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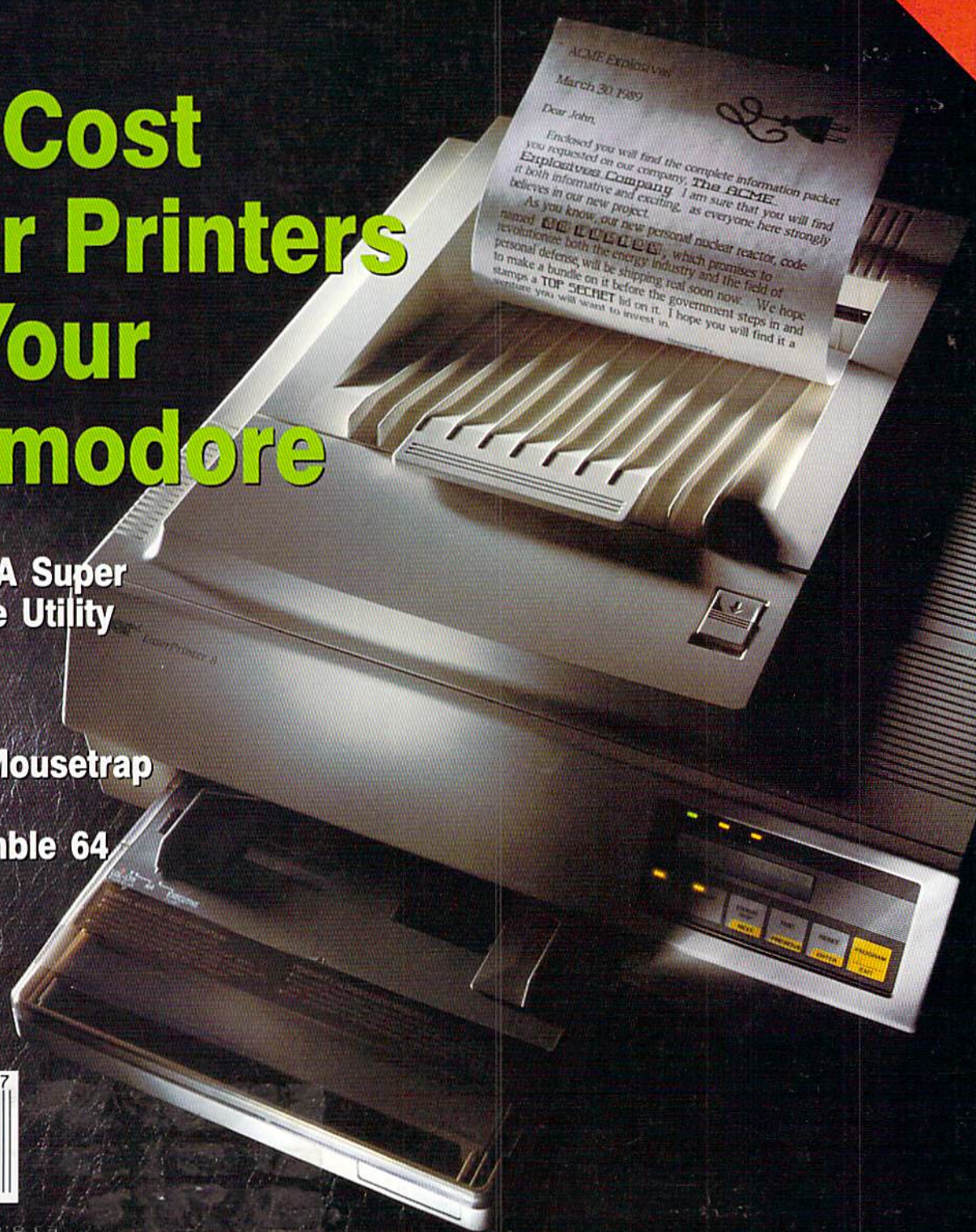

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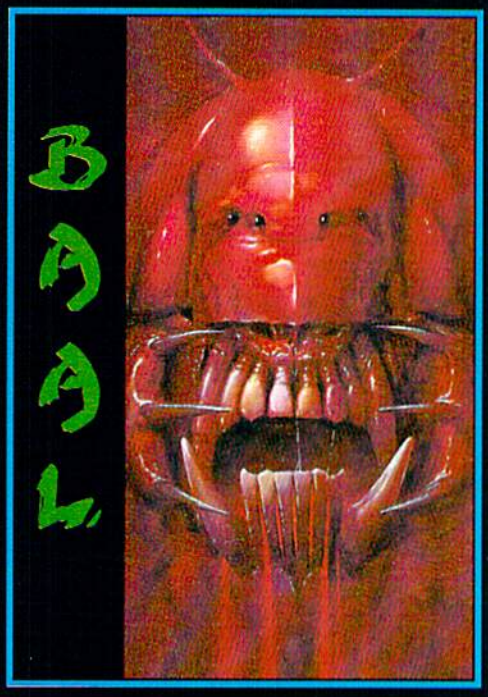

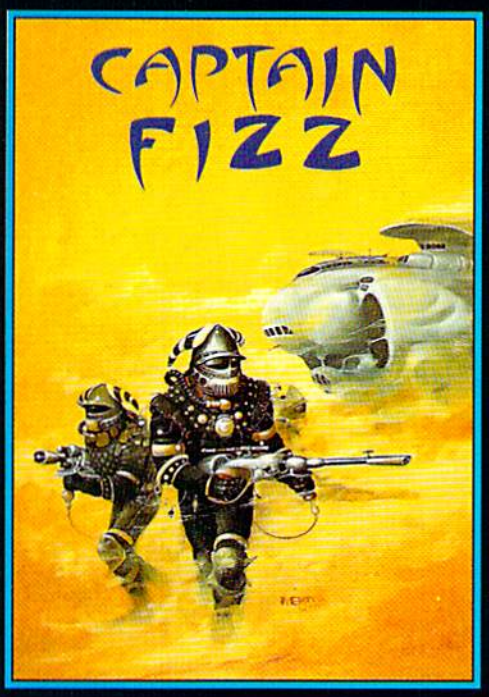

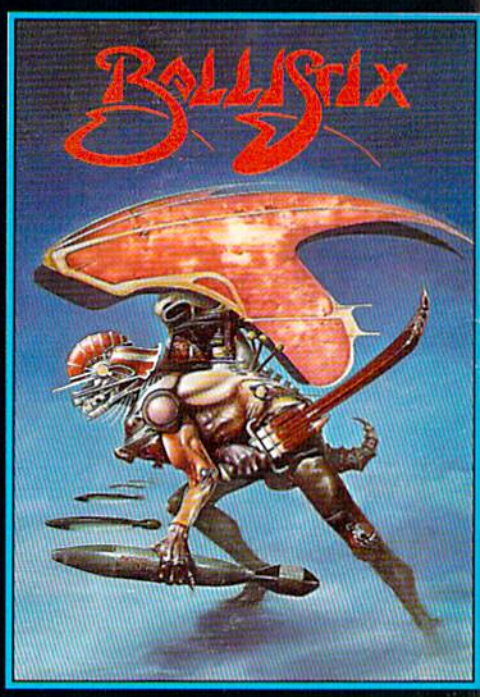

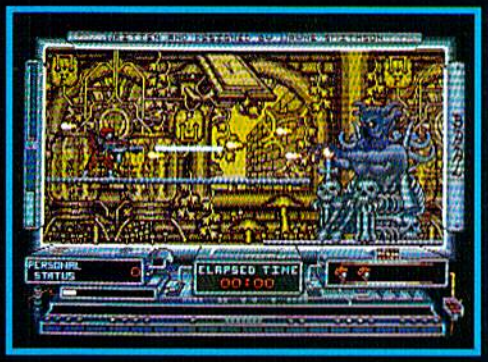

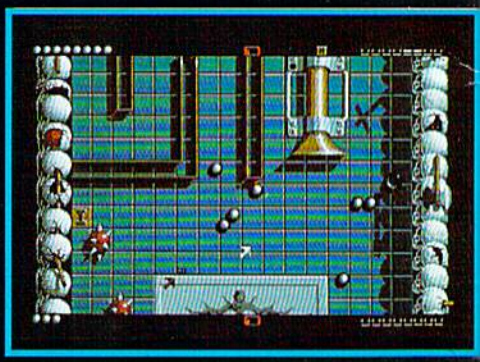

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Screen Shots from the Atari ST version

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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

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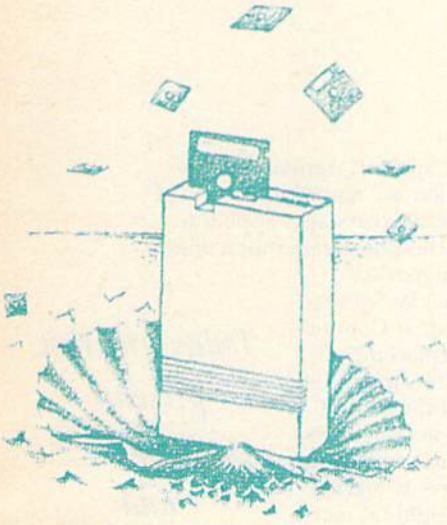
JULY 1989



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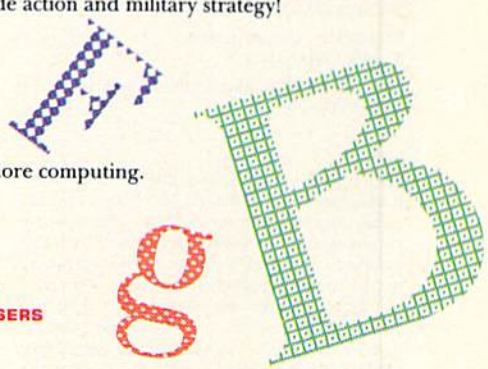

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RUNning Ruminations

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.

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

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.

Dennis Brisson
Editor-in-Chief

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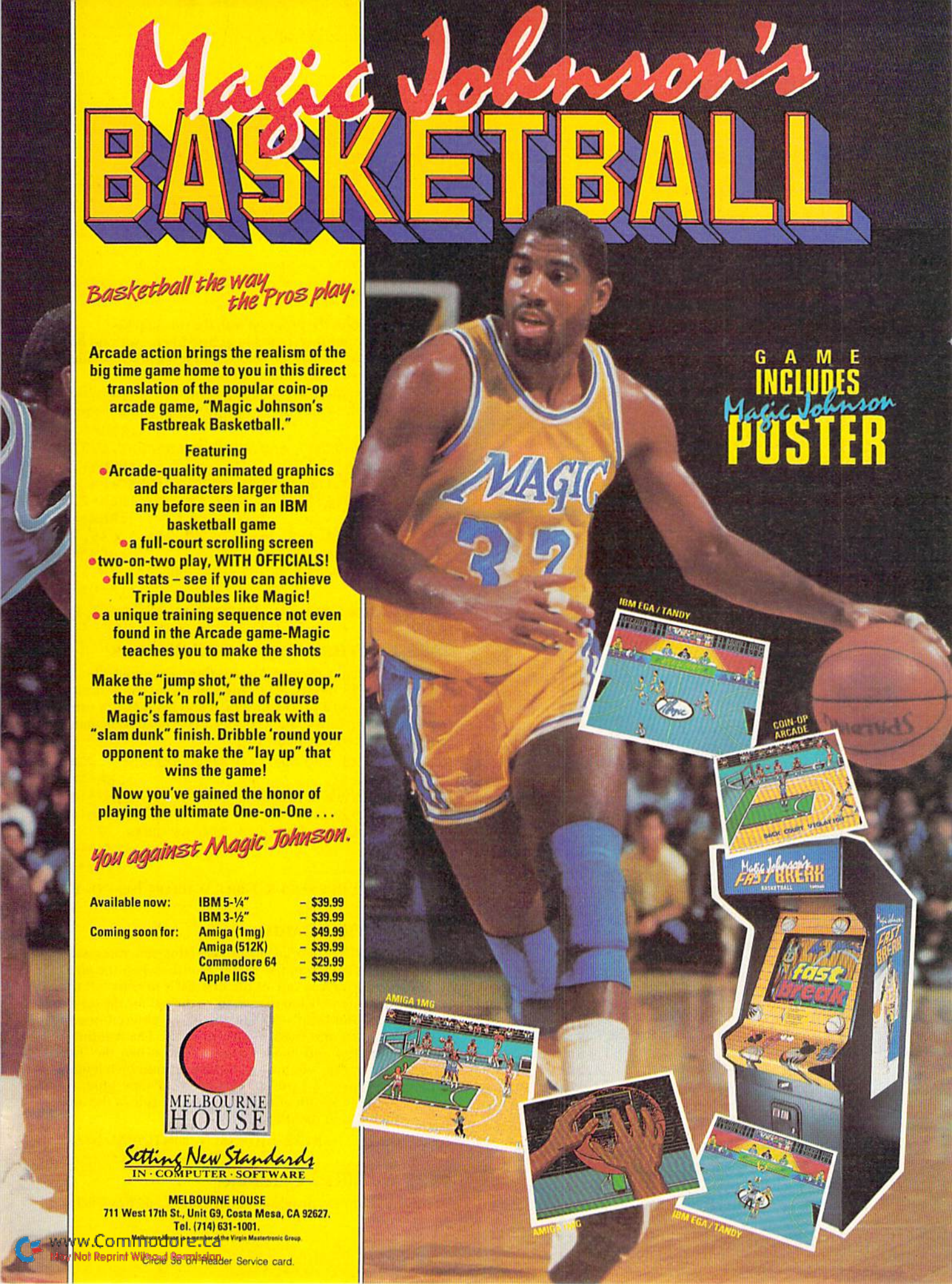

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MAGIC

Protect your computer from static electricity; design sprites with a dry-erase marker; create animated snakes.

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
   EXT                              :REM*92
3Ø IFCK<>2Ø112THENPRINT"ERROR IN DATA":STO
   P                                :REM*57
4Ø FOR T=1 TO 24Ø:PRINT"{CTRL 9} {CTRL Ø}
   ";:NEXT                          :REM*63
5Ø PRINT"{CTRL Ø}{6 SPACEs}SYS 49152 TO CL
   EAR SCREEN.{5 SPACEs}"           :REM*1Ø8
6Ø FOR T=1 TO 22Ø:PRINT"{CTRL 9} {CTRL Ø}
   ";:NEXT                          :REM*37
7Ø DATA 162,39,142,61,3,162,Ø,142,6Ø,3,169
   ,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
   ,134,2,169,Ø,133,251,169,4,133 :REM*112
9Ø DATA 252,166,2,24Ø,16,24,165,251,1Ø5,4Ø
   ,133,251,165,252,1Ø5,Ø,133,252   :REM*18
1ØØ DATA 2Ø2,2Ø8,24Ø,172,61,3,169,32,145,2
    51,172,6Ø,3,145,251,198,2,16,212
                                    :REM*19
11Ø DATA 48,2,2Ø8,2Ø4,16Ø,39,173,62,3,133,
    253,173,63,3,133,254,169,32,145
                                   :REM*147
12Ø DATA 253,136,16,251,16Ø,39,173,64,3,13
    3,253,173,65,3,133,254,169,32   :REM*53
13Ø DATA 145,253,136,16,251,24,169,4Ø,1Ø9,
    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,
    173,65,3,233,Ø,141,65,3,16Ø,32 :REM*72
15Ø DATA 162,255,2Ø2,2Ø8,253,136,2Ø8,248,2
    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"ABCDEFGHIJKLMNOPQRSTUVW       :REM*59
1 FAST:TRAP4:INPUT"FILENAME";A$:INPUT"DRIV
  E #";D                           :REM*176
2 IFA$>"" AND D>7 AND D<12 THENOPEN2,D,2,A
  $:ELSE:END                       :REM*177
3 FORI=7176TO7198:READA:POKEI,A:NEXT:PRINT
  CHR$(14):SYS7176                 :REM*228
4 DCLEARU(D)                        :REM*16
5 DATA162,2,32,198,255,32,2Ø7,255,32,45,19
  9,32                             :REM*68
6 DATA225,255,24Ø,4,165,144,24Ø,241,76,231
  ,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
  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
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 ►

