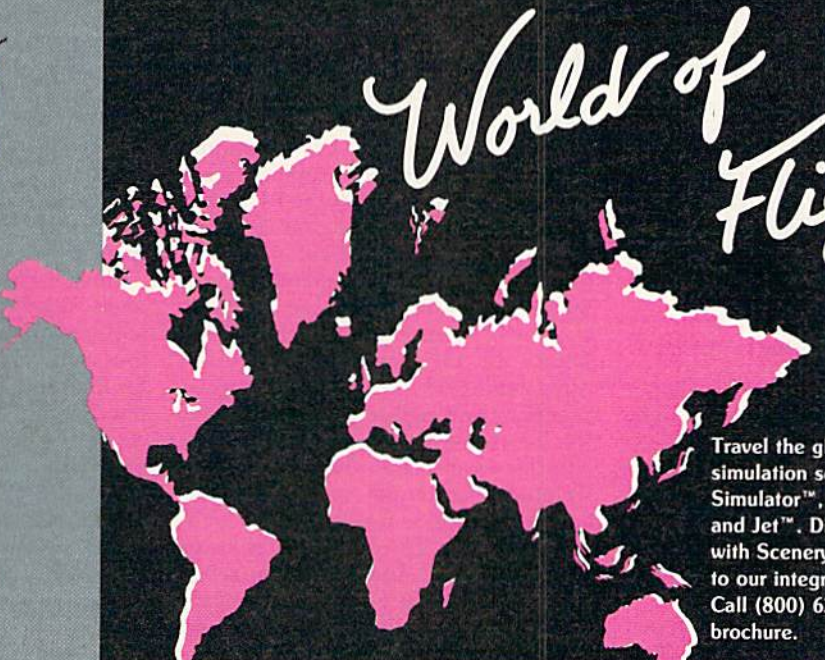
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COMMODORE CLINIC

Using a dual disk drive vs. two disk drives; speeding up subroutines; quickly accessing files on RUN's BBS.

By LOU WALLACE

Q *How can I make a program unlistable after I've loaded and run it, so that others cannot list it and make changes?*

—KEN SHVETZ
WOXALL, PA

A The easiest way is to poke to the list vector. Since you didn't say which computer you have, I'll give you the Pokes for both the C-64 and the C-128 for disabling List:

C-64: POKE 775,1
C-128: POKE 775,81

There'll also be times when you'll want to disable the run-stop and/or restore keys. These Pokes will disable the run-stop key:

C-64: POKE 808,239
C-128: POKE 808,100

These will disable the restore key:

C-64: POKE 792,193
C-128: POKE 792,125

If you want to re-enable run-stop and restore, first save the original contents of the memory locations, then poke them back. Here's an example.

A=PEEK(775) REM Save it for later
POKE 775,1 REM Disable C-64 list
POKE 775,A REM Re-enable C-64 list

Q *I have a C-128 and two disk drives. When I use the Basic 7.0 Backup command, I encounter problems. When the command asks "Are you sure?", I enter Y, and the computer tells me it's ready. However, it never copies anything. The same thing happens with the Copy command. Am I doing something wrong?*

—JOHN KALASHIAN
RACINE, WI

A The source of the problem is the fact that you have two different disk drives. The Backup and Copy commands are designed to be used with a dual disk drive, which is different from two separate disk drives. A dual drive is a single device with two drives (drive 0 and drive 1). The Backup command copies a disk between these drives, but

not between two different devices (device 8 and device 9, for example).

In the same way, the Copy command copies a file between two drives, but not two separate devices. However, Copy can be used with a single drive to make a copy of a file onto the same drive, as long as the duplicate has a different filename.

Q *Do you have a list of all the files available to date for downloading from RUN's BBS, the RUNning Board? It would save a lot of time and money on our end if we could immediately access the file we need and start downloading.*

—CHRIS PENNINGTON, SR.
HARRISBURG, PA

A No, we don't. The number of programs and files changes every week, so such a list would quickly become outdated. You can, however, easily make a list yourself. Use a terminal program that lets you capture what comes in as text. Log on to the RUNning Board and go to the Files area. Open your terminal's capture buffer and select List from the Files menu. As you list a category, you'll capture it in your buffer. Then save the buffer to disk. Repeat this for each of the categories. After signing off the BBS, use any word processor or program you want to print the list yourself, giving you an up-to-date list of available files, a brief description of each file, its size in bytes and how long it takes to download. Then, to get a list of new additions to the libraries each time you log on, select New Files from the Files menu, capture it in your terminal's buffer and save it.

Readers who wish to try our 24-hour BBS can dial 603-924-9704. It supports 300/1200/2400-baud modems. Keep in mind that it is a single-line BBS, and very busy. It may take you a while to get through.

Q *I have a weird problem with a C-128 program I'm writing. It's quite long and uses a lot of subroutines, and the problem*

occurs with each one. The first time the computer accesses a subroutine, it is extremely slow. However, when the computer uses the same subroutine again, it works very fast, and all subsequent uses of the routine work fine. I'm using several large arrays that take up about one-third of the C-128's variable memory. The program is written entirely in Basic. Is this a bug in the C-128, or is it a problem with my programming?

—BRUCE ROSE
MANHATTAN BEACH, CA

A No, it's not a bug—it's perfectly normal. The initial slowdown you're experiencing is due to the presence of the large arrays you've created. When you use a subroutine for the first time, it must find and create whatever variables you use. Since you have these large arrays, the computer must move them around to make room for the information in the new variable, and, with a lot of array variables, this can take a few seconds. Once it has allocated memory for this variable, it doesn't need to do it again, so whenever it re-encounters this particular variable, it can run at full speed.

Since each subroutine probably has some variables unique to it, they must have resources allocated the first time, thus incurring the slow execution speed for first-time access. You can avoid the slowdown in speed by predefining all your variables at the beginning of your program.

For example, before dimensioning any arrays, give each standard variable a default value. Then, after dimensioning your arrays, use a simple loop to assign each element a default value. After you do this, your program should run at top speed. ■

Do you have a problem or question about your Commodore computer system, software or programming? Just send your questions to: Commodore Clinic, RUN Magazine, 80 Elm St., Peterborough, NH 03458. Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