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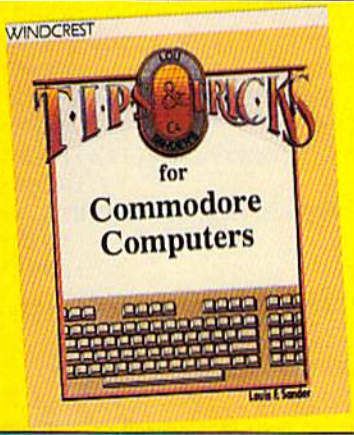
7 GREAT WAYS TO USE YOUR COMMODORE



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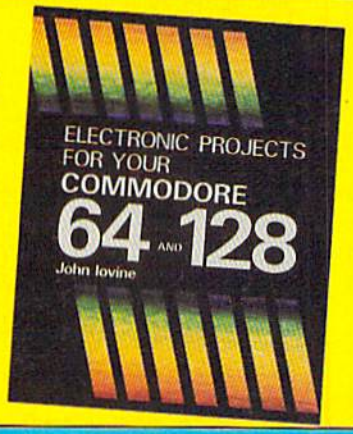

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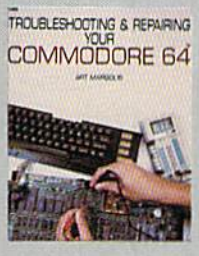

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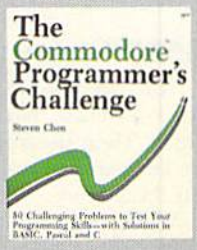

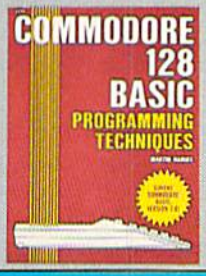

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program. When you run it, press any key to make the monitor emit a clicking sound. I added a latching routine to permit only one click per keypress.

```
Ø REM C-64 KEY CLICKER - RYAN WEAVING
                                        :REM*191
1Ø FORT=49152 TO 49231:READ A:POKE T,A:CK=
   CK+A:NEXT                            :REM*13
2Ø IF CK<>9467 THEN PRINT "ERROR IN DATA S
   TATEMENTS...":END                    :REM*72
3Ø PRINT"KEY CLICKER ON":SYS 49152:REM*1Ø6
4Ø DATA 12Ø,169,18,141,2Ø,3,169,192,141,21
   ,3,88,169,Ø,141,252,3,96,172         :REM*49
5Ø DATA 252,3,192,Ø,2Ø8,21,174,197,Ø,224,6
   4,2Ø8,3,76,49,234,169,1,141,252      :REM*Ø
6Ø DATA 3,32,61,192,76,49,234,174,197,Ø,22
   4,64,2Ø8,5,169,Ø,141,252,3,76        :REM*22
7Ø DATA 49,234,169,15,141,24,212,16Ø,Ø,2ØØ
   ,192,255,2Ø8,251,169,Ø,141,24        :REM*127
8Ø 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.

```
Ø REM PROGRAMMING THE ALT KEY - RICHARD MI
  LNE                                   :REM*6
1Ø SCNCLR:POKE 828,183:CR$=CHR$(13):R=8:S=
   211:DIM X(144)                       :REM*171
2Ø SCNCLR:PRINT"PRESS ALT & FUNCTION KEYS
   SIMULTANEOUSLY"                      :REM*114
25 PRINT"PRESS {LB.} TO END"            :REM*34
3Ø GETKEYA$:IF A$=CHR$(92) THENPRINT" ":PO
   KE 828,173:END                       :REM*16
4Ø T%=ASC(A$):IF T%>132 AND T%<141 GOTO 5Ø
   :ELSE GOTO 14Ø                       :REM*14Ø
5Ø IF T%=133 AND PEEK(S)= R THEN A$="ALT/F
   1"+CR$                               :REM*1Ø
6Ø IF T%=134 AND PEEK(S)= R THEN A$="ALT/F
   3"+CR$                               :REM*117
7Ø IF T%=135 AND PEEK(S)= R THEN A$="ALT/F
   5"+CR$                               :REM*177
8Ø IF T%=136 AND PEEK(S)= R THEN A$="ALT/F
   7"+CR$                               :REM*242
9Ø IF T%=137 AND PEEK(S)= R+1 THEN A$="SHI
   FT/ALT/F2"+CR$                       :REM*8
1ØØ IF T%=138 AND PEEK(S)= R+1 THEN A$="SH
   IFT/ALT/F4"+CR$                      :REM*166
11Ø IF T%=139 AND PEEK(S)= R+1 THEN A$="SH
   IFT/ALT/F6"+CR$                      :REM*115
12Ø IF T%=14Ø AND PEEK(S)= R+1 THEN A$="SH
   IFT/ALT/F8"+CR$                      :REM*64
13Ø PRINT" ";CHR$(157);A$;CHR$(164);CHR$(1
   57)                                  :REM*117
14Ø IF A$=CR$ OR RIGHT$(A$,1)=CR$THEN X=X+
   1                                    :REM*94
15Ø A$="":GOTO 3Ø                       :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.

```
Ø REM C-128 SNAKES ALIVE! - KEN HUEBNER
                                        :REM*13Ø
1Ø L=3Ø:R=13Ø:T=4Ø:B=16Ø:XB=8Ø:YB=1ØØ:GRAP
   HIC 3,1:DRAW 2,XB,YB                 :REM*28
2Ø DO:IF XB>R OR XB<L OR YB<T OR YB>B THEN
    4Ø                                  :REM*1Ø9
3Ø DD=3Ø:IF RND(1)<.5 THEN DD=-3Ø       :REM*118
4Ø D=D+DD:IF D<Ø THEN D=D+36Ø           :REM*168
5Ø IF D>36Ø THEN D=D-36Ø                :REM*45
6Ø XE=XB:YE=YB:LOCATE 7;D               :REM*177
7Ø XB=RDOT(Ø):YB=RDOT(1)                :REM*174
8Ø DRAW Ø,X4,Y4 TO X3,Y3                :REM*7Ø
9Ø DRAW 2,XE,YE TO XB,YB                :REM*154
1ØØ X4=X3:Y4=Y3                         :REM*231
11Ø X3=X2:Y3=Y2                         :REM*247
12Ø X2=XE:Y2=YE                           :REM*9
13Ø 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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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 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.

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

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 footlers. $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 decorations 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. ■

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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.

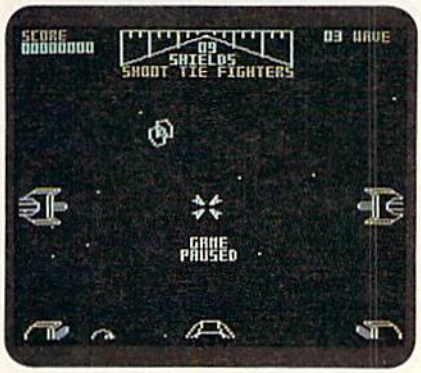
In the third software segment, Luke dives into the Equatorial Trench that runs across the enemy vessel. The hazards in this area are more fireballs and catwalks, which can only be avoided by precision flying. Your goal is to find and shoot the ship's exhaust port and cause the Death Star to explode. 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 enjoy 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



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

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!

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-featured 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 ►

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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.

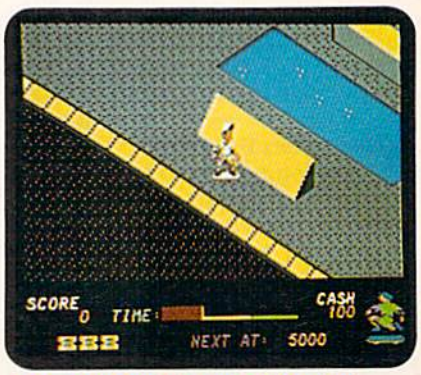
Unfortunately, three aspects of the Greatest Eighteen make it disappointing. First, the animation of your golfer is spoiled by an inexplicable pause right in the middle of his stroke. To be honest, this is more noticeable when you're watching someone play than when you're making the shot yourself, but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

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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

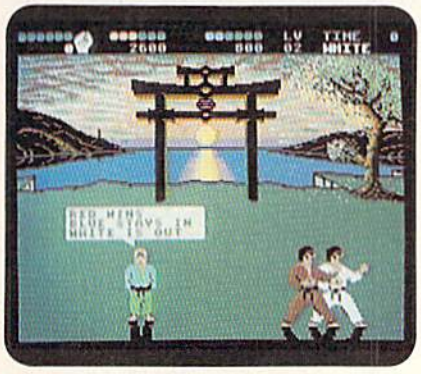
CHOP 'N' DROP ..... B–

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 remains 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 ►

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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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GEOS is needed to operate POWER PAKs I and II. POWER PAK I programs run on C-64 only. GEOS POWER PAKS are products of *RUN* magazine, and are not connected with Berkeley Softworks, creator of GEOS, or Commodore Business Machines, manufacturer of the C-64 and C-128.

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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 shipping) 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 RPF.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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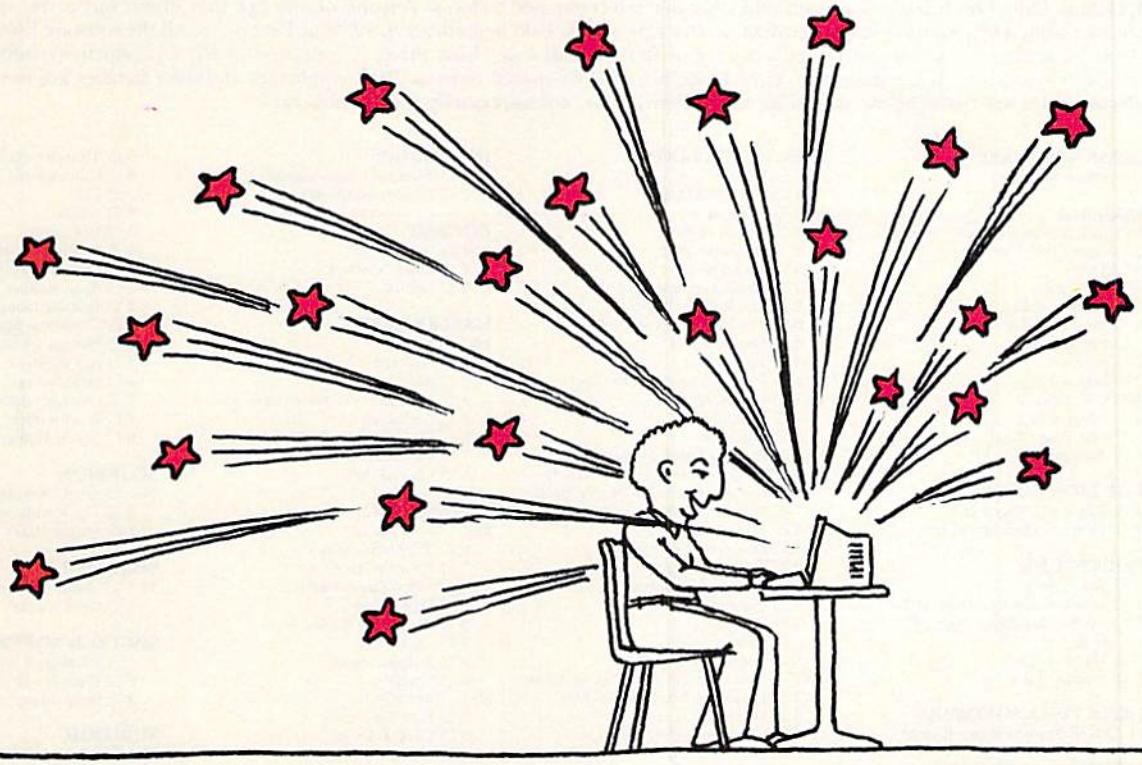

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RUN's READER CHOICE CONTEST

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 Magik
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

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 ☐ 4×4 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

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3 ☐ Purple Heart

SHAREDATA
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2 ☐ Card Sharks

SIR-TECH SOFTWARE
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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

PHOTOGRAPHED BY LARRY DUNN

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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,

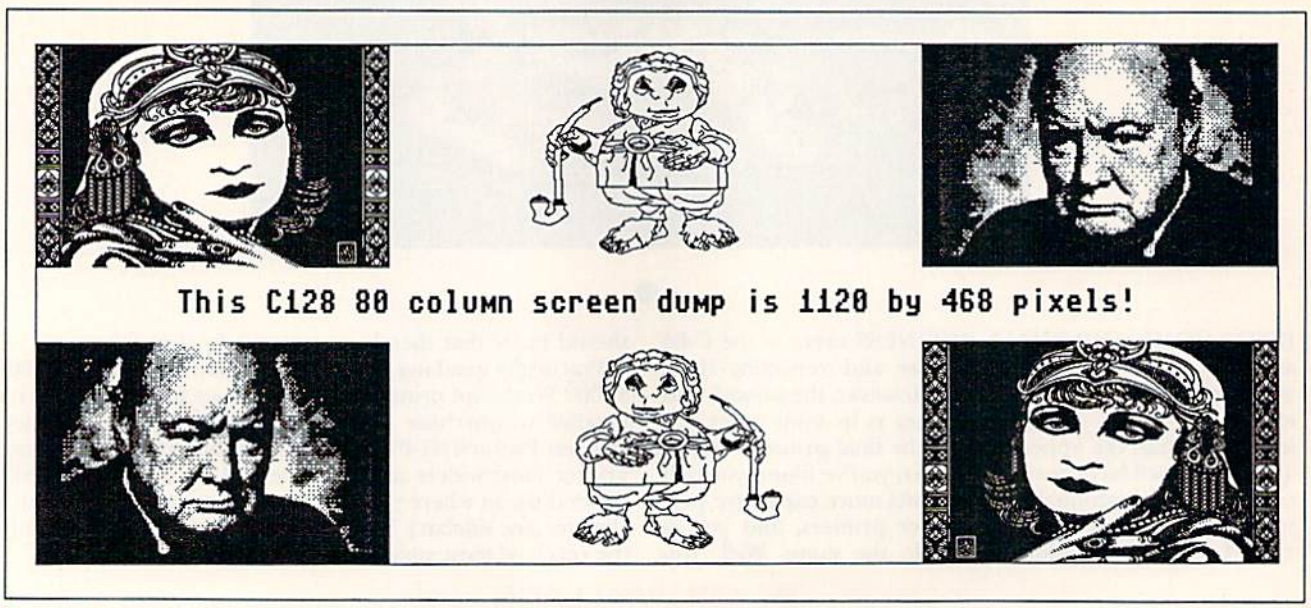

Figure 1. Graphics images produced with the Star LaserPrinter 8.

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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.

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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

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 LP 1000

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 LASERPRINTER 8

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. ■

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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, 300×300 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

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

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.

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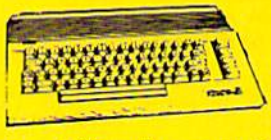

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RUN Shell

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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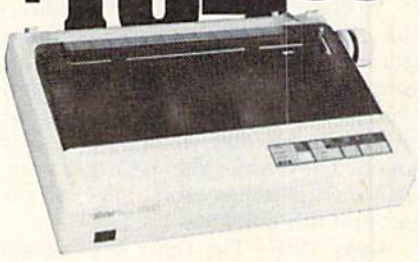

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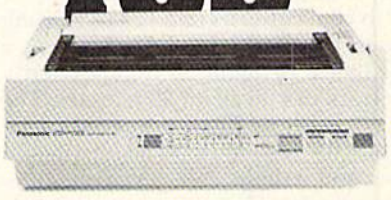

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at the prompt. *All* modules must be formatted before being used as a logical drive or you'll get a RAM Disk Full error message.

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.

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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.)

```
Ø 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=Ø:PRINT"{SHFT CLR}":REM*56
1Ø 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
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
  2Ø)+MID$(A$,43,2Ø)    :REM*242
25 FOR I=1 TO 3Ø        :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*67
5Ø NEXT:GOTO 1Ø         :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
  O 7Ø                  :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
  A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
  )):GOTO 7Ø            :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
  Ø)+RIGHT$(A$,LEN(A$)-42)
                        :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
  T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
  SC(H$)-55             :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
  SC(L$)-55             :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*148
95 NEXT:GOTO 1Ø         :REM*16Ø
1ØØ REM RUN'S C64 & C128 DOS SH
  ELL                   :REM*167
1Ø1 DATA ØØ134C43134CAØ13ØØØØ*Ø
  ØØØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
  ØØØØØØØØØØØØ         :REM*22Ø
1Ø2 DATA ØØØØØØØØØØØØØØØØØØØØ*Ø
  ØØØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
  ØØØØØØØØØØ23         :REM*22
1Ø3 DATA 3124ØØ3A5A2D5C3D55A2*Ø
  88E4E388E4F388E5238*8E5338A
  2ØØ8E5Ø388E51         :REM*171
1Ø4 DATA 388EAC38ADØØAØFØ212Ø*E
  416A9ØØ8D3B382ØA516*2ØF916A
  9ØØ852BA95Ø85         :REM*33
1Ø5 DATA 2CA9ØØ8DØØ5Ø2Ø42A64C*A
  Ø132ØE416A9Ø18D3B38*2Ø8F162
  ØF916A9ØØ852D         :REM*148
1Ø6 DATA A95Ø852EA9ØØ8DØØ5Ø2Ø*D
  951782Ø81FF582ØD332*2ØE7FFA
  9B78D3CØ3AD3B         :REM*89
1Ø7 DATA 38DØØ8A98Ø8D8AØ24CCA*1
  3A5D73Ø2B2Ø9162ØC4*772ØE41
  6A9D5859EA938         :REM*213
1Ø8 DATA 859FA9ØØ8D3238A9288D*3
  438A9ØF8D21DØA9ØE8D*2ØDØ2Ø1
  Ø2B4CØE142ØF9         :REM*183
1Ø9 DATA 162ØB3772ØE416A9C185*9
  EA938859FA9Ø18D3238*A95Ø8D3
  438A9ØFA21A2Ø         :REM*181
11Ø DATA 7716AD32388D3338A9ØØ*8
  D6Ø388D4D388D63388D*54388D6
  8388D6B388D67         :REM*6Ø
111 DATA 388D6C388D6E388D6F38*8
  D7Ø388D75388D78388D*81388DA
  E388DBA388D85         :REM*76
112 DATA 38AA9DØØ4AE8DØFA2Ø2C*1
  6AD7638FØ142Ø1A2B2Ø*ØB2BAE3
  238BD893FA8A2         :REM*75
113 DATA Ø7A91F2Ø111AADAC38DØ*Ø
  34CE514ADØ4DF48ADØ5*DF48ADØ
  6DF482Ø112D2Ø         :REM*88
114 DATA 5A28A9ØØ8DAC38688DØ6*D
  F688DØ5DF688DØ4DF4C*E514AD3
  B38DØ22A5CBC9         :REM*181
115 DATA Ø4FØFAA9ØØ85C6A9932Ø*D
  2FFA9Ø68D21DØ2Ø1A2B*A9ØE8D8
  6Ø22ØA5164CCD         :REM*18
116 DATA 16A9AD8D3CØ32ØF91678*2
  Ø56EØ2ØØ9E12ØØØCØ58*2Ø7A412
  ØØ34ØA2ØF2Ø6B         :REM*5
117 DATA FF8DØØFF6CØØØA2ØE1FF*D
  Ø1ØAD7638FØØB2ØØF2Ø*A9ØØ8D7
  6382ØØ62E2ØCC         :REM*48
118 DATA FF2ØE4FFFØE3C985FØ94*C
  92ØFØØ62Ø78154CE514*AD3E38D
  ØØ62Ø312D4CAØ         :REM*127
119 DATA 13C9Ø9DØØ62Ø471A4CAØ*1
```

Continued on p. 49.

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A–Z Scramble

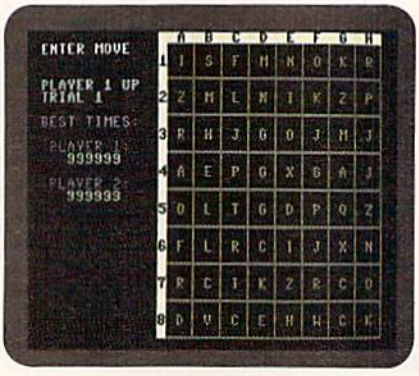
The letters are mixed up, and you may be, too, when you play this alphabet strategy game.

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 make the same swap.



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

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. R

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
                          :REM*249
2 REM BY BRIAN MELCHER :REM*152
5 POKE5328Ø,Ø:POKE53281,Ø:PRINT
  "{SHFT CLR}{2 CRSR DNs}{5 SPA
  CEs}{CTRL 5}{31 SHFT *s}"
                          :REM*67
1Ø 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*1Ø8
2Ø 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*2Ø5
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
3Ø 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}{CR
   SR RT} {CTRL Ø}{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
4Ø PRINTSPC(1Ø)"{2 CRSR DNs}THE
    GAME OF SCRAMBLE"    :REM*82
45 PRINT"{CRSR DN}{5 SPACEs}{CT
```

RUN it right: **C-64**

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```
   RL 7}{31 SHFT *s}"  :REM*150
50 PRINT"{5 SPACEs}{CTRL 5}{31
   SHFT *s}"           :REM*99
55 DIML$(64),S(5):PRINTSPC(9)"{
   2 CRSR DNs}{CTRL 4}PRESS SPA
   CE WHEN READY"      :REM*40
60 GETA$:IFA$<>" "THEN60
                       :REM*110
65 PRINT"{SHFT CLR}{CTRL 5}{4 S
   PACEs}{8 SHFT *s}":PRINT"{CT
   RL 4}{4 SPACEs}SCRAMBLE":PRI
   NT"{CTRL 5}{4 SPACEs}{8 SHFT
    *s}{3 CRSR DNs}{CTRL 8}"
                       :REM*78
70 PRINT"{4 SPACEs}HOW MANY PLA
   YERS (1-5)"         :REM*241
75 GETA$:IFA$<"1"ORA$>"5"THEN75
                       :REM*91
80 P=VAL(A$):PRINT"{2 CRSR DNs}
   {4 SPACEs}HOW MANY CHANCES (
   1-5)"               :REM*213
85 GETA$:IFA$<"1"ORA$>"5"THEN85
                       :REM*125
90 C=VAL(A$):PRINT"{2 CRSR DNs}
   {4 SPACEs}ENTER GRID SIZE (2
   -8)"                :REM*140
95 GETA$:IFA$<"2"ORA$>"8"THEN95
                       :REM*210
100 G=VAL(A$):FORM=1TO5:S(M)=99
    9999:NEXT:B=1:IFG>4THENB=2:
    IFG=8THENB=3       :REM*152
105 FORH=1TOC:FORI=1TOP:J=0
                       :REM*209
110 FORM=1TOG*G:L$(M)=CHR$(INT(
    RND(0)*26)+65):NEXT:Z=0:GOS
    UB340:IFZ=1THEN110 :REM*94
115 PRINT"{SHFT CLR}"SPC(14);:F
    ORM=1TOG:PRINT"{CTRL 8}{CTR
    L 9}{2 SPACEs}"CHR$(64+M);:
    NEXT:PRINT"{CTRL 9} "
                       :REM*200
120 FORM=1TOG:PRINTSPC(14)"{CTR
    L 8}{CTRL 9} {CTRL 0}{COMD
    4}";:FORN=1TOG:PRINT"{2 SPA
    CEs}{COMD N}";:NEXT:PRINT
                       :REM*197
125 PRINTSPC(14)"{CTRL 8}{CTRL
    9}"CHR$(48+M);:FORN=1TOG:PR
    INT"{CTRL 0}{COMD 4}{2 SPAC
    Es}{COMD N}";:NEXT:PRINT
                       :REM*190
130 PRINTSPC(14)"{CTRL 8}{CTRL
    9} {CTRL 0}{COMD 4}";:FORN=
    1TOG:PRINT"{2 COMD Ps}{SHFT
     @}";:NEXT:IFM<GTHENPRINT
                       :REM*123
135 NEXT:PRINT"{HOME}{4 CRSR DN
    s}{CTRL 4} PLAYER"I"UP":PRI
    NT" TRIAL"H:PRINT"{CRSR DN}
     {CTRL 5}BEST TIMES:"
                       :REM*196
140 FORM=1TOP:PRINT"{CRSR DN}{C
    TRL 7}{2 SPACEs}PLAYER"M"{C
    RSR LF}:":PRINT"{CTRL 6}{3
    SPACEs}"S(M):NEXT:PRINT"{HO
    ME}"               :REM*48
145 GOSUB325:PRINT"{HOME}{CRSR
    DN} {CTRL 8}ENTER MOVE"
                       :REM*59
150 PRINT"{HOME}{2 CRSR DNs}{12
     SPACEs}{HOME}{2 CRSR DNs}{
    2 CRSR RTs}{CTRL 2}";:E=1:U
    $="":V$="":W$="":X$=""
                       :REM*218
155 GETA$:IFA$=""THEN155
                       :REM*110
160 IFA$=CHR$(20)THEN150
                       :REM*139
165 IFA$="{LB.}"THENJ=999999:GO
    TO275              :REM*15
170 IFE=2THEN215        :REM*7
175 IFA$<"A"ORA$>CHR$(64+G)THEN
    190                :REM*44
180 IFU$<>""THEN155    :REM*143
185 U$=A$:GOTO205      :REM*158
190 IFA$<"1"ORA$>CHR$(48+G)THEN
    155                :REM*55
195 IFW$<>""THEN155    :REM*184
200 W$=A$              :REM*48
205 IFU$<>""ANDW$<>""THENE=2
                       :REM*31
210 GOTO250            :REM*29
215 IFA$<"A"ORA$>CHR$(64+G)THEN
    230                :REM*98
220 IFV$<>""THEN155    :REM*209
225 V$=A$:GOTO245      :REM*209
230 IFA$<"1"ORA$>CHR$(48+G)THEN
    155                :REM*223
235 IFX$<>""THEN155    :REM*194
240 X$=A$              :REM*91
245 IFV$<>""ANDX$<>""THENE=3
                       :REM*218
250 PRINTA$;:IFE<3THEN155
                       :REM*251
255 IFU$=V$ANDW$=X$THEN150
                       :REM*77
260 U=ASC(U$):V=ASC(V$):W=ASC(W
    $):X=ASC(X$):IFABS(U-V)>BOR
    ABS(W-X)>BTHEN150  :REM*87
265 Q=(U-64)+(W-49)*G:R=(V-64)+
    (X-49)*G:J=J+1:T$=L$(Q):L$(
    Q)=L$(R):L$(R)=T$  :REM*171
270 GOSUB325:Z=0:GOSUB340:IFZ=0
    THEN145            :REM*134
275 IFJ<S(I)THENS(I)=J  :REM*41
280 PRINT"{SHFT CLR}{2 CRSR DNs
    }{CTRL 4}{2 SPACEs}THIS MAT
    CH IS NOW OVER.":PRINT"{CRS
    R DN}{CTRL 5}{2 SPACEs}PLAY
    ER:{CTRL 2}"I,J"{CTRL 5}MOV
    ES."               :REM*181
285 PRINT"{2 CRSR DNs}{CTRL 7}{
    2 SPACEs}PRESS SPACE"
                       :REM*220
290 GETA$:IFA$<>" "THEN290
                       :REM*87
295 NEXT:NEXT:PRINT"{SHFT CLR}{
    2 CRSR DNs} {CTRL 4}THE GAM
    E IS NOW OVER.":PRINT"{CRSR
     DN} HERE ARE THE FINAL ";
                       :REM*34
300 PRINT"SCORES:":FORM=1TOP:PR
    INT"{CRSR DN}{3 SPACEs}{CTR
    L 5}PLAYER{CTRL 2}"M"{CRSR
    LF}{CTRL 5}:{CTRL 6}"S(M):N
    EXT                :REM*34
305 PRINT"{CRSR DN} {CTRL 7}WOU
    LD YOU LIKE TO PLAY AGAIN (
    Y/N)?"             :REM*36
310 GETA$:IFA$="Y"THEN65:REM*50
315 IFA$<>"N"THEN310   :REM*50
320 PRINT"{SHFT CLR}{CTRL 8}":E
    ND                 :REM*223
325 PRINT"{HOME}{COMD 1}{CRSR D
    N}":FORM=1TOG:PRINTTAB(14);
    :FORN=1TOG:PRINT"{2 CRSR RT
    s}"L$((M-1)*G+N);  :REM*122
330 NEXT:IFM<GTHENPRINT"{2 CRSR
     DNs}"             :REM*209
335 NEXT:RETURN        :REM*236
340 FORN=1TOG*G-1:IFL$(N)>L$(N+
    1)THENRETURN       :REM*242
345 NEXT:Z=1:RETURN    :REM*84 ■
```

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Cubix 1

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

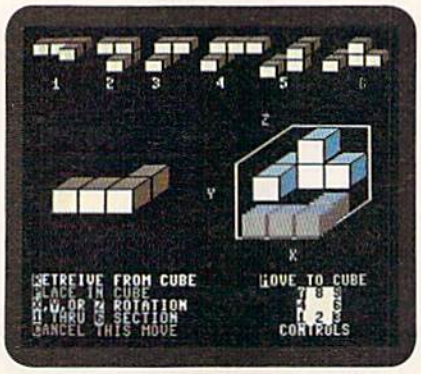
By LEONARD MORRIS

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 (3×3×3 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 MORRI
   S                          :REM*227
20 FAST:GRAPHIC4,1,19:DIMV(6,6)
   ,X(6,6),Y(6,6),BZ(6),BY(6),B
   X(6),BU(6):CT=26:C1=2:C2=7:C
   3=15:AD=12240:P1=0         :REM*85
30 BLOAD"ML-CUBIX 1",B0,P4864:S
   YSDEC("15D3"):SYSDEC("15E1")
                              :REM*15
40 SPRCOLOR11,3:SPRITE1,0,5,0,1
   ,1,1: FORT=2TO5:POKEDEC("1FF
   7")+T,56:SPRITET,0,5,0,1,1,1
   :NEXT                      :REM*108
50 REM SET MEMORY LOC. FOR ROTA
   TION (X,Y,Z)               :REM*35
60 FORT=0TO31:POKEDEC("19D0")+T
   ,1:NEXT                    :REM*232
70 FORT=0TO8:READX,Y:POKEDEC("1
   B80")+T,X:POKEDEC("1B90")+T,
   Y:NEXT                     :REM*62
80 FORT=0TO8:READX,Y:POKEDEC("1
   BA0")+T,X:POKEDEC("1BB0")+T,
   Y:NEXT                     :REM*37
90 FORT=0TO8:READX,Y:POKEDEC("1
   BC0")+T,X:POKEDEC("1BD0")+T,
   Y:NEXT                     :REM*81
100 ZA(0)=27:ZB(0)=208:ZC(0)=17
   6:ZD(0)=DEC("19D0"):FORT1=1
   TO6:ZA(T1)=26:ZB(T1)=16+(T1
   -1)*32:ZC(T1)=16:ZD(T1)=DEC
   ("1910")+(T1-1)*32:READZ(T1
   )                          :REM*9
110 FORT=1TOZ(T1):READX(T1,T),Y
   (T1,T),V(T1,T):POKEZD(T1)+V
   (T1,T),T1+1:NEXTT,T1
                              :REM*193 ►
```