R U N S H E L L

From p. 29.

```

3C903D00620302B4CA0*13C904D      E3E3820BE1820      :REM*86
0062018364CA0      :REM*171
120 DATA 13C902D006204B364CA0*1      143 DATA 8533AD5438F0034CCE32*A
3C901D00620F4364CA0*13C907D      20120C6FFA000AD7B38*C953D00
00620372F4CA0      :REM*198      BA9008DBB388D      :REM*127
121 DATA 13C905D0062015264CA0*1      144 DATA BC384C191820CFFF8DBB*3
3C906D00620A73F4CA0*13C908D      820CFFF8DBC3820CFFF*20B7FFD
006209A174CA0      :REM*134      00BEEBD38D0F3      :REM*232
122 DATA 134CE514A003D97B39F0*0      145 DATA EEBE384C191820CCFF20*8
48810F86098D00EAD3E*38F01D8      53320CE32AD5438F003*4CB8181
D3F38CE3E384C      :REM*124      8ADB386DBD38      :REM*116
123 DATA 0416C901D011AD3E38C9*0      146 DATA 8DBF38ADBC386DBE388D*C
9F0D68D3F38EE3E384C*041660C      038201A2B20062EAE32*38BD8F3
902D02DAD3438      :REM*158      FA8A207A93320      :REM*94
124 DATA C950F013AD3E38C905B0*B      147 DATA 111AADBB388D5538ADBC*3
A8D3F381869058D3E38*4C0416A      88D563820983220AF18*A9348D3
D3E38C907B0DA      :REM*164      D3820171AADBF      :REM*118
125 DATA 8D3F381869038D3E384C*0      148 DATA 388D5538ADC0388D5638*2
416AD3438C950F013AD*3E38C90      0983220AF18A9358D3D*3820171
590C08D3F3838      :REM*249      AADB388D5538      :REM*15
126 DATA E9058D3E384C0416AD3E*3      149 DATA ADBE388D563820983220*7
8C90390AD8D3F3838E9*038D3E3      A1790FB4CB818A92020*D2FF20D
820102B20152B      :REM*200      2FF60A9008DBA      :REM*82
127 DATA AD3F38201A16201A2BAD*3      150 DATA 3860A00C18C6E388E6D38*2
E38201A16608D3C380A*A8B19EA      01C208A48C8B1928D7B*38E8E8E
AC8B19EA82009      :REM*201      8E8E061368AA      :REM*209
128 DATA 364CF019A9E9859BA938*8      151 DATA A92C9D0A13E8AD7B389D*0
59C208C3520102B2015*2B20C91      A13E8A92C9D0A13E8A9*529D0A1
9AD3438C950F0      :REM*66      3201724208533      :REM*64
129 DATA 0CA901A200A00120111A*4      152 DATA 0AD3B38F0034C8619A9*B
C6516A901A200A00120*111AA90      885FA85FCA90585FBA9*D985FD2
2A200A00292011      :REM*42      09F19A20DA005      :REM*207
130 DATA 1A201A2B20102BA9008D*3      153 DATA B1FA48B1FC4820B41968*9
E388D3F38201A16608E*00D62C0      1FC6891FA209F19C8C0*28D0E92
0D610FB8D01D6      :REM*174      09F19CAD0E1A2      :REM*93
131 DATA 608E00D62C00D610FBAD*0      154 DATA 18A0002009364CFE9AD*3
1D660A98585FAA93985*FBA90F8      B38F0034C9019A9288D*3538A9C
5FCA9FAA00FA2      :REM*136      085FA85FCA907      :REM*213
132 DATA 012065FF6078A9B28D14*0      155 DATA 85FBA9DB85FD20B419A2*0
3A9168D15035860AD8D*02C901F      DA005B1FA48B1FC4820*9F19689
011A5CBC904D0      :REM*61      1FC6891FA20B4      :REM*57
133 DATA 0B78208AFF686868584C*A      156 DATA 19C8C028D0E920B419CA*D
0134C31EA20F9166C02*A0AD343      0E1A20BBA0002009364C*FFE9A20
8C950F009A200      :REM*229      CA0002009364C      :REM*158
134 DATA A001A90220111A60AD3B*3      157 DATA DCC3A20BA00020093620*3
8F009A90E8D01D58D01*FF60A50      DCA20B4C85CB18A5FA*692885F
129FE850160AD      :REM*74      A85FCA5FB6900      :REM*181
135 DATA 3B38F00CA20F206BFF8D*0      158 DATA 85FB1869D485FD6038A5*F
1D58D01FF60A5010901*8501602      AE92885FA85FCA5FBE9*0085FB1
0E1FFD00FAD33      :REM*178      869D485FD60A9      :REM*165
136 DATA 388D323868686868EE54*3      159 DATA 008D3C388D3738AC3738*B
8386020E4FFF0E7C920*D002186      19EAA8B19EC88C3738*A820093
0AE4A38F016C9      :REM*41      620F019EE3C38      :REM*91
137 DATA 11F00CC991D0D4AD3E38*F      160 DATA AD3C38C90A90E260A000*B
0CF4C6E17AD72384C5B*17AE4B3      19BCD3C38F004C84CF2*19C8B19
8F0C1C99DF015      :REM*175      BF007202D2FFC8      :REM*88
138 DATA C91DD0B9AD4C38CD3E38*F      161 DATA 4CFE1960E6A7D002E6A8*6
0B1201A2EEE3E384C11*17AD3E3      08D3D38200936A9AB85*A7A9398
8F0A3EE4D3820      :REM*112      5A84C251A2009      :REM*200
139 DATA 1A2ECE3E384C11172E1*F      162 DATA 36A000B1A7CD3D38F00D*2
FD002386020E4FF1860*AE3B38B      00A1AB1A7D0F9200A1A*4C251AC
D6F398D280360      :REM*7      8B1A7F00620D2      :REM*140
140 DATA AE3B38BD71398D280360*A      163 DATA FF4C3B1A60202733B005*A
2018E6B388E67388EBA*38CA8E5      9008D3E38AE3E38BD4E*388D523
4388AA2059DBB      :REM*172      820062E200834      :REM*253
141 DATA 38CA10FA202733B005A9*0      164 DATA AD5438F00160AD6F38D0*1
08D3E38AE3E38BD4E38*8D5238B      2AE6638BD5038C902D0*08ADBA3
D5038C903D003      :REM*47      8D00320321FAD      :REM*212
142 DATA 4CB81820F02D20D31620*5      165 DATA 6F38F00C20D316201A2B*2
D1AAD5438F0034CB818*20B232A      0F02D20152B20F33420*9C1CAD5
438D021AD5D38      :REM*191

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166 DATA F01C20E31DA90B8D6138*A 189 DATA 35A000B1FE9192C8B1FE*9 212 DATA 13C901D006A9008D7638*6
2008E6238E88E3E38AD*7838D00 192C86C5A38B1FEC8C9*22D0F9B 0EE763860A92F8D0713*A9018D0
320FA1E20BB1A :REM*218 1FEC922F0138C :REM*80 6134CEF1FA901 :REM*108
167 DATA 60AD7838F0016020EAF*2 190 DATA 5B38AC5A389192C88C5A*3 213 DATA 8D6E38AD6D3820471EA9*0
0E1FFD00FADBA38F004*EE54386 8AC5B38C84C651DC88C*5B38AC5 08D6E38AD7038F006AE*71384C3
06868EE543860 :REM*220 A38A9FF9192EE :REM*186 920A200B192C9 :REM*2
168 DATA 20E4FF8D3D38F0DBC920*D 191 DATA 5A38AC5B38B1FEC92D0D*0 214 DATA FFF0089D0A13C8E84C39*2
037AD6738D008AD6F38*D0034C6 4C84C8F1DA203B1FE8C*5B38AC5 060A90B8D7938A9048D*7A38AE7
41BAD3E388D6D :REM*253 A389192EE5A38 :REM*7 938A000200936 :REM*48
169 DATA 3820691FB01CAD6F38D0*0 192 DATA EE5B38AC5B38CAD0EAAC*5 215 DATA AE3438CA20112EEE7938*C
9A2008E6738E88E6C38*AD7038F A38A9009192EE5A3820*5235206 E7A38D0E96018A54169*018541A
00920F42E20A7 :REM*42 03538AD5838E5 :REM*247 5426900854260 :REM*49
170 DATA 37200B2F4CBB1AAD6B38*F 193 DATA FE8D4038AD5938E5FF0D*4 216 DATA 202733B005A9008D3E38*A
044AD6838F03FAD3D38*C987D02 038F00B9009EE5C38EE*5D384C4 E3E38BD5038C903F001*6020062
3AE3E38BD004A :REM*224 11DEE5D3860A9 :REM*234 EBD4E3820D316 :REM*147
171 DATA F030A9009D004A9008D*6 194 DATA 0A8D4138A9008D5F3820*1 217 DATA 8D5238201A2B20F02D20*1
C38CE683820791FAD6F*38D003E 02B201A2BEE4138A007*8C4238A 02BA90B8D4138AE3238*BD953F8
E67384CBB1AAD :REM*87 E4138EE5F3820 :REM*64 D4238A9238D39 :REM*6
172 DATA 3D38C988D00EAD6C38F0*0 195 DATA 0936AD5F3820471EAD5F*3 218 DATA 38AE4138AC4238AD3938*2
34CD31FAD6F38F00160*AD3D38C 8CD5D38B034AD3238F0*23AD603 0111AE3938EE4138AD*3938C92
911F00AC991D0 :REM*125 8D007AD5F38C9 :REM*84 6D0E7A2008E4B :REM*242
173 DATA 034C061C4CBB1AAD3E38*C 196 DATA 1CB023AD4238C92F9008*A 219 DATA 38E88E4A38A2198E4638*A
D5D38B0F5AD6138C918*9010AD3 D6038D0174CF31DA02F*8C4238A D3438BD3538A9028D72*38AD323
238F005AD6238 :REM*252 CFB1DAD6038D0 :REM*158 80AAABD553F48 :REM*77
174 DATA F00620CB1B4C721B201E*1 197 DATA 07AD5F38C90ED0AD608D*0 220 DATA E8BD553FA86820222F20*4
FAD6138C919B010EE3E*38AD323 613AD8D388592AD8E38*8593A00 820AD3E38F007C901F0*64C9C2
8F005AD6238F0 :REM*41 0B192CD0613F0 :REM*233 94C0E214C2623 :REM*103
175 DATA 03EE6138AD3238F00AAD*6 198 DATA 20C8C8C8B192F004C84C*6 221 DATA A2018E6F388E6B38CA8E*8
238D005A9284CBF1BA9*008D623 01EC88C3D3818A5926D*3D38859 538202733B005A9008D*3E38AE3
820FA1E4CBB1A :REM*118 2A59369008593 :REM*34 E38BD5038C903 :REM*20
176 DATA 4CBB1AE8E6038201E1F20*F 199 DATA 4C541EAD6E38F004C8C8*C 222 DATA D00160BD4E388D523820*5
91820102BA9188D4138*A0078C4 860C8B1928D5538C8B1*928D563 A1A201A2B20062E200B*2BAC323
238AD3E388D5F :REM*159 8C88C5A382098 :REM*81 8B9853FA8A207 :REM*131
177 DATA 3820FB1DA9008D6038AD*3 200 DATA 32AE0613BD0004AF00320*1 223 DATA A92820111AA9018D4C38*2
238F008AD623849288D*6238EE3 52B18AD423869058D42*38A8AE4 07132AD3E38D00160A2*00BD004
E3820FA1E604C :REM*15 138200936AC5A :REM*34 AD009E8D0F8A9 :REM*154
178 DATA BB1AAD3E38C901F0F6AD*6 201 DATA 38A200B192C9FFF00820*D 224 DATA 008D853860A0018C6E38*8
138C90BD00DAD3238F0*05AD623 2FFC8E84CB91EE010B0*09A9202 E6D38201C209848A001*B1928D7
8D0034C4C1C20 :REM*105 0D2FFE84CC71E :REM*251 D38C8B1928D7E :REM*179
179 DATA 1E1FAD3238F012AD6238*D 202 DATA 201A2BC8C5A3818AD42*3 225 DATA 3868A838AD8A38ED7D38*8
005A9284C3D1CA9008D*62384C4 869148D4238A8AE4138*200936A D7938AD8B38ED7E38D0*7938F00
31CA9008D6238 :REM*70 C5A38B192F007 :REM*254 CB00AAD8538F0 :REM*238