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

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CUBIX 1

```
12Ø FORT=1TO6:READN$(T),L(T):NE
    XT                    :REM*214
13Ø REM DETERMINE BLOCKS LOCATI
    ON                    :REM*234
14Ø P1=Ø:FORV=ØTO2:FORU=ØTO2:FO
    RT=ØTO2:A=AD+T*24-U*64Ø+V*3
    Ø4:GOSUB17Ø:POKEDEC("1BØØ")
    +P1,A2:POKEDEC("1BØØ")+P1+1
    ,A1                   :REM*25Ø
15Ø A=A-16Ø:GOSUB17Ø:POKEDEC("1
    AØØ")+P1,A2:POKEDEC("1AØØ")
    +P1+1,A1:P1=P1+2:NEXTT,U,V
                          :REM*53
16Ø GOTO19Ø               :REM*244
17Ø A1=INT(A/256):A2=A-256*A1:R
    ETURN                 :REM*86
18Ø REM CLR SCRN & DRAW SMALL B
    LOCKS                 :REM*191
19Ø COLORØ,1:COLOR1,8:COLOR2,1Ø
    :COLOR3,9:COLOR4,1:GRAPHIC4
    ,Ø,19                 :REM*1
2ØØ FORTZ=1TO6:FORT1=1TOZ(TZ):X
    =X(TZ,T1):Y=Y(TZ,T1):REM*75
21Ø BOX1,X,Y,X+7,Y+7,,1:FORT=1T
    O3:DRAW3,X+T,Y-TTO7;9Ø:DRAW
    2,X+7+T,Y-TTO7;18Ø:NEXT:DRA
    WØ,X,YTO7;9ØTO7;18ØTO4;45:N
    EXT:NEXT:SLOW         :REM*3Ø
22Ø REM SET COLORS AND NUMBERS
                          :REM*246
23Ø X=68:FORY=ØTO13       :REM*254
24Ø COLOR1,8:DRAW1,Ø,X+Y*8TO79;
    9Ø                    :REM*148
25Ø COLOR1,C1:DRAW1,8Ø,X+Y*8TO7
    9;9Ø                  :REM*5
26Ø COLOR2,1Ø:DRAW2,Ø,X+Y*8TO79
    ;9Ø                   :REM*242
27Ø COLOR2,C2:DRAW2,8Ø,X+Y*8TO7
    9;9Ø                  :REM*38
28Ø COLOR3,9:DRAW3,Ø,X+Y*8TO79;
    9Ø                    :REM*81
29Ø COLOR3,C3:DRAW3,8Ø,X+Y*8TO7
    9;9Ø                  :REM*251
3ØØ DRAWØ,Ø,X+Y*8TO159;9Ø:NEXT
                          :REM*92
31Ø FORZB=1TO6:GOSUB32Ø:NEXT:ZA
    =Ø:ZC=12:GOTO35Ø      :REM*3
32Ø COLOR1,14:CHAR1,L(ZB),4,N$(
    ZB):COLOR1,2:RETURN:REM*113
33Ø COLOR1,3:CHAR1,L(ZB),4,N$(Z
    B):COLOR1,2:RETURN :REM*14Ø
34Ø REM INSTRUCTIONS  :REM*165
35Ø WINDOWØ,19,39,24,1:PRINT"{C
    RSR DN}{CTRL 4}THE OBJECT O
    F THIS GAME IS TO USE THESE
     BLOCK SECTIONS";  :REM*64
36Ø AA=1:FORZB=1TO6:PRINTZB"{CR
    SR LF},";:GOSUB33Ø:GOSUB62Ø
    :FORN=1TO4:GOSUB4ØØ:GOSUB64
    Ø:NEXT:FORN=1TO4:GOSUB4ØØ:G
    OSUB66Ø               :REM*171
37Ø NEXT:FORN=1TO4:GOSUB4ØØ:GOS
    UB68Ø:NEXT:GOSUB4ØØ:GOSUB32
    Ø:NEXT:PRINT"{CRSR DN}{CTRL
     2}":GOSUB4ØØ         :REM*234
38Ø PRINTTAB(6)"TO MAKE THIS 3X
    3X3 CUBE":GOSUB55Ø:SLEEP5
                          :REM*245
39Ø SYSDEC("15E1"):GOSUB55Ø:FOR
    T=1TO6:ZE(T)=Ø:FORU=1TOZ(T)
    :POKEZD(T)+V(T,U),T+1:NEXT:
    NEXT:ZB=Ø:GOTO42Ø     :REM*217
4ØØ FORX=ØTO5Ø:NEXT:RETURN
                          :REM*3
41Ø REM DISPLAY MENU      :REM*1Ø1
42Ø WINDOWØ,19,39,24,1:PRINT"{C
    RSR DN}{CTRL 2}{CTRL 9}R{CT
    RL Ø}ETREIVE FROM CUBE"TAB(
    25)"{CTRL 8}{CTRL 9}M{CTRL
    Ø}OVE TO CUBE"        :REM*174
43Ø PRINT"{CTRL 9}{CTRL 6}P{CTR
    L Ø}LACE IN CUBE"TAB(29)"{C
    TRL 8}7{CTRL 9} 8 9":REM*94
44Ø PRINT"{CTRL 9}{COMD 6}X{CTR
    L Ø},{CTRL 9}Y{CTRL Ø},OR {
    CTRL 9}Z{CTRL Ø} ROTATION"T
    AB(29)"{CTRL 8}{CTRL 9}4{3
    SPACEs}6"             :REM*22Ø
45Ø PRINT"{CTRL 9}{CTRL 4}1{CTR
    L Ø} THRU {CTRL 9}6{CTRL Ø}
     SECTION"TAB(29)"{CTRL 8}{C
    TRL 9}1 2 {CTRL Ø}3":REM*96
46Ø PRINT"{CTRL 9}{COMD 3}C{CTR
    L Ø}ANCEL THIS MOVE"TAB(27)
    "{CTRL 8}CONTROLS";:REM*121
47Ø FORT=ØTO31:POKEDEC("19DØ")+
    T,Ø:NEXT:ZB=Ø:GOSUB64Ø:AA=Ø
                          :REM*58
48Ø REM MAKE X,Y,Z ROTATION BOR
    DERS                  :REM*48
49Ø COLOR1,15:CHAR1,19,13,"Y":C
    HAR1,28,18,"X":CHAR1,25,7,"
    Z"                    :REM*145
5ØØ COLOR1,2:DRAW1,9Ø,136TO34;9
    ØTO36;45TO48;ØTO35;27ØTO36;
    225TO48;18Ø           :REM*211
51Ø REM MAKE SELECTION FOR SECT
    ION                   :REM*1Ø1
52Ø GETY$                 :REM*196
53Ø IFY$>"Ø"ANDY$<"7"THENZB=VAL
    (Y$):GOSUB62Ø:GOTO52Ø:ELSEI
    FY$="Ø"THEN55Ø        :REM*1
54Ø ONINSTR("RXYZM",Y$)GOTO58Ø,
    64Ø,68Ø,66Ø,56Ø:GOTO52Ø
                          :REM*14Ø
55Ø ZB=Ø:SYSDEC("1486"):IFAATHE
    NRETURN:ELSE5ØØ       :REM*79
56Ø IFZB=ØORZE(ZB)THENSOUND2,8Ø
    Ø,2Ø:GOTO52Ø:ELSE72Ø
                          :REM*133
57Ø REM RETREIVE SECTION FROM C
    UBE                   :REM*32
58Ø IFZB<>ØANDZE(ZB)THEN59Ø:ELS
    ESOUND3,4ØØ,3Ø:GOTO52Ø
                          :REM*6Ø
59Ø FORT=ØTO26:IFPEEK(ZD(Ø)+T)=
    ZB+1THENPOKEZD(Ø)+T,Ø:POKEZ
    D(ZB)+T,ZB+1:GOTO61Ø:REM*41
6ØØ POKEZD(ZB)+T,Ø        :REM*157
61Ø NEXT:GOSUB62Ø:ZE(ZB)=Ø:GOSU
    B32Ø:POKEDEC("14B2"),176:SY
    SDEC("14B1"):POKEDEC("14B2"
    ),16:SYSDEC("1486"):GOTO5ØØ
                          :REM*237
62Ø SOUND1,6ØØØØ,1Ø:POKEDEC("14
    C6"),ZB(ZB):SYSDEC("14B1"):
    SYSDEC("14BD"):RETURN
                          :REM*236
63Ø REM X,Y,Z ROTATIONAL ROUTIN
    ES                    :REM*111
64Ø GOSUB7ØØ:SOUND1,5ØØØØ,1:SYS
    DEC("13AA"):IFAATHENRETURN:
    REM ROTATE 'Y' DIR.   :REM*2
65Ø GOTO5ØØ               :REM*2Ø1
66Ø GOSUB7ØØ:SOUND2,25ØØØ,1:SYS
    DEC("13DF"):IF AATHENRETURN
    :REM ROTATE 'Z' DIR.:REM*54
67Ø GOTO5ØØ               :REM*229
68Ø GOSUB7ØØ:SOUND3,25ØØØ,1:SYS
    DEC("141E"):IF AATHENRETURN
    :REM ROTATE 'X' DIR.:REM*56
69Ø GOTO5ØØ               :REM*241
7ØØ POKEDEC("1466"),ZB(ZB):POKE
    DEC("1478"),ZA(ZB):POKEDEC(
    "145E"),ZC(ZB):RETURN
                          :REM*26
71Ø REM PLACE SECTION IN CUBE
                          :REM*246
72Ø SP=Z(ZB):ZZ=SP:FORZ=ØTO2:FO
    RY=ØTO2:FORX=ØTO2:PS=Z*9+Y*
    3+X                   :REM*133
73Ø 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
74Ø NEXTX,Y,Z:POKEDEC("DØ15"),2
    {UP ARROW}ZZ-1        :REM*63
75Ø SOUND2,4ØØØØ,1ØØ,1,3ØØ,1ØØ,
    Ø:FORT=1TO159STEP4:FORU=1TO
    ZZ:MOVSPRU,+4,+Ø:NEXT:NEXT:
    A2=4Ø                 :REM*56
76Ø SOUND1,4ØØ*A2,2Ø:A2=1
                          :REM*45
77Ø REM MOVE SECTION TO DESIRED
     LOCATION             :REM*158
78Ø VP=-(VP=Ø):POKEDEC("DØ1B"),
    VP*255                :REM*112
79Ø GETY$:ONINSTR("462819PC",Y$
    )GOTO8ØØ,82Ø,84Ø,86Ø,88Ø,9Ø
    Ø,92Ø,94Ø:GOTO78Ø     :REM*35
8ØØ FORT=1TOZZ:IFBX(T)-1<ØTHEN7
    6Ø                    :REM*168
81Ø NEXT:FORT=1TOZZ:BX(T)=BX(T)
    -1:MOVSPRT,-24,+Ø:NEXT:GOTO
    78Ø                   :REM*139
82Ø FORT=1TOZZ:IFBX(T)+1>2THEN7
    6Ø                    :REM*161
83Ø NEXT:FORT=1TOZZ:BX(T)=BX(T)
    +1:MOVSPRT,+24,+Ø:NEXT:GOTO
    78Ø                   :REM*1Ø6
84Ø FORT=1TOZZ:IFBY(T)-1<ØTHEN7
    6Ø                    :REM*126
85Ø NEXT:FORT=1TOZZ:BY(T)=BY(T)
    -1:MOVSPRT,+Ø,+16:NEXT:GOTO
    78Ø                   :REM*99
86Ø FORT=1TOZZ:IFBY(T)+1>2THEN7
    6Ø                    :REM*113
87Ø NEXT:FORT=1TOZZ:BY(T)=BY(T)
    +1:MOVSPRT,+Ø,-16:NEXT:GOTO
    78Ø                   :REM*141
88Ø FORT=1TOZZ:IFBZ(T)+1>2THEN7
    6Ø                    :REM*16
89Ø NEXT:FORT=1TOZZ:BZ(T)=BZ(T)
    +1:MOVSPRT,-12,+8:NEXT:GOTO
    78Ø                   :REM*166
9ØØ FORT=1TOZZ:IFBZ(T)-1<ØTHEN7
    6Ø                    :REM*49
```


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```
91Ø NEXT:FORT=1TOZZ:BZ(T)=BZ(T)
    -1:MOVSPRT,+12,-8:NEXT:GOTO
    78Ø                    :REM*244
92Ø FORT=1TOZZ:BU(T)=BZ(T)*9+BY
    (T)*3+BX(T):IFPEEK(ZD(Ø)+BU
    (T))THEN76Ø            :REM*145
93Ø NEXT:POKEDEC("DØ15"),Ø:FORT
    =1TOZZ:POKEZD(Ø)+BU(T),ZB+1
    :NEXT:ZE(ZB)=1:SYSDEC("14B1
    "):SYSDEC("1486"):SOUND2,5Ø
    ØØ,2Ø:GOSUB33Ø:ZB=Ø:GOTO97Ø
                           :REM*26
94Ø POKEDEC("DØ15"),Ø:GOTO5ØØ
                           :REM*36
95Ø POKEDEC("1466"),ZB(ZB):POKE
    DEC("1478"),ZA(ZB):POKEDEC(
    "145E"),ZC(ZB):RETURN
                           :REM*231
96Ø REM CHECK FOR COMPLETED CUB
    E                      :REM*198
97Ø FORT=1TO6:IFZE(T)THENNEXT:E
    LSE5ØØ                 :REM*22
98Ø WINDOWØ,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":GETKEYY$:GOTO35Ø
                           :REM*12
99Ø REM ROTATIONAL DATA :REM*84
1ØØØ DATA 18,Ø,9,3,Ø,6,21,9,12,
     12,3,15,24,18,15,21,6,24
                           :REM*132
1Ø1Ø DATA 6,Ø,7,3,8,6,15,9,16,1
     2,17,15,24,18,25,21,26,24
                           :REM*48
1Ø2Ø DATA 18,Ø,21,3,24,6,19,9,2
     2,12,25,15,2Ø,18,23,21,26,
     24                    :REM*57
1Ø3Ø REM SMALL BLOCKS DATA
                           :REM*51
1Ø4Ø DATA 4,Ø,8,3,8,8,4,16,8,5,
     12,12,14,4,37,16,12,29,8,1
     3,37,8,1Ø,33,2Ø,19,4,54,16
     ,13,54,8,14,62,8,1Ø,5Ø,2Ø,
     19                    :REM*233
1Ø5Ø DATA 5,78,16,9,78,8,12,86,
     8,13,94,8,14,74,2Ø,18,5,11
     6,8,7,1Ø4,2Ø,16,112,2Ø,12,
     112,12,13,1ØØ,24,21
                           :REM*114
1Ø6Ø DATA 5,132,16,12,14Ø,16,13
     ,148,16,14,14Ø,8,16,128,2Ø
     ,21                   :REM*38
1Ø7Ø REM{2 SPACEs}* NUMBERS AND
      LOC.{2 SPACEs}*      :REM*191
1Ø8Ø DATA 1,2,2,8,3,13,4,2Ø,5,2
     7,6,36                :REM*86
1Ø9Ø DATA 8,Ø,7,3,6,6,5,9,4,12,
     3,15,2,18,1,21,Ø,24:REM*46
```

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

```
Ø REM THIS LIST 2 CREATES (BUT
  SHOULD NOT BE CALLED) ML-CUBI
  X 1                      :REM*1Ø4
5 OPEN 8,8,8,"ML-CUBIX 1,P,W"
                           :REM*214
6 CT=Ø:PRINT"{SHFT CLR}":REM*56
1Ø 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
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)      :REM*242
25 FOR I=1 TO 3Ø           :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                           :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55               :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55               :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                           :REM*67
5Ø NEXT:GOTO 1Ø            :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 7Ø                    :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 7Ø              :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                           :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                           :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55               :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55               :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                           :REM*148
95 NEXT:GOTO 1Ø            :REM*16Ø
1ØØ REM HEX LOADER FOR ML-CUBIX
    1                      :REM*24
1Ø1 DATA ØØ13A9ØØ8DFF1BA5FA18*6
    91885FA9ØØ2E6FBE6FB*6ØC8EEF
    F1BE6FADØØ2E6          :REM*143
1Ø2 DATA FBADFF1B6ØA1FA29Ø319*E
    Ø1481FA6ØA1FA29ØF19*EØ1481F
    A6ØA1FA293F19          :REM*194
1Ø3 DATA EØ1481FA6ØAØØAA2ØØ8E*F
    F1BA9ØØ81FA2Ø1413C9*8ØDØF5A
    5FA1869CØ85FA          :REM*219
1Ø4 DATA 9ØØ2E6FB88DØE26ØEAEA*E
    AEAEAEAEAA9ØØ8DFE1B*ADFE1BA
    ABDDØ19FØ12AD          :REM*162
1Ø5 DATA FE1BØAAABDØØ1B85FABD*Ø
    11B85FB2Ø6Ø15EEFE1B*ADFE1BC
    91BDØDB6ØA21B          :REM*2Ø6
1Ø6 DATA BDCF199D5F1BCADØF76Ø*A
    21BBD5F1B9DCF19CADØ*F76Ø2Ø5
    D14A9ØØ85FCAØ          :REM*255
1Ø7 DATA Ø9B97F1B1865FCAABD6Ø*1
    B8D8C1BB98F1B1865FC*AAAD8C1
    B9DDØ1988DØE3          :REM*128
1Ø8 DATA E6FCA5FCC9Ø3DØD92Ø67*1
    36ØEAEAEA2Ø5D14A9ØØ*85FCA5F
    CØAEAEA1865FC          :REM*74
1Ø9 DATA 85FDAØØ9B99F1B38E5FD*A
    ABD6Ø1B8D8C1BB9AF1B*1865FCA
    AAD8C1B9DDØ19          :REM*186
11Ø DATA 88DØE3E6FCA5FCC9Ø3DØ*C
    F2Ø67136ØEAEAEA2Ø5D*14A9ØØ8
    5FCA5FCØAØAØA          :REM*41
111 DATA 1865FC85FDAØØ9B9BF1B*3
    8E5FDAABD6Ø1B8D8C1B*B9CF1B1
    865FCAAAD8C1B          :REM*136
112 DATA 9DDØ1988DØE3E6FCA5FC*C
    9Ø3DØCF2Ø67136ØEAEA*EAA9B08
    5FAA92A85FBA2          :REM*76
113 DATA DØ8E71138ECB138EØA14*8
    E4914CA8E9513A91B8D*7C138D8
    1132Ø92132Ø3F          :REM*4Ø
114 DATA 136ØA9ØØ8DFE1BADFE1B*A
    ABDDØ19FØ12ADFE1BØA*AABDØØ1
    B85FABDØ11B85          :REM*14
115 DATA FB2Ø6Ø15EEFE1BADFE1B*C
    91BDØDB6ØA91Ø85FAA9*2A85FB2
    Ø3F136ØA91A8D          :REM*155
116 DATA 9B148DAØ14A9BØ8D9Ø14*2
    Ø8614A91B8D9B148DAØ*14A9DØ8
    D9Ø146ØFFØØFF          :REM*111
117 DATA ØØFFØØØØØØØØØØØØØØ3*Ø
    ØØØØØØ3ØF3FFFFFØØ3F*FFFFFFF
    FFFFFØØFFFFFF          :REM*114
118 DATA FFFCF2CAØØFCF2CA2AAA*A
    AAAØØ15151515151515*ØØ55555
    5555555555Ø55          :REM*191
119 DATA 5555555555552A2A2A2A*2
    A2A2A2AAAAAAAAAAAAA*AAAA151
    5151515151515          :REM*77
12Ø DATA 55555555555555555555*5
    555555555552A2A2A2A*282ØØØØ
    ØA8AØ8ØØØØØØØ          :REM*23
121 DATA ØØØØØØØØØØØØØØØØØØØØ*A
    ØØØA2ØØ8EFF1BB9EØ14*49FF21F
    A19EØ1481FA2Ø           :REM*21
122 DATA 1313C918DØEDA9ØØ8DFF*1
    BB9EØ1481FA2Ø1313C9*1ØDØF42
    ØØØ13B9EØ1481          :REM*49
123 DATA FA2Ø1313C928DØF42ØØØ*1
    3B9EØ1481FA2Ø1313C9*1DDØF42
    Ø21132Ø131320          :REM*233
124 DATA 2B132Ø13132Ø35132Ø13*1
    3B9EØ1481FA2Ø13132Ø*21132Ø1
    3132Ø2B132Ø13          :REM*21
125 DATA 132Ø35136ØA2ØØBDFØ15*9
    DØØØEE8EØ4ØDØF56ØA2*ØØA9ØØ9
    DØØ19E8DØF86Ø          :REM*231
126 DATA EAEAEAEAØØØØØØØØØØ*Ø
    ØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*251
127 DATA ØØØØØØØØØ2AACØØAABCØ*2
    AAFCØ557FCØ557FCØ55*7FCØ557
    FCØ557FØØ557C          :REM*48
128 DATA ØØ557ØØØFFCØØØ3F
                           :REM*16
129 DATA -1                :REM*24Ø
```

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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- ►

RUN it right: **C-64 or C-128; joystick and 1350 or 1351 mouse.**

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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 2↑3, 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 Mousetrap 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 throwaway 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. R

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(64Ø1)=216 THEN1ØØ
                        :REM*22Ø
1Ø I=64ØØ               :REM*6Ø
15 PRINT"{SHFT CLR}128 MOUSE &
   JOYSTICK READER DEMO":PRINT"
   {CRSR DN}BY TOM BROWN"
                        :REM*161
18 PRINT"{2 CRSR DNs}LOADING ML
   ..."                 :REM*199
2Ø READ A:IF A=256 THEN 1ØØ
                        :REM*19Ø
3Ø POKE I,A:I=I+1:GOTO 2Ø
                        :REM*231
4Ø :                    :REM*98
1ØØ KEY8,"":REM KEEPS MOUSE BUT
    TON FROM PRINTING THE F8 TE
    XT                  :REM*115
11Ø ML=64ØØ:REM STARTING LOCATI
    ON OF MOUSE-READER   :REM*1
12Ø SYS(ML):REM INSTALL THE MOU
    SE INTERRUPT READER:REM*122
13Ø A=USR(5),32Ø,2ØØ:REM SET RI
    GHT AND BOTTOM LIMIT OF POI
    NTER VALUE          :REM*84
14Ø A=USR(4),1ØØ,1ØØ:REM SET TH
    E CURRENT X AND Y VALUE OF
    THE POINTER         :REM*254
145 PRINT"{2 CRSR DNs}MOUSETRAP
     IS ACTIVE. HIT ANY KEY TO
    EXIT"               :REM*68
15Ø IF(USR(Ø))THEN GOSUB18Ø:REM
     IF NON-ZERO, THE POINTER H
    AS BEEN MOVED       :REM*233
16Ø IF(USR(3))THENPRINT"{CTRL 9
    } BUTTON PRESSED {CTRL Ø}":
    FORX=1TO3Ø:NEXT     :REM*96
165 GETA$:IFA$<>""THEN A=USR(7)
    :PRINT"{2 CRSR DNs}MOUSETRA
    P TURNED OFF":END   :REM*139
17Ø GOTO15Ø             :REM*246
18Ø X=USR(1):Y=USR(2):REM GET T
    HE X AND Y POSITION OF THE
    POINTER             :REM*152
19Ø PRINT"X =";X;"{2 SPACEs}Y =
    ";Y:RETURN          :REM*122
2ØØ DATA 12Ø,216,173,21,3,2Ø1,2
    5,24Ø,32,173,2Ø,3,141,93,26
    ,173,21,3,141,94    :REM*122
21Ø DATA 26,169,239,141,2Ø,3,16
    9,25,141,21,3,169,242,141,2
    5,18,169,26,141     :REM*1
22Ø DATA 26,18,88,96,12Ø,216,17
    3,21,3,2Ø1,25,2Ø8,12,173,93
    ,26,141,2Ø,3,173    :REM*224
23Ø DATA 94,26,141,21,3,88,96,3
    2,92,121,32,131,25,14Ø,119,
    25,141,12Ø,25,32    :REM*165
24Ø DATA 92,121,32,131,25,14Ø,1
    21,25,141,122,25,96,32,92,1
    21,32,131,25,14Ø    :REM*48
25Ø DATA 126,25,141,127,25,32,9
    2,121,32,131,25,14Ø,128,25,
    141,129,25,96,Ø     :REM*94
26Ø DATA 188,188,97,Ø,85,Ø,122,
    188,Ø,64,1,2ØØ,Ø,Ø,32,215,1
    19,76,12,175,32     :REM*2Ø7
27Ø DATA 2Ø8,25,173,121,25,2Ø8,
    8,173,122,25,24Ø,6,2Ø6,122,
    25,2Ø6,121,25,96    :REM*112
28Ø DATA 32,14Ø,25,173,119,25,2
    Ø8,8,173,12Ø,25,24Ø,6,2Ø6,1
    2Ø,25,2Ø6,119,25    :REM*132
29Ø DATA 96,32,16Ø,25,173,121,2
    5,2Ø5,128,25,2Ø8,8,173,122,
    25,2Ø5,129,25       :REM*1
3ØØ DATA 24Ø,8,238,121,25,2Ø8,3
    ,238,122,25,96,32,18Ø,25,17
    3,119,25,2Ø5,126    :REM*1Ø8
31Ø DATA 25,2Ø8,8,173,12Ø,25,2Ø
    5,127,25,24Ø,8,238,119,25,2
    Ø8,3,238,12Ø,25     :REM*156
32Ø DATA 96,169,255,141,125,25,
    96,12Ø,216,32,194,26,162,Ø,
    142,116,25,173      :REM*236
33Ø DATA 25,212,172,123,25,32,1
    49,26,14Ø,123,25,176,3,238,
    116,25,24,1Ø9       :REM*5Ø
34Ø DATA 119,25,141,119,25,138,
    1Ø9,12Ø,25,141,12Ø,25,173,2
    6,212,172,124,25    :REM*174
35Ø DATA 32,149,26,176,3,238,11
    6,25,14Ø,124,25,2Ø1,2,144,1
    8,2Ø1,255,176,14    :REM*1Ø8
36Ø DATA 72,138,1Ø,8,1Ø6,4Ø,1Ø6
    ,17Ø,1Ø4,1Ø,8,1Ø6,4Ø,1Ø6,56
    ,73,255,1Ø9,121     :REM*33
37Ø DATA 25,141,121,25,138,73,2
    55,1Ø9,122,25,141,122,25,17
    3,116,25,24Ø,6      :REM*234
```


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```
38Ø DATA 32,95,26,32,233,25,76,
    1Ø1,25Ø,162,1,32,1Ø5,26,162
    ,3,76,1Ø5,26,189     :REM*98
39Ø DATA 119,25,48,3Ø,221,126,2
    5,144,24,2Ø8,9,2Ø2,189,119,
    25,221,126,25        :REM*229
4ØØ DATA 144,13,189,126,25,157,
    119,25,232,189,126,25,157,1
    19,25,96,169,Ø       :REM*188
41Ø DATA 157,119,25,157,118,25,
    96,14Ø,117,25,141,118,25,16
    2,Ø,56,237,117       :REM*159
42Ø DATA 25,41,127,2Ø1,64,176,8
    ,74,24Ø,2Ø,172,118,25,24,96
    ,9,192,2Ø1,255       :REM*161
43Ø DATA 24Ø,9,56,1Ø6,162,255,1
    72,118,25,24,96,169,Ø,56,96
    ,173,Ø,22Ø,16Ø,Ø     :REM*174
44Ø DATA 74,176,6,72,32,14Ø,25,
    2ØØ,1Ø4,74,176,6,72,32,18Ø,
    25,2ØØ,1Ø4,74        :REM*147
45Ø DATA 176,6,72,32,16Ø,25,2ØØ
    ,1Ø4,74,176,6,72,32,2Ø8,25,
    2ØØ,1Ø4,152,24Ø      :REM*4Ø
46Ø DATA 3,32,233,25,96,169,Ø,1
    33,1Ø2,32,12,175,169,Ø,141,
    Ø,255,152,41,7       :REM*13Ø
47Ø DATA 17Ø,189,3Ø,27,72,189,2
    2,27,72,96,172,125,25,169,Ø
    ,141,125,25,76,3     :REM*254
48Ø DATA 175,1Ø,86,1ØØ,37,65,9Ø
    ,114,42,27,27,27,27,25,25,2
    7,25,32,47,27        :REM*252
49Ø DATA 168,169,Ø,76,3,175,12Ø
    ,162,Ø,169,255,141,Ø,22Ø,14
    1,47,2Ø8,173,1       :REM*3Ø
5ØØ DATA 22Ø,32,77,27,162,127,1
    42,Ø,22Ø,88,17Ø,24Ø,1,96,17
    3,Ø,22Ø,162,Ø,41     :REM*48
51Ø DATA 16,2Ø8,2,162,128,138,9
    6,12Ø,172,119,25,173,12Ø,25
    ,88,32,128,27,76     :REM*2Ø7
52Ø DATA 3,175,12Ø,172,121,25,1
    73,122,25,88,32,128,27,76,3
    ,175,32,92,121       :REM*33
53Ø DATA 32,131,25,152,41,7,141
    ,13Ø,25,96,174,13Ø,25,24Ø,9
    ,74,72,152,1Ø6       :REM*51
54Ø DATA 168,1Ø4,2Ø2,2Ø8,247,96
    ,256                 :REM*227
```

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