180 DATA CE613820FA1ECE3E384C*B 203 DATA 20D2FFC84CEE1E60A91C*2 226 DATA 0238604C0C238A48AE60*3
B1A201E1FEE6038203D*19AD323 0D2FFA9122D2FFAE61*38AC623 8A9009D004ACE6838C8*B1928D7
8F003CE3E38CE :REM*16 8200936A200BD :REM*229 B3868AAE8E8E8 :REM*227
181 DATA 3E38CE3E3820102BA90B*8 204 DATA 8139F00720D2FFE84C0F*1 227 DATA E88E0613AAA92C9D0A13*E
D4138A0078C4238AD3E*388D5F3 F4C1A2BAE6138AC6238*200936A 8AD7B389D0A13E8A92C*9D0A13E
820FB1DA9008D :REM*78 202A92020D2FF :REM*76 8A9529D0A1320 :REM*7
182 DATA 6038AD3238F008AD6238*4 205 DATA CA10FA60200B2B201A2B*2 228 DATA 1724AD3B380AAABD653F*8
9288D6238AD3238F003*EE3E382 0062EAE3238BD7F3FA8*A207A91 5B48D7F38E8BD653F85*B58D003
0FA1EE3E384C :REM*225 120111A208617 :REM*183 8A9B48DB902EE :REM*98
183 DATA BB1AAE6638BD5038C903*D 206 DATA 20442C209017A200AD3E*3 229 DATA 7C3820272438AD0613E9*0
032AD8C388D5D38A900*8D8D38A 88D67388D6B38F00620*F02D20D 48D0613A000AD7C3891*418D8C3
9628D8E38AD04 :REM*254 31620152B60AE :REM*147 8206A20AD8538 :REM*216
184 DATA DF48AD05DF48AD06DF48*2 207 DATA 3E38BD004AF0023860EE*6 230 DATA F0034C3122AD7D389141*2
0112D207928688D06DF*688D05D 838FE004AA9008D4D38*AD3238F 06A20AD7E389141206A*20A200B
F688D04DFEEAC :REM*218 00EA90085FA85 :REM*142 D0A139141206A :REM*142
185 DATA 386020861720B232A902*8 208 DATA FBA9508D35384C9D1FA9*0 231 DATA 20E8CE0613D0F2A9FF91*4
D0613A9248D0A13A930*8D0B13A 0A00420332EA9288D35*38AD613 1206A20AE7C38AD7B38*9D0072A
9008D5738A920 :REM*201 88D693820B92E :REM*143 9038D7938A200 :REM*47
186 DATA 85FEA94D85FF20D93220*9 209 DATA CE6938D0F818AD623869*0 232 DATA BD773FCD7B38D0034C65*2
017208533AD5438F004*20D3326 C8D353820B92EAD3238*F007A5F 2A203BD773F9141206A*20E8CE7
020D332A2008E :REM*154 AA4FB20332EA0 :REM*131 938D0F2A90091 :REM*245
187 DATA 5D38E88E5C38A03CB1FE*D 210 DATA 108C463820F42E2085E*2 233 DATA 41206A20AD8538F0044C*9
00160A90085928D8D38*A94D859 00B2F18600AD8138D0FA*ADBA38D A2260AD7C380AAA38A5*B4ED7F3
38D8E3838AD58 :REM*57 0F5201C20E8E8 :REM*146 89D006EE8A5B5 :REM*198
188 DATA 38E9208D5838AD5938E9*0 211 DATA E88E0613A92FA230A03A*2 234 DATA ED00389D006E38AD8A38*E
08D5938205235A000AD*5C38919 0843720103320853320*D332AD5 D7D388D8A38AD8B38ED*7E388D8
2C88C5A382060 :REM*47 438F00160AD06 :REM*194 B38AD8538F002 :REM*57

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R U N S H E L L

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235 DATA 1860AE7C38AD06DF2907*9 258 DATA 00B141CD8638F0D0206A*2 281 DATA 38BD933FA8A207A92C4C*1
D00748A0AAAAD04DF9D*8074E8A 0B141D0F9206A204C65*25A200A 11A20102BAE3238BD95*3FA8A20
D05DF9D8074CA :REM*177 DB238D006206A :REM*153 7A92B4C111A20 :REM*244
236 DATA AD7F388D02DFAD80388D*0 259 DATA 204C8925C8C8CB141C9*F 282 DATA 1A2B20062E20102BAE32*3
3DFBD006E8D07DFE8BD*006E8D0 FF0089D0A13CE884C89*25A92C9 8BD813FA8A207A92620*111AAE8
8DFAD3B38F008 :REM*124 D0A13E8CB141 :REM*241 238BD94392D02 :REM*204
237 DATA AD06D509408D06D5205A*2 260 DATA 9D0A13E8A92C9D0A13E8*A 283 DATA FF20903220062E6020A0*2
8AD3B38F008AD06D529*BF8D06D 9579D0A13E88E061360*AD53388 8AD01DF29FC8D01DFAD*01DF29D
5EEAC384C5D21 :REM*45 D5238200B2B20 :REM*47 F8D01DFAD01DF :REM*92
238 DATA 201A2B20062E200B2BAE*3 261 DATA 5032AD3E38F003204D2B*A 284 DATA 09808D01DF2090286020*A
238BD973FA8A207A929*20111A4 E8238BD4E388D523860*AD3B380 028AD01DF09018D01DF*AD01DF0
C9032A9018D6B :REM*229 AAABD733F8D8A :REM*99 9808D01DF2090 :REM*157
239 DATA 388D81388D6738202733*B 262 DATA 38BD613F9D653FE8BD73*3 285 DATA 2860AD3238D0016020F9*1
005A9008D3E38AE3E38*BD5038C 80AAABD005E85 :REM*120 620B37720E41660AD32*38D0016
903F00160BD4E :REM*87 020F91620C477 :REM*75
240 DATA 388D52382052234C5623*2 263 DATA B438BD0060FDF005E8D87*3 286 DATA 20E41660A90E20D2FFAD*3
05A1A60AD5438F00160*A2008E8 8E8BD0060FDF005E8D88*38BD005 B380AAABD693F8528E8*8DAF38B
138200B249001 :REM*73 E85B56020EE24 :REM*175 D693F85298DB0 :REM*207
241 DATA 608E6D38BD0072C950F0*0 264 DATA AE3E388E8238BD5038C9*0 287 DATA 38A9008DB138AD04DF8D*5
34C9223BD00748D06DF*8A0AAA3 3D00160203328A9018D*6B388D6 838AD05DF8D5938205B*2920082
8BD0070E9028D :REM*235 F38205A1AAD89 :REM*182 9207A179006A9 :REM*109
242 DATA 02DFE8BD0070E9008D03*D 265 DATA 381006EE84384C452620*1 288 DATA 8E20D2FF60C911F00FC9*9
F4CA823BD00748D06DF*8A0AAB D00708D02DFE8 :REM*28 E2520B425205126AD3E*388D853 1D0ED207F29A9008DB1*384CDC2
D00708D02DFE8 :REM*28 8D02260208617 :REM*188 8ADB138D0DD4C :REM*22
243 DATA BD00708D03DFCABD8074*8 266 DATA 201A2B20062E200B2BAE*3 289 DATA DC28A908BD6A38A9008D*6
D04DFE8BD80748D05DF*8ABD006 E8D07DFE8BD00 :REM*20 238BD833FA8A207A92A*20111A2 938AC6938AE6A382009*36A0002
E8D07DFE8BD00 :REM*20 0CD3620901760 :REM*241 08C29F035C90D :REM*125
244 DATA 6E8D08DFAD3B38F012AE*6 267 DATA 20062E208227AD893830*1 290 DATA F02B20D2FFC8CC3438D0*E
D38BD0072C950F008AD*06D5094 D20062E20102BAE3238*BD933FA E4C3329C88C403818A5*286D403
08D06D5207928 :REM*120 8A207A92D2011 :REM*144 88528A5296900 :REM*54
245 DATA AD02DF85B4AD03DF85B5*A 268 DATA 1AAE8238BD943920D2FF*A 291 DATA 8529EE6A38AD6A38C917*F
900A891B4AD3B38F008*AD06D52 9008D8C388D7C388D86*3820572 00C4C122920D2FF4C32*29EEB13
9BF8D06D5AE6D :REM*33 520D225AD8938 :REM*34 860A20B8E6938 :REM*124
246 DATA 38BD0072C953D00320B0*2 269 DATA 38034CB626202228205D*2 292 DATA A9008D6A38AE6938AC6A*3
8EEAC3860BD004AD005*E8D0F83 1AD5438F0034C792708*AD7C388 8200936AE343820112E*EE6938A
860186020CCFF :REM*137 D8C380AAAD7F :REM*70 D6938C918D0E7 :REM*217
247 DATA 20B23220D62420853320*C 270 DATA 389D005EA5B49D0060E8*A 293 DATA 60A20EADAF388528ADB0*3
CFF60A20120C6FFA000*AD8538D D80389D005EA5B59D00*6020B32 8852960AD3B38D003B1*2860A92
04FAD7B38C953 :REM*148 4AD3B380AAAA5 :REM*164 8A2012074FF60 :REM*127
248 DATA D020AD3B380AAAE8BD69*3 271 DATA B49D653FE8A5B59D653F*2 294 DATA 20CE32202733B005A900*8
F48CABD693F48AD7C38*0AAA689 8B008AD6838F0034CAB*26AD7C3 D3E38AE3E38BD5038C9*03F0016
D0070E8689D00 :REM*204 8F0754C0727AD :REM*17 08A4901AABD4E :REM*103
249 DATA 704C8224AD7C380AA820*C 272 DATA 89383009AD53388D5238*4 295 DATA 388D5238A9FF8D893820*8
FFF990070C88C3838A0*0020BF2 C2E27AD8438F011A900*8D84382 227200B2B205032AD3E*38F0062
420B324AC838 :REM*250 01E2520B42520 :REM*214 04D2B4CDA2920 :REM*138
250 DATA 20CFFF990070A00020BF*2 273 DATA 062E4C2E27201E25A901*8 296 DATA 1E25A9018D7838205A1A*2
420B32420BA2420B7FF*D00620B D8638AD893810032011*2820602 05126A9008D7838AD3E*38D0016
3244C822420B3 :REM*108 520F125201724 :REM*244 0A9018DB23820 :REM*26
251 DATA 24AD3B38F00AA201A900*2 274 DATA 20E02720853320CE32AD*5 297 DATA 1A2B20062E201128A901*8
077FF4CA624A90091B4*20B3242 438F0034C7927EE8638*CE7C38D D8638206025AE8638BD*00748D0
0CCFF20853320 :REM*206 0D6AD8538F017 :REM*109 6DF8A0AAABD00 :REM*100
252 DATA CE3260E6B4D002E6B560*A 275 DATA AD8938300CAE8238BD4E*3 298 DATA 6E8D87388D07DFBD8074*8
00020CFFF8D3838AD3B*38F009A 88D52384C7627203328*4C9A262 D04DFE8BD006E8D8838*8D08DFB
201AD38382077 :REM*159 0B127A9008D85 :REM*157 D80748D05DFAD :REM*200
253 DATA FF60AD383891B460AD06*1 276 DATA 3860AD7C388DB338AD8C*3 299 DATA B380AAABD653F85B48D*0
3A20AA01320BDFFA901*AE5238A 88DB438AD8A388DB538*AD8B388 2DFE8BD653F85B58D03*DFAD3B3
00520BAFF20C0 :REM*40 DB638AD653F8D :REM*136 8F008AD06D509 :REM*10
254 DATA FF60202733B012A2008E*3 277 DATA B738AD663F8DB838A541*8 300 DATA 408D06D5207928AD3B38*F
E38BD4E388D5338CA8E*89384C1 DB938A5428DBA3860AD*B3388D7 008AD06D529BF8D06D5*2017242
425AD3E388D89 :REM*243 C38AD84388D8C :REM*41 0B23220E02720 :REM*4
255 DATA 384901AABD4E388D5338*A 278 DATA 38ADB5388D8A38ADB638*8 301 DATA 853320CE32AD5438F003*4
E3E38BD4E388D523860*20062E2 D8B38ADB7388D653FAD*B8388D6 C832AE8638CE7C38D0*8020B12
0102BAE3238BD :REM*96 63FADB9388541 :REM*255 7A9008D85388D :REM*250
256 DATA 813FA8A207A92720111A*A 279 DATA AD8A38854260A000A201*2 302 DATA B23820CE3260A0008C65*3
D89381008A9008D3E38*4C4725A 0C9FFAD3B38F00AA201*A9B4207 8AD7738F00BA9008D77*38AD433
D823849018D3E :REM*63 4FF4CF827B1B4 :REM*188 84CB12A20E1FF :REM*251
257 DATA 38AE3E38BD943920D2FF*2 280 DATA 20D2FF20B324CE8738F0*0 303 DATA D002386020E4FFA207DD*9
0903220062E60A90085*41A9628 34CE727CE8838AD8838*C9FFD0D E3FF0DFCA10F8AC6538*C914D02
54260205725A0 :REM*186 76020102BAE32 :REM*3 EC00F0FCE8C65 :REM*244