```
5 REM 64 MOUSE & JOYSTICK READE
  R DEMO                 :REM*129
1Ø I=525ØØ:IF PEEK(525Ø1)=216TH
   EN1ØØ                 :REM*211
15 PRINT"{SHFT CLR}64 MOUSE & J
   OYSTICK READER DEMO":PRINT"{
   CRSR DN}BY TOM BROWN" :REM*8
18 PRINT"{2 CRSR DNs}LOADING ML
   ..."                  :REM*199
2Ø READ A:IF A=256 THEN 1ØØ
                         :REM*19Ø
3Ø POKE I,A:I=I+1:GOTO 2Ø
                         :REM*231
1ØØ ML=525ØØ:REM STARTING LOCAT
   ION OF MOUSE-READER :REM*24
12Ø SYS(ML):REM INSTALL THE MOU
   SE INTERRUPT READER:REM*122
13Ø A=USR(5),32Ø,2ØØ:REM SET RI
   GHT AND BOTTOM LIMIT OF POI
   NTER VALUE            :REM*84
14Ø A=USR(4),1ØØ,1ØØ:REM SET TH
   E CURRENT X AND Y VALUE OF
   THE POINTER           :REM*254
145 PRINT"{2 CRSR DNs}MOUSETRAP
    IS ACTIVE. HIT ANY KEY TO
   EXIT"                 :REM*68
15Ø IF(USR(Ø))THEN GOSUB18Ø:REM
    IF NON-ZERO, THE POINTER H
   AS BEEN MOVED         :REM*233
16Ø IF(USR(3))THENPRINT"{CTRL 9
   } BUTTON PRESSED {CTRL Ø}":
   FORX=1TO2Ø:NEXT       :REM*14Ø
165 GETA$:IFA$<>""THEN A=USR(7)
   :PRINT"{2 CRSR DNs}MOUSETRA
   P TURNED OFF":END     :REM*139
17Ø GOTO15Ø              :REM*246
18Ø X=USR(1):Y=USR(2):REM GET T
   HE X AND Y POSITION OF THE
   POINTER               :REM*152
19Ø PRINT"X =";X;"{2 SPACEs}Y =
   ";Y:RETURN            :REM*122
2ØØ DATA 12Ø,216,173,21,3,2Ø1,2
   Ø5,24Ø,32,173,2Ø,3,141,63,2
   Ø6,173,21,3,141       :REM*85
21Ø DATA 64,2Ø6,169,2Ø9,141,2Ø,
   3,169,2Ø5,141,21,3,169,6,14
   1,17,3,169,2Ø7        :REM*84
22Ø DATA 141,18,3,88,96,12Ø,216
   ,173,21,3,2Ø1,2Ø5,2Ø8,12,17
   3,63,2Ø6,141,2Ø       :REM*229
23Ø DATA 3,173,64,2Ø6,141,21,3,
   88,96,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
   ,Ø,Ø,Ø,Ø,32,138       :REM*58
24Ø DATA 173,76,247,183,32,178,
   2Ø5,173,91,2Ø5,2Ø8,8,173,92
   ,2Ø5,24Ø,6,2Ø6        :REM*158
25Ø DATA 92,2Ø5,2Ø6,91,2Ø5,96,3
   2,11Ø,2Ø5,173,89,2Ø5,2Ø8,8,
   173,9Ø,2Ø5,24Ø,6      :REM*126
26Ø DATA 2Ø6,9Ø,2Ø5,2Ø6,89,2Ø5,
   96,32,13Ø,2Ø5,173,91,2Ø5,2Ø
   5,98,2Ø5,2Ø8,8        :REM*189
27Ø DATA 173,92,2Ø5,2Ø5,99,2Ø5,
   24Ø,8,238,91,2Ø5,2Ø8,3,238,
   92,2Ø5,96,32,15Ø      :REM*185
28Ø DATA 2Ø5,173,89,2Ø5,2Ø5,96,
   2Ø5,2Ø8,8,173,9Ø,2Ø5,2Ø5,97
   ,2Ø5,24Ø,8,238        :REM*79
29Ø DATA 89,2Ø5,2Ø8,3,238,9Ø,2Ø
   5,96,169,255,141,95,2Ø5,96,
   12Ø,216,32,164        :REM*61
3ØØ DATA 2Ø6,162,Ø,142,86,2Ø5,1
   73,25,212,172,93,2Ø5,32,119
   ,2Ø6,14Ø,93,2Ø5       :REM*176
31Ø DATA 176,3,238,86,2Ø5,24,1Ø
   9,89,2Ø5,141,89,2Ø5,138,1Ø9
   ,9Ø,2Ø5,141,9Ø        :REM*2Ø9
32Ø DATA 2Ø5,173,26,212,172,94,
   2Ø5,32,119,2Ø6,176,3,238,86
   ,2Ø5,14Ø,94,2Ø5       :REM*43
33Ø DATA 2Ø1,2,144,18,2Ø1,255,1
   76,14,72,138,1Ø,8,1Ø6,4Ø,1Ø
   6,17Ø,1Ø4,1Ø,8        :REM*243
34Ø DATA 1Ø6,4Ø,1Ø6,56,73,255,1
   Ø9,91,2Ø5,141,91,2Ø5,138,73
   ,255,1Ø9,92,2Ø5       :REM*225
35Ø DATA 141,92,2Ø5,173,86,2Ø5,
   24Ø,6,32,65,2Ø6,32,2Ø3,2Ø5,
   76,49,234,162,1       :REM*2Ø6
36Ø DATA 32,75,2Ø6,162,3,76,75,
   2Ø6,189,89,2Ø5,48,3Ø,221,96
   ,2Ø5,144,24,2Ø8       :REM*36
37Ø DATA 9,2Ø2,189,89,2Ø5,221,9
   6,2Ø5,144,13,189,96,2Ø5,157
   ,89,2Ø5,232,189       :REM*3
38Ø DATA 96,2Ø5,157,89,2Ø5,96,1
   69,Ø,157,89,2Ø5,157,88,2Ø5,
   96,14Ø,87,2Ø5         :REM*235
39Ø DATA 141,88,2Ø5,162,Ø,56,23
   7,87,2Ø5,41,127,2Ø1,64,176,
   8,74,24Ø,2Ø,172       :REM*2Ø9
4ØØ DATA 88,2Ø5,24,96,9,192,2Ø1
   ,255,24Ø,9,56,1Ø6,162,255,1
   72,88,2Ø5,24,96       :REM*244
41Ø DATA 169,Ø,56,96,173,Ø,22Ø,
   16Ø,Ø,74,176,6,72,32,11Ø,2Ø
   5,2ØØ,1Ø4,74,176      :REM*2Ø9
42Ø DATA 6,72,32,15Ø,2Ø5,2ØØ,1Ø
   4,74,176,6,72,32,13Ø,2Ø5,2Ø
   Ø,1Ø4,74,176,6        :REM*56
43Ø DATA 72,32,178,2Ø5,2ØØ,1Ø4,
   152,24Ø,3,32,2Ø3,2Ø5,96,32,
   253,174,32,1Ø1        :REM*199
44Ø DATA 2Ø5,14Ø,89,2Ø5,141,9Ø,
   2Ø5,32,253,174,32,1Ø1,2Ø5,1
   4Ø,91,2Ø5,141,92      :REM*39
45Ø DATA 2Ø5,96,32,253,174,32,1
   Ø1,2Ø5,14Ø,96,2Ø5,141,97,2Ø
   5,32,253,174,32       :REM*181
46Ø DATA 1Ø1,2Ø5,14Ø,98,2Ø5,141
   ,99,2Ø5,96,169,Ø,133,1Ø2,32
   ,247,183,152,41       :REM*42
47Ø DATA 7,17Ø,189,45,2Ø7,72,18
   9,37,2Ø7,72,96,172,95,2Ø5,1
   69,Ø,141,95,2Ø5       :REM*33
48Ø DATA 76,145,179,25,66,8Ø,52
   ,211,236,94,62,2Ø7,2Ø7,2Ø7,
   2Ø7,2Ø6,2Ø6,2Ø7       :REM*228
49Ø DATA 2Ø5,16Ø,Ø,32,1Ø8,2Ø7,2
   4Ø,2,16Ø,128,169,Ø,76,145,1
   79,12Ø,172,89         :REM*24
5ØØ DATA 2Ø5,173,9Ø,2Ø5,88,32,1
   48,2Ø7,76,145,179,12Ø,172,9
   1,2Ø5,173,92,2Ø5      :REM*162
51Ø DATA 88,32,148,2Ø7,76,145,1
   79,32,253,174,32,1Ø1,2Ø5,15
   2,41,7,141,1ØØ        :REM*28
52Ø DATA 2Ø5,96,12Ø,162,Ø,169,2
   55,141,Ø,22Ø,141,47,2Ø8,173
   ,1,22Ø,32,138         :REM*136
53Ø DATA 2Ø7,162,127,142,Ø,22Ø,
   88,17Ø,24Ø,1,96,173,Ø,22Ø,1
   62,Ø,41,16,2Ø8,2      :REM*194
54Ø DATA 162,128,138,96,174,1ØØ
   ,2Ø5,24Ø,9,74,72,152,1Ø6,16
   8,1Ø4,2Ø2,2Ø8          :REM*5
55Ø DATA 247,96,256      :REM*184 ■
```

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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!

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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.

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In Most Cases, Plugs Right In-NO Soldering Required

***RAMBOard Is An Optional Accessory For Use With Maverick™**

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..." "...significantly 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 givers 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 exra 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 enchancement system ever created for th 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!

ALL NEW

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 warranteed 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 Soutions; 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 seperately.

* 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

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

ALL NEW

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' 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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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."

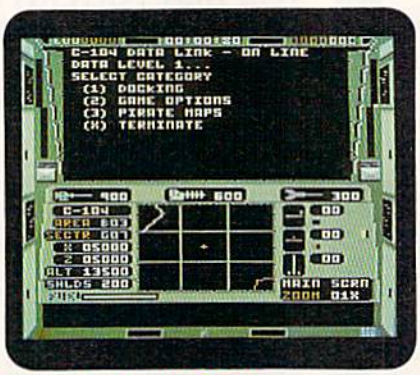
BUBBLE BOBBLE

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 Ferarri, 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. ►

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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 philosphy 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 Softworks 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!
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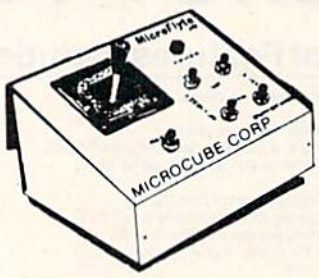

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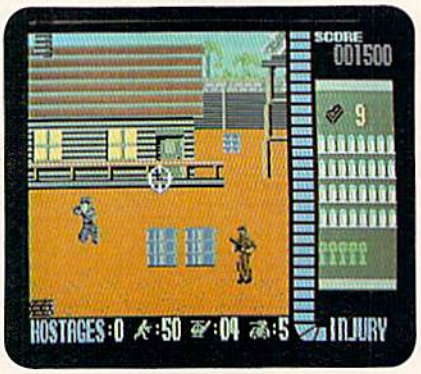
Be forewarned: slight miscalculations bring instant death. But, of course, Indy never miscalculates!

Operation Wolf

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



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

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.
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#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. Fontastic 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.

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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.

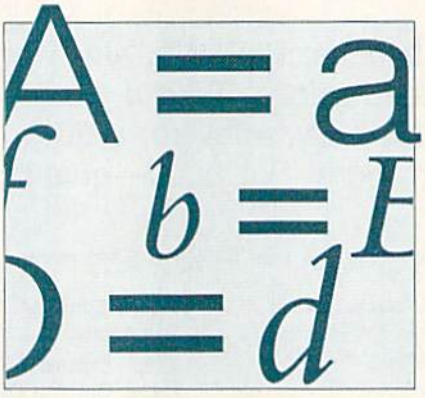
Unfortunately, there are no other new GEOS products to discuss. On the other hand, *RUN* has produced GEOS Power Pak II, a disk that features new GEOS utilities, applications and even a few games, and has the documentation right on the disk. One of the programs, Q & D Edit, helps provide a solution to 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

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

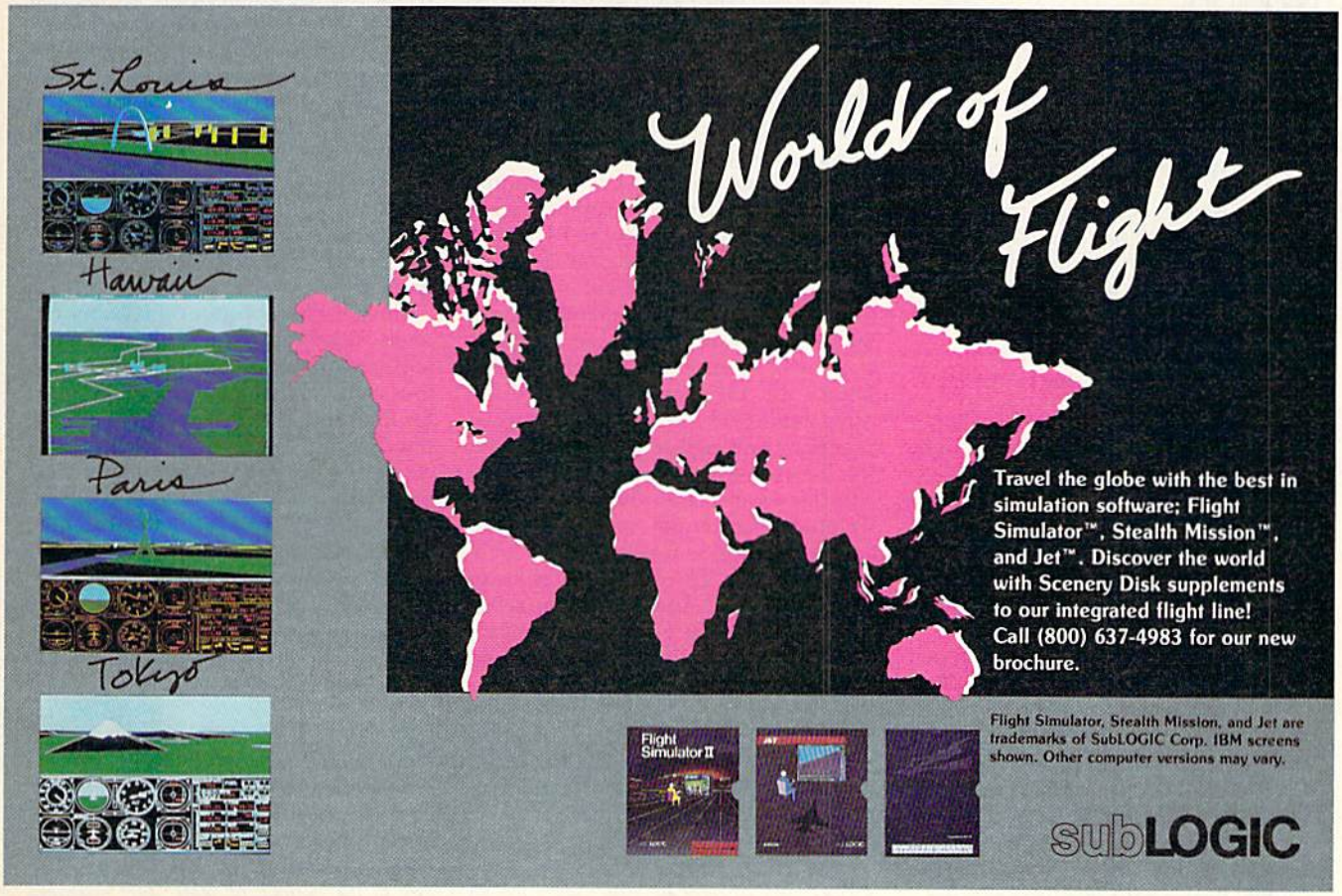
—J. SUTTON
ADDRESS UNKNOWN

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.



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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.

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From p. 29.