```


R U N S H E L L

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304 DATA 3818AD41386D6538A888*A 327 DATA 048D41384C562DA00048C*3 350 DATA CD7238B0DDC925D0005A9*2
2078C40381820F0FFA9*2020D2F 5388C46388C4B38888C*4C38A90 88D5538EE55384C0E30*C92DD0C
FAC4038A20718 :REM*1 08D4A38AD3238 :REM*103 AAD5538CD4C38 :REM*19
305 DATA 20F0FFAC6538884C942A*C 328 DATA 0AAABD313F48E8BD313F*A 351 DATA F0C2AD5538C929D0005A9*2
90DF009CCA63FF09B99*0A13C82 86820222FAE3E38BD77*39AC423 68D5538CE55384C0E30*AD55388
0D2FFC90DD000 :REM*111 8994E38A9068D :REM*220 D7338A9038D4C :REM*87
306 DATA A900990A131860A91C4C*D 329 DATA 46388D3538AD32380AAA*B 352 DATA 38A9788D5538A900C8D41*3
2FFA91F4CD2FFA9124C*D2FFA99 D393F48E8BD393FA868*20222FA 8A91B8D3D3820FD31AE*3238BD9
24CD2FF20102B :REM*186 D3E38AC423899 :REM*212 13FA8A20DA920 :REM*65
307 DATA 20152BA212A92020D2FF*C 330 DATA 5038EE4238AD3238C902*B 353 DATA 20111AAD553848AD5638*4
A10FA60202733B005A9*008D3E3 009EE3238EE32384C81*2DAD333 8AD4C38186D73388D55*38A9008
8AE3E38BD4E38 :REM*100 88D3238602006 :REM*227 D5638CE553820 :REM*114
308 DATA 8D5238BD5038C903D003*4 331 DATA 2EA207AD3238F005A015*4 354 DATA 9832A92020D2FF688D56*3
C832C20062E20D31620*1A2B200 C012EA001A9074C111A*207A00 8688D5538207A179001*60C920F
B2BA207AD3238 :REM*42 0200936AE3438 :REM*170 02FC92DF007C9 :REM*80
309 DATA D008A00028C41384C6D2B*A 332 DATA CAA92020D2FFCAD0F860*2 355 DATA 2BF0134C6E30AD4C38C9*0
0168C4138A90E20111A*2090322 0F42E20852E20B2F20*B92E203 3F09FCE4C382028324C*6E30203
0062EEE753820 :REM*207 32E20F42E2085 :REM*251 A32AD4C38CD74 :REM*36
310 DATA 0834200B2B201A23A207*A 333 DATA 2E200B2F60AAAD3438C9*2 356 DATA 38F08BEE4C382016324C*6
C4138A90F20111A201F*2BA207A 8F0108AA21385FA2077*16CA988 E30200B2B20062EAE32*38BD853
D41381869108D :REM*47 5FB207716608A :REM*43 FA8A207A91C20 :REM*76
311 DATA 4138A8200936AD5438F0*0 334 DATA 85FA85FC84FB189869D4*8 357 DATA 111A207132AD3E38D001*6
34CEF2BA000B90A13F0*0720D2F 5FD60AE3438E028F00F*A213208 0200B2BAE3238BD813F*A8A20FA
FC84CAA2BA92C :REM*253 3168D4438CA20 :REM*107 92120111A2010 :REM*123
312 DATA 990A1320D2FFC8A212BD*0 335 DATA 83168D453860AE3438F0*0 358 DATA 2B20062EAE3238BD853F*A
A1320D2FF990A13C8E8*BD0A132 FA213AD4438207716CA*AD45382 88C4138A207A91D2011*1A201F2
0D2FF990A138C :REM*231 0771660AC4638 :REM*170 B18AD4138690F :REM*87
313 DATA 061320E1FFD00160207A*1 336 DATA AE3438E028F01820592E*A 359 DATA 8D4138A207AC41382009*3
7F0F5B0F8C90DD006EE*06134C1 21F2083164820702E68*4980A21 620922A9001609848A2*0F20653
32C8D4338EE77 :REM*211 F20771688D0E9 :REM*173 268A8A92C990A :REM*20
314 DATA 3820152BA207AC413820*0 337 DATA 608C4138A000B1FA4980*9 360 DATA 13C8AD7338990A13C8A9*0
936201F2BAC4138A207*2009362 1FAC8CE4138D0F460AD*4D38D01 0990A13C8AD5538990A*13C8AD5
0922A8C0613B0 :REM*106 318A5FA6D3538 :REM*225 638990A13C8A9 :REM*22
315 DATA CA206B2C20442CAD3E38*D 338 DATA 85FA85FCA5FB690085FB*4 361 DATA 2C990A13C8A943990A13C*
00160AC0613C8C8C88C*0613A94 CE62EA9008D4D3838A5*FAED353 8C8C8C88C0613A92FA2*30A03A2
E8D0713A9308D :REM*64 885FA85FCA5FB :REM*112 0843720103320 :REM*131
316 DATA 0813A93A8D0913201033*2 339 DATA E90085FB18A5FB69D485*F 362 DATA 853320D332AD5438F001*6
0B23220853320D33260*A2008E4 DA5FAA4FBA6FD60AE34*38E028F 038AD0613E9078D0613*2010332
A38E88E4B388E :REM*247 00FA2132F08316 :REM*127 0853320D332AD :REM*197
317 DATA 4C38A9038D46388D3538*A 340 DATA 8D4738CA2083168D4838*6 363 DATA 5438F00160200B2BAE32*3
D32380AAABD453F48E8*BD453FA 0AE3438E028F08A213*AD47382 8BD873FA8A20FA9220*111A201
86820222F6020 :REM*163 07716CAAD4838 :REM*160 02B20062EAE32 :REM*130
318 DATA 1A2B20062E200B2BAE32*3 341 DATA 20771660A2008E3E3820*3 364 DATA 38BD853FA207A88C4138*A
8BD7F3FA8A207A91020*111A60A 32E20F42E20852E200B*2F20111 91E20111A201F2BA207*AD41381
E66388E3E38EE :REM*198 760201A2B2006 :REM*189 8690F8D4138A8 :REM*36
319 DATA 7838EEAD38205A1A206B*2 342 DATA 2E200B2BAE3238BD8B3F*A 365 DATA 20093620922A8C0613EE*7
C20442CAD3E38D00160*201A2B2 8A207A91620111AA200*8E4A38E 6384C132CAE3238BD91*3FA8AE4
0062E20102BAE :REM*248 88E4B388E4C38 :REM*78 138AD3D382011 :REM*141
320 DATA 23238BD8D3FA8A207A936*2 343 DATA A9108D4638A9138D3538*A 366 DATA 1A209832A92020D2FF60*1
0111AA9048D46388C4B*38A9078 D32380AA8B94D3F48C8*B94D3FA 8AD553869288D5538AD*5638690
D3538A9028D4C :REM*90 86820222FAD3E :REM*120 08D56386038AD :REM*121
321 DATA 38AD32380AAABD5D3F48*E 344 DATA 38F0034C782020062E20*2 367 DATA 5538E9288D5538AD5638*E
8BD5D3FA86820222FAD*3E388D9 733B005A9008D3E38AE*6638BD5 9008D563860AD7338C9*28B005A
F38A9008D8C38 :REM*40 038C903D00160 :REM*236 9284C48D2A950 :REM*157
322 DATA AD9F380AAABD6D3F8D8A*3 345 DATA C9020F1A201A2B200B2B*2 368 DATA 38ED73388D7438602006*2
8E8BD6D3F8D8B38A900*8D7C388 0062EAE3238BD8D3FA8*A207A91 0AE3238BD833FA8A207*A918201
D06DFA9018D04 :REM*164 720111A4C9032 :REM*222 11A20CD3660A0 :REM*238
323 DATA DFA9138D05DFA9008541*A 346 DATA BD4E388D523820062EAE*3 369 DATA 00200936AE3438CA4C11*2
962854260A9008D02DF*A9628D0 238BD873FA8A207A90E*20111A2 EA9038D46388D3538A2*018E4B3
3DFA9008D04DF :REM*134 09032205032AD :REM*206 8AD32380AAABD :REM*74
324 DATA 8D05DF8D06DFA9008D07*D 347 DATA 3E38D0034CDC2F204D2B*2 370 DATA 513F48E8BD513FA8684C*2
FA9138D08DF6020F02D*20D316A 01A2B20062E20D31620*1A2B200 22F20E4FFC920D0F960*20F916A
903A20CA00420 :REM*18 B2BAE3238BD8F :REM*143 E5538AD5638AC :REM*38
325 DATA 111AA904A210A820111A*A 348 DATA 3FA8A207A91920111AA9*0 371 DATA 3B38F00620328E4CE416*2
9008D41388D4238AD32*388D333 18D4C388D5538A9008D*5638A94 0CDBD4CE416A90020BD*FFAD3B3
818A90C6D4138 :REM*70 D8D723820102B :REM*217 8F005A20F2068 :REM*152
326 DATA AAA012A90520111A18AD*4 349 DATA A91A8D3D38A90B8D4138*2 372 DATA FFA90FAE5238A820BAFF*2
138690EAAA00EA90620*111AAD4 0FD31207A17900160C9*20F039C 0C0FF60A90120C3FFA9*0F20C3F
138C904F008A9 :REM*101 92BD017AD5538 :REM*2 F60A9002090FF :REM*113