```
      3C9Ø3DØØ62Ø3Ø2B4CAØ*13C9Ø4D
      ØØ62Ø18364CAØ       :REM*171
12Ø   DATA 13C9Ø2DØØ62Ø4B364CAØ*1
      3C9Ø1DØØ62ØF4364CAØ*13C9Ø7D
      ØØ62Ø372F4CAØ       :REM*198
121   DATA 13C9Ø5DØØ62Ø15264CAØ*1
      3C9Ø6DØØ62ØA73F4CAØ*13C9Ø8D
      ØØ62Ø9A174CAØ       :REM*134
122   DATA 134CE514AØØ3D97B39FØ*Ø
      4881ØF86Ø98DØØEAD3E*38FØ1D8
      D3F38CE3E384C        :REM*124
123   DATA Ø416C9Ø1DØ11AD3E38C9*Ø
      9FØD68D3F38EE3E384C*Ø4166ØC
      9Ø2DØ2DAD3438        :REM*158
124   DATA C95ØFØ13AD3E38C9Ø5BØ*B
      A8D3F38186Ø58D3E38*4CØ416A
      D3E38C9Ø7BØDA        :REM*164
125   DATA 8D3F381869Ø38D3E384C*Ø
      416AD3438C95ØFØ13AD*3E38C9Ø
      59ØCØ8D3F3838        :REM*249
126   DATA E9Ø58D3E384CØ416AD3E*3
      8C9Ø39ØAD8D3F3838E9*Ø38D3E3
      82Ø1Ø2B2Ø152B        :REM*2ØØ
127   DATA AD3F382Ø1A162Ø1A2BAD*3
      E382Ø1A166Ø8D3C38Ø*A8B19EA
      AC8B19EA82ØØ9        :REM*2Ø1
128   DATA 364CFØ19A9E9859BA938*8
      59C2Ø8C352Ø1Ø2B2Ø15*2B2ØC91
      9AD3438C95ØFØ        :REM*66
129   DATA ØCA9Ø1A2ØØAØØ12Ø111A*4
      C6516A9Ø1A2ØØAØØ12Ø*111AA9Ø
      2A2ØØAØ292Ø11        :REM*42
13Ø   DATA 1A2Ø1A2B2Ø1Ø2BA9ØØ8D*3
      E388D3F382Ø1A166Ø8E*ØØD62CØ
      ØD61ØFB8DØ1D6        :REM*174
131   DATA 6Ø8EØØD62CØØD61ØFBAD*Ø
      1D66ØA98585FAA93985*FBA9ØF8
      5FCA9FAAØØFA2        :REM*136
132   DATA Ø12Ø65FF6Ø78A9B28D14*Ø
      3A9168D15Ø3586ØAD8D*Ø2C9Ø1F
      Ø11A5CBC9Ø4DØ        :REM*61
133   DATA ØB782Ø8AFF686868584C*A
      Ø134C31EA2ØF9166CØ2*AØAD343
      8C95ØFØØ9A2ØØ        :REM*229
134   DATA AØØ1A9Ø22Ø111A6ØAD3B*3
      8FØØ9A9ØE8DØ1D58DØ1*FF6ØA5Ø
      129FE85Ø16ØAD        :REM*74
135   DATA 3B38FØØCA2ØF2Ø6BFF8D*Ø
      1D58DØ1FF6ØA5Ø1Ø9Ø1*85Ø16Ø2
      ØE1FFDØØFAD33        :REM*178
136   DATA 388D323868686868EE54*3
      8386Ø2ØE4FFFØE7C92Ø*DØØ2186
      ØAE4A38FØ16C9        :REM*41
137   DATA 11FØØCC991DØD4AD3E38*F
      ØCF4C6E17AD72384C5B*17AE4B3
      8FØC1C99DFØ15        :REM*175
138   DATA C91DDØB9AD4C38CD3E38*F
      ØB12Ø1A2EEE3E384C11*17AD3E3
      8FØA3EE4D382Ø        :REM*112
139   DATA 1A2ECE3E384C11172ØE1*F
      FDØØ2386Ø2ØE4FF186Ø*AE3B38B
      D6F398D28Ø36Ø        :REM*7
14Ø   DATA AE3B38BD71398D28Ø36Ø*A
      2Ø18E6B388E67388EBA*38CA8E5
      4388AA2Ø59DBB        :REM*172
141   DATA 38CA1ØFA2Ø2733BØØ5A9*Ø
      Ø8D3E38AE3E38BD4E38*8D5238B
      D5Ø38C9Ø3DØØ3        :REM*47
142   DATA 4CB8182ØFØ2D2ØD3162Ø*5
      D1AAD5438FØØ34CB818*2ØB232A
      E3E382ØBE182Ø        :REM*86
143   DATA 8533AD5438FØØ34CCE32*A
      2Ø12Ø6C6FFAØØØAD7B38*C953DØØ
      BA9ØØ8DBB388D        :REM*127
144   DATA BC384C19182ØCFFF8DBB*3
      82ØCFFF8DBC382ØCFFF*2ØB7FFD
      ØØBEEBD38DØF3        :REM*232
145   DATA EEBE384C19182ØCCFF2Ø*8
      5332ØCE32AD5438FØØ3*4CB8181
      8ADBB386DBD38        :REM*116
146   DATA 8DBF38ADBC386DBE388D*C
      Ø382Ø1A2B2ØØ62EAE32*38BD8F3
      FA8A2Ø7A9332Ø        :REM*94
147   DATA 111AADBB388D5538ADBC*3
      88D56382Ø98322ØAF18*A9348D3
      D382Ø171AADBF        :REM*118
148   DATA 388D5538ADCØ388D5638*2
      Ø98322ØAF18A9358D3D*382Ø171
      AADBD388D5538        :REM*15
149   DATA ADBE388D56382Ø98322Ø*7
      A179ØFB4CB818A92Ø2Ø*D2FF2ØD
      2FF6ØA9ØØ8DBA        :REM*82
15Ø   DATA 386ØAØØ18C6E388E6D38*2
      Ø1C2Ø8A48C8B1928D7B*38E8E8E
      8E88EØ61368AA        :REM*2Ø9
151   DATA A92C9DØA13E8AD7B389D*Ø
      A13E8A92C9DØA13E8A9*529DØA1
      32Ø1724Ø28533        :REM*64
152   DATA 6ØAD3B38FØØ34C8619A9*B
      885FA85FCA9Ø585FBA9*D985FD2
      Ø9F19A2ØDAØØ5        :REM*2Ø7
153   DATA B1FA48B1FC482ØB41968*9
      1FC6891FA2Ø9F19C8CØ*28DØE92
      Ø9F19CADØE1A2        :REM*93
154   DATA 18AØØØ2ØØ9364CFFE9AD*3
      B38FØØ34C9Ø19A9288D*3538A9C
      Ø85FA85FCA9Ø7        :REM*213
155   DATA 85FBA9DB85FD2ØB419A2*Ø
      DAØØ5B1FA48B1FC482Ø*9F19689
      1FC6891FA2ØB4        :REM*57
156   DATA 19C8CØ28DØE92ØB419CA*D
      ØE1A2ØBAØØØ2ØØ9364C*FFE9A2Ø
      CAØØØ2ØØ9364C        :REM*158
157   DATA DCC3A2ØBAØØØ2ØØ9362Ø*3
      DCAA2ØB4C85CB18A5FA*692885F
      A85FCA5FB69ØØ        :REM*181
158   DATA 85FB1869D485FD6Ø38A5*F
      AE92885FA85FCA5FBE9*ØØ85FB1
      869D485FD6ØA9        :REM*165
159   DATA ØØ8D3C388D3738AC3738*B
      19EAAC8B19EC88C3738*A82ØØ93
      62ØFØ19EE3C38        :REM*91
16Ø   DATA AD3C38C9ØA9ØE26ØAØØØ*B
      19BCD3C38FØØ4C84CF2*19C8B19
      BFØØ72ØD2FFC8        :REM*88
161   DATA 4CFE196ØE6A7DØØ2E6A8*6
      Ø8D3D382ØØ936A9AB85*A7A9398
      5A84C251A2ØØ9        :REM*2ØØ
162   DATA 36AØØØB1A7CD3D38FØØD*2
      ØØA1AB1A7DØF92ØØA1A*4C251AC
      8B1A7FØØ62ØD2        :REM*14Ø
163   DATA FF4C3B1A6Ø2Ø2733BØØ5*A
      9ØØ8D3E38AE3E38BD4E*388D523
      82ØØ62E2ØØ834        :REM*253
164   DATA AD5438FØØ16ØAD6F38DØ*1
      2AE6638BD5Ø38C9Ø2DØ*Ø8ADBA3
      8DØØ32Ø321FAD        :REM*212
165   DATA 6F38FØØC2ØD3162Ø1A2B*2
      ØFØ2D2Ø152B2ØF3342Ø*9C1CAD5
      438DØ21AD5D38        :REM*191 ►
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RUN SHELL

```
166 DATA F01C20E31DA90B8D6138*A
    2008E6238E88E3E38AD*7838D00
    320FA1E20BB1A       :REM*218
167 DATA 60AD7838F0016020EAFF*2
    0E1FFD00FADBA38F004*EE54386
    06868EE54386Ø       :REM*220
168 DATA 20E4FF8D3D38F0DBC920*D
    037AD6738D008AD6F38*D0034C6
    41BAD3E388D6D       :REM*253
169 DATA 3820691FB01CAD6F38D0*0
    9A2008E6738E88E6C38*AD7038F
    0092OF42E20A7       :REM*42
170 DATA 37200B2F4CBB1AAD6B38*F
    044AD6838F03FAD3D38*C987D02
    3AE3E38BD004A       :REM*224
171 DATA F030A9009D004AA9008D*6
    C38CE683820791FAD6F*38D003E
    E67384CBB1AAD       :REM*87
172 DATA 3D38C988D00EAD6C38F0*0
    34CD31FAD6F38F0016Ø*AD3D38C
    911F00AC991D0       :REM*125
173 DATA 034C061C4CBB1AAD3E38*C
    D5D38B0F5AD6138C918*901ØAD3
    238F005AD6238       :REM*252
174 DATA F0062ØCB1B4C721B201E*1
    FAD6138C919B01ØEE3E*38AD323
    8F005AD6238F0       :REM*41
175 DATA 03EE6138AD3238F00AAD*6
    238D005A9284CBF1BA9*008D623
    820FA1E4CBB1A       :REM*118
176 DATA 4CBB1AEE60382Ø1E1F20*F
    9182Ø102BA9188D4138*A0078C4
    238AD3E388D5F       :REM*159
177 DATA 382ØFB1DA9008D6038AD*3
    238F008AD623849288D*6238EE3
    E382ØFA1E604C       :REM*15
178 DATA BB1AAD3E38C901F0F6AD*6
    138C90BD00DAD3238F0*05AD623
    8D0034C4C1C20       :REM*105
179 DATA 1E1FAD3238F012AD6238*D
    005A9284C3D1CA9008D*62384C4
    31CA9008D6238       :REM*70
180 DATA CE61382ØFA1ECE3E384C*B
    B1A201E1FEE6Ø382Ø3D*19AD323
    8F003CE3E38CE       :REM*16
181 DATA 3E38CE3E382Ø102BA90B*8
    D4138A0078C4238AD3E*388D5F3
    820FB1DA9008D       :REM*78
182 DATA 60382AD3238F008AD6238*4
    9288D6238AD3238F003*EE3E382
    0FA1EEE3E384C       :REM*225
183 DATA BB1AAE6638BD50382C903*D
    032AD8C388D5D38A900*8D8D38A
    9628D8E38AD04       :REM*254
184 DATA DF48AD05DF48AD06DF48*2
    0112D2070928688D06DF*688D05D
    F688D04DFEEAC       :REM*218
185 DATA 3860286172ØB232A902*8
    D0613A9248D0A13A930*8D0B13A
    9008D5738A920       :REM*201
186 DATA 85FEA94D85FF20D9322Ø*9
    0172Ø8533AD5438F004*20D3326
    02ØD332A2008E       :REM*154
187 DATA 5D38E88E5C38A03CB1FE*D
    0016ØA9008592ØD8D38*A94D859
    38D8E3838AD58       :REM*57
188 DATA 38E9208D5838AD5938E9*0
    08D59382Ø5235A000AD*5C38919
    2C88C5A382Ø6Ø       :REM*47
189 DATA 35A000B1FE9192C8B1FE*9
    192C88C5A38B1FEC8C9*22D0F9B
    1FEC922F0138C       :REM*80
190 DATA 5B38AC5A389192C88C5A*3
    8AC5B38C84C651DC88C*5B38AC5
    A38A9FF9192EE       :REM*186
191 DATA 5A38AC5B38B1FEC920D0*0
    4C84C8F1DA203B1FE8C*5B38AC5
    A389192EE5A38       :REM*7
192 DATA EE5B38AC5B38CAD0EAAC*5
    A38A9009192EE5A3820*523520Ø6
    03538AD5838E5       :REM*247
193 DATA FE8D4038AD5938E5FF0D*4
    038F00B9009EE5C38EE*5D384C4
    11DEE5D3860A9       :REM*234
194 DATA 0A8D4138A9008D5F3820*1
    02B201A2BEE4138A007*8C4238A
    E4138EE5F3820       :REM*64
195 DATA 0936AD5F3820471EAD5F*3
    8CD5D38B034AD3238F0*23AD603
    8D007AD5F38C9       :REM*84
196 DATA 1CB023AD4238C92F9008*A
    D6038D0174CF31DA02F*8C42384
    CFB1DAD6038D0       :REM*158
197 DATA 07AD5F38C90ED0AD6008D*0
    613AD8D388592AD8E38*8593A00
    0B192CD0613F0       :REM*233
198 DATA 20C8C8C8B192F004C84C*6
    01EC88C3D3818A5926D*3D38859
    2A59369008593       :REM*34
199 DATA 4C541EAD6E38F004C8C8*C
    860C8B1928D5538C8B1*928D563
    8C88C5A382098       :REM*81
200 DATA 32AE0613BD004AF00320*1
    52B18AD423869058D42*38A8AE4
    1382009936AC5A      :REM*34
201 DATA 38A200B192C9FFF0082Ø*D
    2FFC8E84CB91EE01B0*09A9202
    0D2FFE84CC71E       :REM*251
202 DATA 201A2BC88C5A3818AD42*3
    869148D4238A8AE4138*200936A
    C5A38B192F007       :REM*254
203 DATA 20D2FFC84CEE1E60A91C*2
    0D2FFA9122ØD2FFAE61*38AC623
    8200936A200BD       :REM*229
204 DATA 8139F0072ØD2FFE84C0F*1
    F4C1A2BAE6138AC6238*2000936A
    202A9202ØD2FF       :REM*76
205 DATA CA10FA6020B2B201A2B*2
    0062EAE3238BD7F3FA8*A207A91
    120111A208617       :REM*183
206 DATA 20442C209017A200AD3E*3
    88D67388D6B38F0062Ø*F02D20D
    3162Ø152B60AE       :REM*147
207 DATA 3E38BD04AF002386ØEE*6
    838FE004AA9008D4D38*AD3238F
    00EA9008SFA85       :REM*142
208 DATA FBA9508D35384C9D1FA9*0
    0A0042Ø332EA9288D35*38AD613
    88D69382ØB92E       :REM*143
209 DATA CE6938D0F818AD623869*0
    C8D35382ØB92EAD3238*F007A5F
    AA4FB20332EA0       :REM*131
210 DATA 108C46382ØF42E20852E*2
    00B2F1860AD8138D0FA*ADBA38D
    0F5201C20E8E8       :REM*146
211 DATA E88E0613A92FA23ØA03A*2
    084372Ø1Ø332Ø85332Ø*D332AD5
    438F0016ØAD06       :REM*194
212 DATA 13C901D006A9008D7638*6
    0EE76386ØA92F8D0713*A918D0
    6134CEF1FA901       :REM*108
213 DATA 8D6E38AD6D3820471EA9*0
    08D6E38AD7038F006AE*71384C3
    920A200B192C9       :REM*2
214 DATA FFF0089D0A13C8E84C39*2
    060A90B8D7938A9048D*7A38AE7
    938A000200936       :REM*48
215 DATA AE3438CA2Ø112EEE7938*C
    E7A38D0E9601ØA54169*018541A
    54269000854260      :REM*49
216 DATA 202733B005A9008D3E38*A
    E3E38BD5038C903F001*602006Ø2
    EBD4E3820D316       :REM*147
217 DATA 8D5238201A2B20F02D20*1
    02BA90B8D4138AE3238*BD953F8
    D4238A9238D39       :REM*6
218 DATA 38AE4138AC4238AD3938*2
    0111AEE3938EE4138AD*3938C92
    6D0E7A2008E4B       :REM*242
219 DATA 38E88E4A38A2198E4638*A
    D34388D3538A9028D72*38AD323
    80AAABD553F48       :REM*77
220 DATA E8BD553FA86820222F20*4
    820AD3E38F007C901F0*064C9C2
    94C0E214C2623       :REM*103
221 DATA A2018E6F388E6B38CA8E*8
    5382Ø2733B005A9008D*3E38AE3
    E38BD5038C903       :REM*20
222 DATA D0016ØBD4E388D52382Ø*5
    A1A201A2B200062E200B*2BAC323
    8B9853FA8A207       :REM*131
223 DATA A9282Ø111AA9018D4C38*2
    07132AD3E38D0016ØA2*00BD004
    AD009E8D0F8A9       :REM*154
224 DATA 008D85386ØA0018C6E38*8
    E6D382Ø1C209848A001*B1928D7
    D38C8B1928D7E       :REM*179
225 DATA 3868A838AD8A38ED7D38*8
    D7938AD8B38ED7E380D*7938F00
    CB00AAD8538F0       :REM*238
226 DATA 02386Ø4C0C238A48AE6D*3
    8A9009D004ACE6838C8*B1928D7
    B3868AAE8E8E8       :REM*227
227 DATA E88E0613AAA92C9D0A13*E
    8AD7B389D0A13E8A92C*9D0A13E
    8A9529D0A132Ø       :REM*7
228 DATA 1724AD3B380AAABD653F*8
    5B48D7F38E8BD653F85*B58D803
    8A9B48DB902EE       :REM*98
229 DATA 7C3820272438AD0613E9*0
    48D0613A000AD7C3891*418D8C3
    8206A20AD8538       :REM*216
230 DATA F0034C3122AD7D389141*2
    06A20AD7E389141206A*20A200B
    D0A139141206A       :REM*142
231 DATA 20E8CE0613D0F2A9FF91*4
    1206A20AE7C38AD7B38*9D0072A
    9038D7938A200       :REM*47
232 DATA BD773FCD7B38D0034C65*2
    2A203BD773F91412Ø6A*20E8CE7
    938D0F2A9009Ø       :REM*245
233 DATA 41206A20AD8538F0044C*9
    A2260AD7C380AAA38A5*B4ED7F3
    89D006EE8A5B5       :REM*198
234 DATA ED80389D006E38AD8A38*E
    D7D388D8A38AD8B38ED*7E388D8
    B38AD8538F002       :REM*57
```