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R U N S H E L L

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373 DATA A900AE5238AC573820BA*F      :REM*147
FA90AAAA913A8AD0613*20BDFFA
D3B38F006A900      :REM*125
374 DATA AA2068FFA900A6FEA4FF*2
0D5FF8E58388C593860*AD0613A
207A01320BDF      :REM*53
375 DATA A90FAE5238A802BAFF20*C
0FF6020861720062EA9*008D663
8AD4F38D00520      :REM*62
376 DATA 90171860CD4E38F0F6A2*0
7AC3238D005A0074C4F*33A01BA
90820111AA200      :REM*60
377 DATA 8E4A38E88E4B388E4C38*A
9038D46388D3538AD32*380AAAB
D413F48E8BD41      :REM*90
378 DATA 3FA86820222FAD3E388D*6
6382090173860A9008D*543820C
CFFA20F20C6FF      :REM*205
379 DATA 20CFFFC9329050AE7538*E
00F0F034CD2338D5438*A99220D
2FF20062EA91C      :REM*99
380 DATA 20D2FFAE3238BD7D3FA8*A
207200936AD543820D2*FF20CFF
FC90DF00620D2      :REM*164
381 DATA FF4CC533A9018D543820*C
CFFAD7538D00920932*2007342
0062E6020CFF      :REM*101
382 DATA C90DF0034CE933A9008D*5
43820CCFF60A90120C3*FFA90F2
0C3FF6060AE66      :REM*40
383 DATA 38BD0538C903D0034C6F*3
520B232A901AE5238A0*0020BAF
FAD3B38F006A9      :REM*5
384 DATA 0FAA2068FFA908A23BA0*1
320BDF020CFF208533*AD5438F
00420CE3260A2      :REM*7
385 DATA 0120C6FFA20520CFFCA*1
0FAA00020CFFFC922D0*F920CFF
FF007990A13C8      :REM*231
386 DATA 4C5B34A010990A1320CF*F
F20CFF20CFF8D5538*20CFF8
D5638208533AD      :REM*147
387 DATA 5438F00420CE326020CE*3
220CCFFA209AD3238F0*05A0164
C9E34A002A909      :REM*12
388 DATA 20111AAE6638BD943920*D
2FFA209AD3238F005A0*214CBA3
4A00D200936A0      :REM*249
389 DATA 00B90A13F00720D2FFC8*4
CBF34A209AD3238F005A0*324CD
934A01E200936      :REM*62
390 DATA 209832A209AD3238F005A
0374CED34A023A90A20*111A60A
99A20D2FFA20A      :REM*67
391 DATA A000200936AE3438A920*2
0D2FFCAD0FAA9028D5F*38A9008
D4138A20AA905      :REM*51
392 DATA 186D4138A8A90B20111A*A
20A18A90C6D4138A8A9*0C20111
AA20A18A91F6D      :REM*70
393 DATA 4138A8A90D20111AAD32*3
8F00DCE5F38F008A928*8D4138A
C1435606018A5      :REM*230
394 DATA FE92085FEA5FF690085*F
F6018A5926D5A388592*A593690
0859360A213BD      :REM*188
395 DATA 96399D0A13CA10F7AD8A*3
88D538AD8B388D5638*20152B4
C9034A99320D2      :REM*250
396 DATA FFA99720D2FF20152BA2*0
0A000200936A920200E*3620102
BA2018E3738AE      :REM*101
397 DATA 3738A000200936A200A9*2
020D2FFEBC3438D0F5*EE3738A
D3738C906D0E1      :REM*164
398 DATA 201A2BA90D20D2FFA206*A
000200936A9B8200E36*A99720D
2FFA208A00020      :REM*171
399 DATA 0936A9B9200E3620152B*A
209A000200936A200A9*A020D2F
FE8EC3438D0F5      :REM*87
400 DATA 601820F0FF6020D2FFC8*C
C3438D0F760201A2B20*062E202
733AE3E38BD50      :REM*229
401 DATA 38C903D00160BD4E388D*5
238201738A9028D0613*A9568D0
713A9308D0813      :REM*169
402 DATA 20103320853360202733*B
005A2008E3E38AE3E38*BD5038C
903F01DBD4E38      :REM*79
403 DATA 8D5238A9018D6B388D6F*3
8205A1A201A2B200B2B*20062E2
07D3660AE3238      :REM*84
404 DATA BD833FA8A207A9132011*A
A20CD36AD3E38D00160*A200BD0
04AC901F004E8      :REM*82
405 DATA D0F660A9009D004A8E6D*3
8201C20E8E8E8E8E613*A9538D0
713A9308D0813      :REM*101
406 DATA A93A8D09132010332085*3
320D3324C9436A2038E*35388E4
638A2018E4B38      :REM*195
407 DATA 8E4C38CA8E4A38AD3238*0
AAABD493F48E8BD493F*A868202
22F6020F937B0      :REM*43
408 DATA 3A2018E70388E6B388E*6
F38205A1AAD5438D021*201A2B2
0062E200B2BAE      :REM*23
409 DATA 3238BD833FA8A207A915*2
011A20CD36B005AD3E*38D0016
0A200BD004AD0      :REM*204
410 DATA 06E8E0FFD0F660208E37*A
9009D004A8E6D38E001*F006209
937CAD0FAA000      :REM*123
411 DATA B1A9F007990A13C84C52*3
7A93D990A13C88C7138*201C20E
8E8E8E8E613A9      :REM*131
412 DATA 5A2A30A03A2084372010*3
320853320D3324C2E37*8D07138
E08138C091360      :REM*120
413 DATA AD583885A9AD593885AA*6
018A5A9691185A9A5AA*690085A
A60201A2B2010      :REM*109

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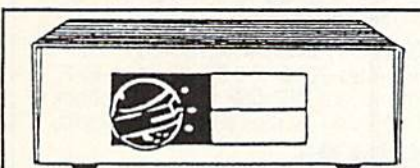
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Serial, DB25, 6 ft., male/male	R6MM	\$8.95
Serial, DB25, 6 ft., male/fem	R6MF	\$8.95
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IBM Printer, 10 ft., male/male	IBP10	\$10.95
IBM Printer, 15 ft., male/male	IBP15	\$16.95
IBM Printer, 25 ft., male/male	IBP25	\$24.95
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414 DATA 2B20062EAE3238BD853F*A 9031904190519004449*534B205 A000520303820 :REM*44
818690F8D4138A207A9*1420111 3455455500001 :REM*192 435 DATA 20303920203130202031*3
A20222BA207AC :REM*241 425 DATA 52454E414D4520412046*4 1200006203135343120*2031353
415 DATA 413820093620922A208E*3 94C4500025343524154*4348204 7312020313538 :REM*64
7AE3E38E001F0062099*37CAD0F 12046494C4500 :REM*116 436 DATA 31202052414D20200007*1
AA000B90A1391 :REM*31 426 DATA 03464F524D4154204120*4 C924D4F564520435552*534F522
416 DATA A9F004C84CE437201A2B*2 449534B0004434C4541*4E55502 05448454E2050 :REM*117
0062E20F02D60202733*B005A90 041204449534B :REM*19 437 DATA 52455353205350414345*2
08D3E38AE3E38 :REM*118 427 DATA 0005434F50592046494C*4 0544F2053454C454354*0081C5
417 DATA BD5038C903F008BD4E38*8 50006434F5059204449*534B000 553494E472057 :REM*92
D52381860386020102B*AE3238B 7435245415445 :REM*148 438 DATA 48494348204452495645*3
D813FA8A20BA9 :REM*100 428 DATA 204449522F52414D0008*4 A20204120204220009*9712445
418 DATA 1220111AAE6638BD9439*2 449534B4C4F47000944*4952454 24956453A000A :REM*5
0D2FF6000000000000*0000000 3544F52590000 :REM*119 439 DATA 46524545000B53495A45*0
0000000000000 :REM*133 429 DATA 00EF64ED6E0004000008*0 00C46494C45204E414D*45000D5
419 DATA 000000000000000000*0 90A0B91111D9D0E1CC0*03E004 4595045000E49 :REM*235
000000000000000000 :REM*10 430 DATA 535953343836370D4142*5 440 DATA 4E53455254204120424C*4
000000000000000000 :REM*11 2414E4B31353A :REM*7 14E4B204449534B2041*4E44205
420 DATA 000000000000000000*0 2414D20444952454354*4F52590 0524553532053 :REM*68
000000000000000000 :REM*11 020202020524E :REM*197 441 DATA 50414345000F454E5445*5
000000000000000000 :REM*8 431 DATA 000197124D4F56452043*5 2204449534B204E414D*453A001
421 DATA 000000000000000000*0 552534F52205448454E*2050524 04F4B41592054 :REM*95
000000000000000000 :REM*8 432 DATA 4143451220544F205345*4 442 DATA 4F20464F524D41542044*4
000000000000000000 :REM*9 433 DATA 4F20554E2D53454C4543*5 9534B20204E20205920*00114F5
422 DATA 000000000000000000*0 C454354000297125052*4553532 0454E20535542 :REM*112
000000000000000000 :REM*9 434 DATA 0924635122054 :REM*237 443 DATA 2D4449524543544F5259*3
423 DATA 000000000000000020803*0 4202F209253544F5012*20544F2 B20434C45414E :REM*82
80408021A031A041A02*2D032D0 043414E43454C :REM*116 444 DATA 555020574F524B494E47*2
42D023E010202 :REM*24 434 DATA 00031F92444556494345*2 04F4E2044524956453A*00134F4
424 DATA 0203020402052011902*1 0413A00044445564943*4520423 B415920544F20 :REM*206

```

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```

445 DATA 44454C4554452046494C*4 52D4C4953543F20204E*2020592
00014454E5445 :REM*255 446 DATA 52204E4557204E414D45*3
A00154F4B415920544F*2052454 E414D45204649 :REM*23
447 DATA 4C452D4C4953543F2020*4 E202059200016435245*4154452
0444952454354 :REM*202 448 DATA 4F525920202041434345*5
3532052414D20434152*5420001 74552524F5220 :REM*21
449 DATA 2D2053454C4543544544*2 0444556494345204953*204E4F5
4204120313538 :REM*52 450 DATA 310018464F524D415420*4
4455354494E4154494F*4E20444 9534B3F202020 :REM*82
451 DATA 4E2020590001955534520*2 B202D20204B45595320*544F205
3454C45435420 :REM*40 452 DATA 545241434B2F424C4F43*4
B53001A535441525449*4E47205 45241434B3A00 :REM*224
453 DATA 1B424C4F434B2053495A*4 53A001C4F4B41592054*4F20435
2454154452044 :REM*86 454 DATA 49524543544F52593F20*2
04E202059001D504152*5449544 94F4E204E414D :REM*72
455 DATA 453A001E444952454354*4 F5259204E414D453A00*1F50524
55353203C5354 :REM*242 456 DATA 4F503E20544F20414343*4
5535320524F4F542044*4952454 3544F52590020 :REM*60
457 DATA 454E44494E4720545241*4 34B3A00214558414D50*4C453A2

```


R U N S H E L L

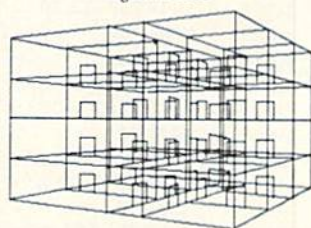
```

0504152544954      :REM*211      71B0418041805      :REM*86
458 DATA 494F4E204E414D45203C*5 481 DATA 19021601150216011502*1
2455455524E3E002245*58414D5    60A1E061A071B0D2107*1B0C202
04C453A204E41      :REM*113      300111D919D94      :REM*88
459 DATA 4D452C203C322D4C4554*5 482 DATA 13931020D33220E7FFA2*0
445522049443E203C52*4554555    18E84388EA638CA8EA8*388E973
24E3E00232044      :REM*65      8A9FE8DB90220      :REM*173
460 DATA 49534B20544F20455850*4 483 DATA EE24AD3E388D823820C0*4
14E53494F4E2052414D*2020200    4203328AD893830034C*F53FA90
0242045585041      :REM*177      08DA538A9558D      :REM*38
461 DATA 4E53494F4E20544F2053*5 484 DATA 0713A9498D0813A9028D*0
95354454D2052414D20*0025204    61320103320D3324C05*40A9018
55850414E5349      :REM*45      DA538201E25AD      :REM*62
462 DATA 4F4E2052414D20544F20*4 485 DATA A838D00320B425201A2B*2
449534B202020002649*4E53455    0062E200B2BAE3238BD*7F3FA8A
25420534F5552      :REM*255      207A92E20111A      :REM*153
463 DATA 4345204449534B20494E*5 486 DATA 20442CAD3E38D00160AD*A
44F2044524956453A00*27494E5    938F03CA9018D9738AD*52388D9
3455254205441      :REM*88      1382097449010      :REM*254
464 DATA 52474554204449534B20*4 487 DATA 20CE32AD523820C3FFAD*5
94E544F204452495645*3A00284    33820C3FF60AD8938C9*FFF055A
F4B415920544F      :REM*133      D53388D52388D      :REM*47
465 DATA 204C4F4144204449534B*2 488 DATA 9138209744900720B232*2
046494C45533F202020*4E20205    0853360ADA938D0034C*8640AE8
920002952414D      :REM*163      238BD4E388D52      :REM*159
466 DATA 204449534B2046554C4C*0 489 DATA 388D9138206844AD5338*8
02A4F4B415920544F20*434F505    D9138206844201A2B20*062E201
92046494C4520      :REM*125      02BAE3238BD85      :REM*183
467 DATA 4C4953543F202020204E*2 490 DATA 3FA8A207A93120111AAE*8
0205920002B52454144*494E472    238BD943920D2FF206B*42A9018
046524F4D2053      :REM*126      DA238A9008DA4      :REM*149
468 DATA 4F55524345204449534B*0 491 DATA 38ADA438D047205542AD*A
02C57524954494E4720*544F204    7388DA438ADA538D039*ADA638D
4455354494E41      :REM*188      003203328A900      :REM*100
469 DATA 54494F4E204449534B00*2 492 DATA 8DA638AE8238BD4E388D*5
D46494C4520434F5059*20574F5    2388D91382068442006*2E20102
24B494E472046      :REM*201      BAE3238BD913F      :REM*117
470 DATA 524F4D2044524956453A*2 493 DATA A8A207A92F20111AAE82*3
0002E4F4B415920544F*20434F5    8BD943920D2FFAE8238*BD4E388
059204449534B      :REM*128      D52388D913820      :REM*162
471 DATA 3F2020204E2020592000*2 494 DATA BB428D9438ADA2388D92*3
F52454144494E472046*524F4D2    8A9008D9338ADA938D0*0620174
04449534B3A00      :REM*34      54C3541ADA838      :REM*141
472 DATA 3057524954494E472054*4 495 DATA F00620F0424C354120FD*4
F204449534B3A0003144*49534B2    2AD8F38290FC903900A*AEA138C
0434F50592057      :REM*132      A8EA238206844      :REM*159
473 DATA 4F524B494E472046524F*4 496 DATA EEA238CEA438F00BADA2*3
D2044524956453A0032*3135343    8CDA138B0034CFF4020*554238A
12F3634204D4F      :REM*212      DA738EDA4388D      :REM*200
474 DATA 4445204E4F5420494E53*5 497 DATA A43838ADA238EDA4388D*A
4414C4C45442D505245*5353205    238AD89381038201E25*ADA838D
3504143450033      :REM*41      00DAD8438F008      :REM*41
475 DATA 53544152543A0034454E*4 498 DATA A9008D843820B4252068*4
43A003542595445533A*0036534    420062E20102BAE3238*BD9B3FA
54C4543542045      :REM*115      8A207A9302011      :REM*149
476 DATA 582D4D4F442054595045*3 499 DATA 1AAE8238BD943920D2FF*4
A203137363420202031*3730302    CB541AD53388D9138AD*A2388D9
0202031373503      :REM*39      23820BB428D94      :REM*36
477 DATA 00374F4B415920544F20*4 500 DATA 38A9008D9338ADA938D0*0
34C45414E2D55502044*49534B3    CAD53388D523820F145*4CF441A
F20202020204E      :REM*199      DA838F006207D      :REM*92
478 DATA 2020592000F205D20392*0 501 DATA 434CE541208A43AD8F38*2
612053E066E04DE06AE*0532055    90FC90390062068444C*0B42CEA
E0233055F0236      :REM*124      438AEA238E88E      :REM*56
479 DATA 0562021A054602370563*0 502 DATA A238ECA138B008ADA438*D
2BF058B031E054A022D*0559200    0AD4CB340AD53388D52*3820AF4
0750010007500      :REM*181      4201A2B20062E      :REM*28
480 DATA 1000750010EC03EC01EC*0 503 DATA 200B2BAC3238B9853FA8*A
75B00B5005345515052*47071B0    207A93720111AA9018D*4C38207

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R U N S H E L L

132AD3E38D003 :REM*110	060442057448EA038A2*01AD0CD	523 DATA 048D3113AE9838F00209*1
504 DATA 4C3A4020062E201738A9*5	C2077FFAE038 :REM*25	0A9038D9D38201F4478*2C0DDC2
68D0713A9018D061320*10334C3	514 DATA 0D9C388D9C38C8D0E3E6*F	05744206044AD :REM*36
A400050010AD :REM*198	FCAD0DECE3413D0C458*688D00F	524 DATA 0CDC8D8F385860AD9138*A
505 DATA 3B380AAABD514285FEE8*B	F60A9828D3113 :REM*62	E5238A00F20BAFFA901*A29DA03
D514285FFA9FE8DB902*60AE823	515 DATA A9018D97384C9643A902*A	F20BDDF20C0FF :REM*136
8BD5038F00AC9 :REM*59	E9838F00209108D3113*AD00FF4	525 DATA 60A9498D0713A9018D06*1
506 DATA 01F00CA9518DA13860A9*2	8A90E8D00FF20 :REM*145	320103320D33260BD82*38BD503
48DA1386020B23220DA*4520073	516 DATA 3844AD92388D3213AD93*3	8F042C902F007 :REM*174
420B232A20F20 :REM*164	88D3313AD94388D3413*A9068D9	526 DATA C901F021686860AD3B38*F
507 DATA C9FFB00EA000B9D848F0*1	D38201F44A940 :REM*213	00EA9058DA738A9018D*A9388DA
020D2FFC84C984220C7*45A9248	517 DATA 8D9E38A000078AE973838*2	83860A9038DA7 :REM*181
DA1386020C745 :REM*226	047FFAD00DD4D9E3829*40F0F64	527 DATA 38A9008DA93860AD3B38*F
508 DATA AD8533D0EFA9478DA138*6	D9E388D9E388E :REM*45	009EEA938A908DA738*60A9008
0AE8238BD5038C902D0*06A9288	518 DATA A038A201A9FE20774F8D*0	DA938A9058DA7 :REM*75
D943860ADA238 :REM*174	CDCAEA038206044C8D0*DAE6FFC	528 DATA 3860A9008DA938AD3B38*F
509 DATA C924B018C912B003A915*6	AD0D5182047FF :REM*89	0E54C044520B23220DA*4520073
0C919B003A91360C91F*B003A91	519 DATA 2C0DDC204344206044AD*0	420B232AE9438 :REM*72
260A9116038E9 :REM*81	CDC8D8F3848204E4468*290FC90	529 DATA CA8E9338A9018DAC48AD*9
510 DATA 234CD242A9808D3113A9*0	2B005CE3413D0 :REM*211	2380A8DAD4818ADAD48*6DAD48A
18D97384C0943A900AE*9838F00	520 DATA AB58688D00FF60AE9138*2	ABDC6468DB648 :REM*64
209108D3113AD :REM*131	0C9FFA200AC9D38BD2F*1320D2F	530 DATA E8BDC6468DB748E8BDC6*4
511 DATA 00FF48A90E8D00FF2038*4	FE888D0F620CC :REM*56	68DB848AD93380A8DAD*4818ADA
4AD92388D3213AD9338*8D3313A	521 DATA FF60A9558D2F13A9308D*3	D486DAD48AABD :REM*248
D94388D3413A9 :REM*29	0136048AD00DD09108D*00DD686	531 DATA 09488DBA48E8BD09488D*B
512 DATA 068D9D38201F44A0008C*9	0AD00DD29EF8D :REM*196	B48E8BD09488DBC48A2*0F20C9F
C38782C0DDC205744AE*9738206	522 DATA 00DD60AD00DD49108D00*D	FB018A0000B9AF :REM*252
044AD0CDC8D8F :REM*133	D60A9082C0DDCF0F960*ADA938D	532 DATA 48F00720D2FFC84C7E45*2
513 DATA 38290FC902B02A205744*2	00160203844A9 :REM*175	0CCFFA20120C6FF9006*A9808D8



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F3860A0020CF : REM*104	5A00B9CF48F072D2*FFC84CB	552 DATA 382C3036392C3037302C*3
533 DATA FFAE3B38E00F0C78A0*0	946603030302C : REM*2	037312C3037322C3037*332C303
0A2012077FF584CB645A00091F	543 DATA 3030312C3030322C3030*3	7342C3037352C : REM*226
EE6FED0E2E6FF : REM*133	32C3030342C3030352C*3030362	553 DATA 3037362C3037372C3037*3
534 DATA 20CCFFCE9338303034C2F*4	C3030372C3030 : REM*194	82C3037392C3038303030302C3
5A90120C3FFA90F20C3*FF20CCF	544 DATA 382C3030392C3031302C*3	030312C303032 : REM*110
FA9008D8F3860 : REM*128	031312C3031322C3031*332C303	554 DATA 2C30303332C303342C30*3
535 DATA A901AE5238A00320BAFF*A	1342C3031352C : REM*56	0352C3030362C303037*2C30303
902A239A01320BDF20C*0FF60A	545 DATA 3031362C3031372C3031*3	82C3030392C30 : REM*35
E9438CA8E9338 : REM*186	82C3031392C3032302C*3032312	555 DATA 31032C3031312C303132*2
536 DATA 20B23220DA4520073420*B	C3032322C3032 : REM*121	C3031332C3031342C30*31352C3
232A20F20C9FF90034C*944520B	546 DATA 332C3032342C3032352C*3	031362C303137 : REM*138
74620CCFFAD92 : REM*57	032362C3032372C3032*382C303	556 DATA 2C3031382C3031392C30*3
537 DATA 380A8DAD4818ADAD486D*A	2392C3033302C : REM*75	2302C3032312C303232*2C30323
D48AABDC6468DC648E8*BDC6468	547 DATA 3033312C3033322C3033*3	32C3032342C30 : REM*91
DC748E8BDC646 : REM*127	32C3033342C3033352C*3033362	557 DATA 32352C3032362C303237*2
538 DATA 8DC848AD93380A8DAD48*1	C3033372C3033 : REM*19	C3032382C3032392C30*33302C3
8ADAD486DAD48AABD09*488DCA4	548 DATA 382C3033392C3034302C*3	033312C303332 : REM*9
8E8BD09488DCB : REM*85	034312C3034322C3034*332C303	558 DATA 2C3033332C3033342C30*3
539 DATA 4E8BD09488DCC48A201*2	4342C3034352C : REM*211	3352C30303362C303337*2C30333
0C9FF9006A9808D8F38*60A000A	549 DATA 3034362C3034372C3034*3	82C3033392C30 : REM*192
D3B38F00C78A2 : REM*68	82C3034392C3035302C*3035312	559 DATA 343000000055413A332C*3
540 DATA 01A9FE2074FF584C7C46*B	C3035322C3035 : REM*137	02C00000002C000000D*0055423
1FE20D2FFC8D0E7E6FF*20CCFFA	550 DATA 332C3035342C3035352C*3	A332C302C0000 : REM*118
20F20C9FF9006 : REM*8	035362C3035372C3035*382C303	560 DATA 002C00000000D00422D50*3
541 DATA A9808D8F3860A20F20C9*F	5392C3036302C : REM*26	A3320300D0055413A33*203203
FB0F3A000B9BF48F07*20D2FFC	551 DATA 3036312C3036322C3036*3	431203000002C : REM*162
84C9D4620CCFF : REM*110	32C3036342C3036352C*3036362	561 DATA -1 : REM*162
542 DATA CE9338303034C14464CC7*4	C3036372C3036 : REM*96	

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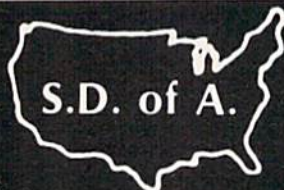
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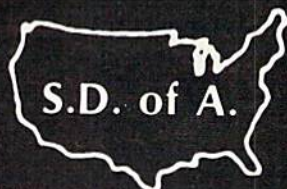


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RUN's CHECKSUM

TYPE IN RUN's CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running. When typing in a program from RUN, first load and run RUN's Checksum. The screen will display a SYS number that deactivates and reactivates the Checksum. Always disable RUN's Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

With this new version, when you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line is correct. If the number that appears *doesn't* match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate RUN's Checksum, using the SYS number. Save the finished program.

All the graphics and control characters in the listings in RUN have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

- {22 SPACES}—press the space bar 22 times
- {SHIFT CLR}—hold down the shift key and press the clr-home key
- {2 CRSR DNs}—press the cursor-down key twice
- {CTRL 1}—hold down the control key and press the 1 key
- {COMD T}—hold down the Commodore logo key and press the T key
- {FUNCT 1}—press the F1 key
- {5 LB.s}—press the British pound key (*not* #) five times [R]

Listing 1. RUN's Checksum program. This program is available on RUN's BBS for users to download.

```

10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(40960) THEN MO=64:SA=4
  9152
30 FOR I=0 TO 169:READ B:CK=CK+B:POKE SA+I,B:NEXT
40 IF CK<>20651 THEN PRINT "DATA ERROR!":END
50 POKESA+110,240:POKESA+111,38:POKESA+140,234
60 PRINT CHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
70 PRINT "TO TOGGLE ON OR OFF, SYS"SA:IF MO=128
  THEN 100
80 POKESA+13,124:POKESA+15,165:POKESA+25,124:PO
  KESA+26,165
90 POKESA+39,20:POKESA+41,21:POKESA+123,205:POK
  ESA+124,189
100 POKESA+4,INT(SA/256):SYS SA:NEW
110 DATA 120,162,24,160,13,173,4,3,201,24,208,4
  ,162,13,160,67,142,4,3,140
120 DATA 5,3,88,96,32,13,67,152,72,169,0,141,0,
  255,133,176,133,180,166,22
130 DATA 164,23,134,167,132,168,170,189,0,2,240
  ,58,201,48,144,7,201,58,176
140 DATA 3,232,208,240,189,0,2,240,42,201,32,20
  8,4,164,180,240,31,201,34
150 DATA 208,6,165,180,73,1,133,180,230,176,164
  ,176,165,167,24,125,0,2,133
160 DATA 167,165,168,105,0,133,168,136,208,239,
  232,208,209,169,42,32,210
170 DATA 255,165,167,69,168,170,169,0,32,50,142
  ,169,32,32,210,255,32,210
180 DATA 255,169,13,32,210,255,104,168,96,104,1
  70,24,32,240,255,104,168
190 DATA 96,56,32,240,255,138,72,152,72,24,162,
  0,160,0,32,240,255,169
200 DATA 42,208,198
  
```

TYPE-IN TROUBLES?

YOU HAVE TYPED IN A RUN PROGRAM and are having some problems getting it to run. After a while, you feel like calling for help, but since we're not next door, it's expensive to call us. But we can share our experiences with you. Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these. If so, perhaps the answers will help you find and correct the difficulty.

- You get an Out of Data in Line xxx message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

- One might be with the line that reads the data, usually a For...Next loop. Make sure you have the proper values for the loop, because if the listing has a loop of 0 to 150 and you've typed 0 to 160, you'll get the "Out of Data" message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. More likely, you may have skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing.

- You get an Illegal Quantity Error in Line xxx. That means that you've read a number from a Data state-

ment and tried to Poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. Just look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).

- You get a Syntax Error in Line xxx. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.

- You get an Error in Data message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if all the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully, correct the mistake(s), save the new version and try again.

Finally, we urge everyone who intends to type in one of our listings to use RUN's Checksum program, which is printed in each issue. This nifty little program will help you avoid every mistake we mentioned above, except that it won't detect the omission of a line. ■

—LOU WALLACE

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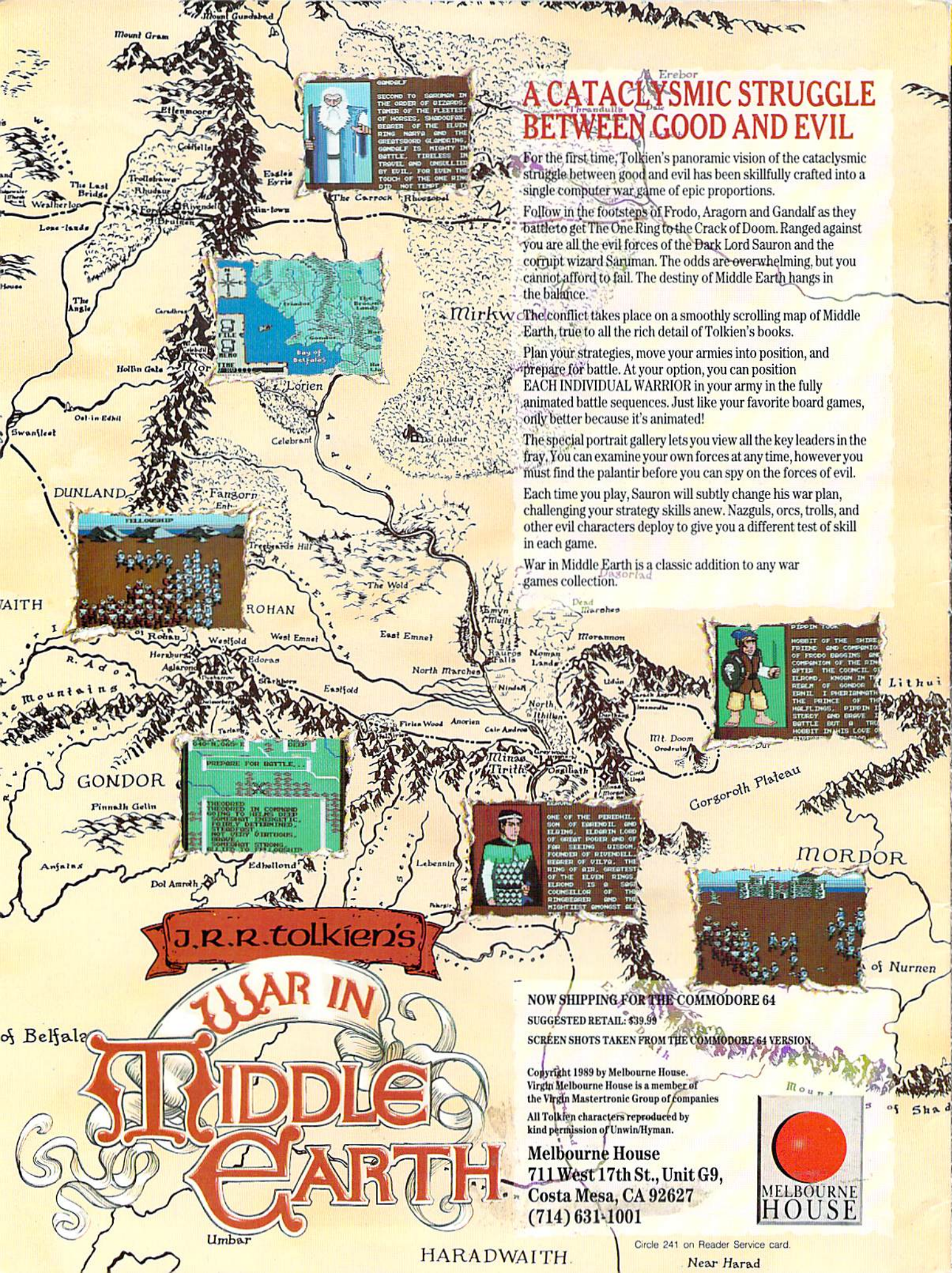
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