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235 DATA 186ØAE7C38AD06DF29Ø7*9
    D00748A0AAAAD04DF9D*8074E8A
    D05DF9D8074CA          :REM*177
236 DATA AD7F388D02DFAD8Ø388D*Ø
    3DFBD006E8D07DFE8BD*006E8D0
    8DFAD3B38F008          :REM*124
237 DATA AD06D5094Ø8D06D52Ø5A*2
    8AD3B38F008AD06D529*BF8D06D
    5EEAC384C5D21          :REM*45
238 DATA 2Ø1A2B2Ø062E200B2BAE*3
    238BD973FA8A207A929*2Ø111A4
    C9Ø32A9Ø18D6B          :REM*229
239 DATA 388D81388D67382Ø2733*B
    Ø05A9Ø08D3E38AE3E38*BD5Ø38C
    903F00160BD4E          :REM*87
24Ø DATA 388D52382Ø52234C5623*2
    Ø5A1A60AD5438F00160*A2008E8
    1382ØØB249ØØ1          :REM*73
241 DATA 608E6D38BD0072C95ØF0*Ø
    34C9223BD00748D06DF*8A0AAA3
    8BD007ØE9Ø28D          :REM*235
242 DATA Ø2DFE8BD007ØE9Ø08D03*D
    F4CA823BD00748D06DF*8A0AAAB
    D007Ø8D02DFE8          :REM*28
243 DATA BD007Ø8D03DFCABD8Ø74*8
    D04DFE8BD8Ø748D05DF*CABD006
    E8D07DFE8BD00          :REM*2Ø
244 DATA 6E8D08DFAD3B38F012AE*6
    D38BD0072C950F008AD*06D5094
    08D06D52Ø7928          :REM*12Ø
245 DATA AD02DF85B4AD03DF85B5*A
    900A891B4AD3B38F008*AD06D52
    9BF8D06D5AE6D          :REM*33
246 DATA 38BD072C953D0032ØB0*2
    8EEAC386ØBD04AD05*E8D0F83
    86Ø186Ø2ØCCFF          :REM*137
247 DATA 2ØB2322ØD6242Ø85332Ø*C
    CFF60A2Ø12ØC6FFA000*AD8538D
    Ø4FAD7B38C953          :REM*148
248 DATA D02ØAD3B38ØAAAE8BD69*3
    F48CABD693F48AD7C38*ØAAA689
    D007ØE8689D00          :REM*204
249 DATA 704C8224AD7C38ØAA82Ø*C
    FFF9900Ø7ØC88C8338A0*002ØBF2
    42ØB324AC8338          :REM*25Ø
25Ø DATA 2ØCFFF9900Ø7ØA000Ø2ØBF*2
    42ØB3242ØBA242ØB7FF*D00620B
    3244C82242ØB3          :REM*1Ø8
251 DATA 24AD3B38F00AA2Ø1A900*2
    Ø77FF4CA624A9Ø091B4*2ØB3242
    ØCCFF2Ø85332Ø          :REM*206
252 DATA CE326ØE6B4D002E6B560*A
    000ØCFFF8D3838AD3B*38F009A
    2Ø1AD38382077          :REM*159
253 DATA FF6ØAD383891B46ØAD06*1
    3A2ØAAØ132ØBDFFA9Ø1*AE5238A
    0052ØBAFF2ØCØ          :REM*4Ø
254 DATA FF602Ø2733B012A2008E*3
    E38BD4E388D5338CA8E*89384C1
    425AD3E388D89          :REM*243
255 DATA 3849Ø1AABD4E388D5338*A
    E3E38BD4E388D52386Ø*2ØØ62E2
    Ø1Ø2BAE3238BD          :REM*96
256 DATA 813FA8A207A9272Ø111A*A
    D89381Ø08A9Ø08D3E38*4C4725A
    D823849Ø18D3E          :REM*63
257 DATA 38AE3E38BD94392ØD2FF*2
    Ø9Ø322ØØ62E60A9ØØ85*41A9628
    5426Ø205725AØ          :REM*186
258 DATA ØØB141CD8638FØØD2Ø6A*2
    ØB141DØF92Ø6A2Ø4C65*25A2ØØA
    DB238DØØ62Ø6A          :REM*153
259 DATA 2Ø4C8925C8C8C8B141C9*F
    FFØØ89DØA13C8E84C89*25A92C9
    DØA13E8C8B141          :REM*241
26Ø DATA 9DØA13E8A92C9DØA13E8*A
    9579DØA13E88E06136Ø*AD53388
    D52382ØØB2B2Ø          :REM*47
261 DATA 5Ø32AD3E38FØØ32Ø4D2B*A
    E8238BD4E388D52386Ø*AD3B38Ø
    AAABD733F8D8A          :REM*99
262 DATA 38BD613F9D653FE8BD73*3
    F8D8B38BD613F9D653F*6ØAD863
    8ØAAABDØØ5E85          :REM*12Ø
263 DATA B438BDØØ6ØFDØØ5E8D87*3
    8E8BDØØ6ØFDØØ5E8D88*38BDØØ5
    E85B56Ø2ØEE24          :REM*175
264 DATA AE3E388E8238BD5Ø38C9*Ø
    3DØØ16Ø2Ø3328A9Ø18D*6B388D6
    F382Ø5A1AAD89          :REM*182
265 DATA 381ØØ6EE84384C45262Ø*1
    E252ØB4252Ø5126AD3E*388D853
    8DØ226Ø2Ø8617          :REM*188
266 DATA 2Ø1A2B2ØØ62E2ØØB2BAE*3
    238BD833FA8A207A92A*2Ø111A2
    ØCD3620Ø176Ø           :REM*241
267 DATA 2ØØ62E2Ø8227AD89383Ø*1
    D2ØØ62E2Ø1Ø2BAE3238*BD933FA
    8A207A92D2Ø11          :REM*144
268 DATA 1AAE8238BD94392ØD2FF*A
    9ØØ8D8C388D7C388D86*382Ø572
    52ØD225AD8938          :REM*34
269 DATA 3Ø034CB6262Ø22282Ø5D*2
    1AD5438FØØ34C7927Ø8*AD7C388
    D8C38ØAAAAD7F          :REM*7Ø
27Ø DATA 389DØØ5EA5B49DØØ6ØE8*A
    DØ389DØØ5EA5B59DØØ*6Ø2ØB32
    4AD3B38ØAAAA5          :REM*164
271 DATA B49D653FE8A5B59D653F*2
    8BØØ8AD6838FØØ34CAB*26AD7C3
    8FØ754CØ727AD          :REM*17
272 DATA 89383ØØ9AD53388D5238*4
    C2E27AD8438FØ11A9ØØ*8D84382
    Ø1E252ØB4252Ø          :REM*214
273 DATA Ø62E4C2E272Ø1E25A9Ø1*8
    D8638AD89381ØØ32Ø11*282Ø6Ø2
    52ØF1252Ø1724          :REM*244
274 DATA 2ØEØ272Ø85332ØCE32AD*5
    438FØØ34C7927EE8638*CE7C38D
    ØD6AD8538FØ17          :REM*1Ø9
275 DATA AD89383ØØCAE8238BD4E*3
    88D52384C76272Ø3328*4C9A262
    ØB127A9ØØ8D85          :REM*157
276 DATA 386ØAD7C388DB338AD8C*3
    88DB438AD8A388DB538*AD8B388
    DB638AD653F8D          :REM*136
277 DATA B738AD663F8DB838A541*8
    DB938A5428DBA386ØAD*B3388D7
    C38ADB4388D8C          :REM*41
278 DATA 38ADB5388D8A38ADB638*8
    D8B38ADB7388D653FAD*B8388D6
    63FADB9388541          :REM*255
279 DATA ADBA3885426ØAØØØA2Ø1*2
    ØC9FFAD3B38FØØAA2Ø1*A9B42Ø7
    4FF4CF827B1B4          :REM*188
28Ø DATA 2ØD2FF2ØB324CE8738FØ*Ø
    34CE727CE8838AD8838*C9FFDØD
    76Ø2Ø1Ø2BAE32          :REM*3
281 DATA 38BD933FA8A2Ø7A92C4C*1
    11A2Ø1Ø2BAE3238BD95*3FA8A2Ø
    7A92B4C111A2Ø          :REM*244
282 DATA 1A2B2ØØ62E2Ø1Ø2BAE32*3
    8BD813FA8A2Ø7A9262Ø*111AAE8
    238BD94392ØD2          :REM*2Ø4
283 DATA FF2Ø9Ø322ØØ62E6Ø2ØA0*2
    8AD01DF29FC8D01DFAD*01DF29D
    F8D01DFAD01DF          :REM*92
284 DATA Ø98Ø8D01DF2Ø9Ø286Ø2Ø*A
    Ø28AD01DFØ9018D01DF*AD01DFØ
    98Ø8D01DF2Ø9Ø          :REM*157
285 DATA 286ØAD3238DØØ16Ø2ØF9*1
    62ØB3772ØE4166ØAD32*38DØØ16
    Ø2ØF9162ØC477          :REM*75
286 DATA 2ØE4166ØA9ØE2ØD2FFAD*3
    B38ØAAABD693F8528E8*8DAF38B
    D693F85298DBØ          :REM*2Ø7
287 DATA 38A9Ø08DB138AD04DF8D*5
    838AD05DF8D59382Ø5B*292ØØ82
    92Ø7A179ØØ6A9          :REM*1Ø9
288 DATA 8E2ØD2FF6ØC911FØØFC9*9
    1DØED2Ø7F29A9Ø08DB1*384CDC2
    8ADB138DØDD4C          :REM*22
289 DATA DC28A9ØB8D6A38A9Ø08D*6
    938AC6938AE6A382ØØ9*36AØØØ2
    Ø8C29FØ35C9ØD          :REM*125
29Ø DATA FØ2B2ØD2FFC8CC3438DØ*E
    E4C3329C88C4Ø3818A5*286D4Ø3
    88528A5296ØØ0          :REM*54
291 DATA 8529EE6A38AD6A38C917*F
    ØØC4C12292ØD2FF4C32*29EEB13
    86ØA2ØB8E6938          :REM*124
292 DATA A9Ø08D6A38AE6938AC6A*3
    82ØØ936AE34382Ø112E*EE6938A
    D6938C918DØE7          :REM*217
293 DATA 6ØA2ØEADAF388528ADBØ*3
    885296ØAD3B38DØØ3B1*286ØA92
    8A2Ø12Ø74FF6Ø          :REM*127
294 DATA 2ØCE322Ø2733BØØ5A9ØØ*8
    D3E38AE3E38BD5Ø38C9*Ø3FØØ16
    Ø8A49Ø1AABD4E          :REM*1Ø3
295 DATA 388D5238A9FF8D89382Ø*8
    2272ØØB2B2Ø5Ø32AD3E*38FØØ62
    Ø4D2B4CDA292Ø          :REM*138
296 DATA 1E25A9Ø18D7838205A1A*2
    Ø5126A9ØØ8D7838AD3E*38DØØ16
    ØA9Ø18DB2382Ø          :REM*26
297 DATA 1A2B2ØØ62E2Ø1128A9Ø1*8
    D86382Ø6Ø25AE8638BD*ØØ748DØ
    6DF8AØAAABDØØ          :REM*1ØØ
298 DATA 6E8D87388DØ7DFBD8Ø74*8
    DØ4DFE8BDØØ6E8D8838*8DØ8DFB
    D8Ø748DØ5DFAD          :REM*2ØØ
299 DATA 3B38ØAAABD653F85B48D*Ø
    2DFE8BD653F85B58DØ3*DFAD3B3
    8FØØ8ADØ6D5Ø9          :REM*1Ø
3ØØ DATA 408DØ6D5207928AD3B38*F
    ØØ8ADØ6D529BF8DØ6D5*2Ø17242
    ØB2322ØE0272Ø          :REM*4
3Ø1 DATA 85332ØCE32AD5438FØØ3*4
    C832AEE8638CE7C38DØ*8Ø2ØB12
    7A9ØØ8D85388D          :REM*25Ø
3Ø2 DATA B2382ØCE326ØAØØØ8C65*3
    8AD7738FØØBA9ØØ8D77*38AD433
    84CB12A2ØE1FF          :REM*251
3Ø3 DATA DØØ2386Ø2ØE4FFA2Ø7DD*9
    E3FFØDFCA1Ø8AC6538*C914DØ2
    ECØØØFØCE8C65          :REM*244 ►
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304 DATA 3818AD41386D6538A888*A
    2078C4038182ØFØFFA9*2Ø2ØD2F
    FAC4Ø38A2Ø718          :REM*1
305 DATA 2ØFØFFAC6538884C942A*C
    9ØDFØØ9CCA63FFØ9B99*ØA13C82
    ØD2FFC9ØDDØ9Ø          :REM*111
306 DATA A9ØØ99ØA13186ØA91C4C*D
    2FFA91F4CD2FFA9124C*D2FFA99
    24CD2FF2Ø1Ø2B          :REM*186
307 DATA 2Ø152BA212A92Ø2ØD2FF*C
    A1ØFA6Ø2Ø2733BØØ5A9*ØØ8D3E3
    8AE3E38BD4E38          :REM*1ØØ
308 DATA 8D5238BD5Ø38C9Ø3DØØ3*4
    C832C2ØØ62E2ØD3162Ø*1A2B2ØØ
    B2BA2Ø7AD3238          :REM*42
309 DATA DØØ8AØØ28C41384C6D2B*A
    Ø168C4138A9ØE2Ø111A*2Ø9Ø322
    ØØ62EEE75382Ø          :REM*2Ø7
310 DATA Ø8342ØØB2B2Ø1A2BA2Ø7*A
    C4138A9ØF2Ø111A2Ø1F*2BA2Ø7A
    D413818691Ø8D          :REM*47
311 DATA 4138A82ØØ936AD5438FØ*Ø
    34CEF2BAØØØB9ØA13FØ*Ø72ØD2F
    FC84CAA2BA92C          :REM*253
312 DATA 99ØA132ØD2FFC8A212BD*Ø
    A132ØD2FF99ØA13C8E8*BDØA132
    ØD2FF99ØA138C          :REM*231
313 DATA Ø6132ØE1FFDØØ16Ø2Ø7A*1
    7FØF5BØF8C9ØDDØØ6EE*Ø6134C1
    32C8D4338EE77          :REM*211
314 DATA 382Ø152BA2Ø7AC41382Ø*Ø
    9362Ø1F2BAC4138A2Ø7*2ØØ9362
    Ø922A8CØ613BØ          :REM*1Ø6
315 DATA CA2Ø6B2C2Ø442CAD3E38*D
    ØØ16ØACØ613C8C8C88C*Ø613A94
    E8DØ713A93Ø8D          :REM*64
316 DATA Ø813A93A8DØ9132Ø1Ø33*2
    ØB2322Ø85332ØD33260*A2ØØ8E4
    A38E88E4B388E          :REM*247
317 DATA 4C38A9Ø38D46388D3538*A
    D3238ØAAABD453F48E8*BD453FA
    8682Ø222F62Ø           :REM*163
318 DATA 1A2B2ØØ62E2ØØB2BAE32*3
    8BD7F3FA8A2Ø7A91Ø2Ø*111A6ØA
    E66388E3E38EE          :REM*198
319 DATA 7838EEAD382Ø5A1A2Ø6B*2
    C2Ø442CAD3E38DØØ16Ø*2Ø1A2B2
    ØØ62E2Ø1Ø2BAE          :REM*248
320 DATA 3238BD8D3FA8A2Ø7A936*2
    Ø111AA9Ø48D46388C4B*38A9Ø78
    D3538A9Ø28D4C          :REM*9Ø
321 DATA 38AD3238ØAAABD5D3F48*E
    8BD5D3FA8682Ø222FAD*3E388D9
    F38A9ØØ8D8C38          :REM*4Ø
322 DATA AD9F38ØAAABD6D3F8D8A*3
    8E8BD6D3F8D8B38A9ØØ*8D7C388
    DØ6DFA9Ø18DØ4          :REM*164
323 DATA DFA9138DØ5DFA9ØØ8541*A
    96285426ØA9ØØ8DØ2DF*A9628DØ
    3DFA9ØØ8DØ4DF          :REM*134
324 DATA 8DØ5DF8DØ6DFA9ØØ8DØ7*D
    FA9138DØ8DF6Ø2ØFØ2D*2ØD316A
    9Ø3A2ØCAØØ42Ø          :REM*18
325 DATA 111AA9Ø4A21ØA82Ø111A*A
    9ØØ8D41388D4238AD32*388D333
    818A9ØC6D4138          :REM*7Ø
326 DATA AAAØ12A9Ø52Ø111A18AD*4
    13869ØEAAAØØEA9Ø62Ø*111AAD4
    138C9Ø4FØØ8A9          :REM*1Ø1
327 DATA Ø48D41384C562DAØØ48C*3
    5388C46388C4B38888C*4C38A9Ø
    Ø8D4A38AD3238          :REM*1Ø3
328 DATA ØAAABD313F48E8BD313F*A
    8682Ø222FAE3E38BD77*39AC423
    8994E38A9Ø68D          :REM*22Ø
329 DATA 46388D3538AD3238ØAAA*B
    D393F48E8BD393FA868*2Ø222FA
    D3E38AC423899          :REM*212
330 DATA 5Ø38EE4238AD3238C9Ø2*B
    ØØ9EE3238EE32384C81*2DAD333
    88D32386Ø2ØØ6          :REM*227
331 DATA 2EA2Ø7AD3238FØØ5AØ15*4
    CØ12EAØØ1A9Ø74C111A*A2Ø7AØØ
    Ø2ØØ936AE3438          :REM*17Ø
332 DATA CAA92Ø2ØD2FFCADØF86Ø*2
    ØF42E2Ø852E2ØØB2F2Ø*B92E2Ø3
    32E2ØF42E2Ø85          :REM*251
333 DATA 2E2ØØB2F6ØAAAD3438C9*2
    8FØ1Ø8AA21385FA2Ø77*16CA988
    5FB2Ø77166Ø8A          :REM*43
334 DATA 85FA85FC84FB189869D4*8
    5FD6ØAE3438EØ28FØØF*A2132Ø8
    3168D4438CA2Ø          :REM*1Ø7
335 DATA 83168D45386ØAE3438FØ*Ø
    FA213AD44382Ø7716CA*AD45382
    Ø77166ØAC4638          :REM*17Ø
336 DATA AE3438EØ28FØ182Ø592E*A
    21F2Ø8316482Ø7Ø2E68*498ØA21
    F2Ø771688DØE9          :REM*173
337 DATA 6Ø8C4138AØØØB1FA498Ø*9
    1FAC8CE4138DØF46ØAD*4D38DØ1
    318A5FA6D3538          :REM*225
338 DATA 85FA85FCA5FB69ØØ85FB*4
    CE62EA9ØØ8D4D3838A5*FAED353
    885FA85FCA5FB          :REM*112
339 DATA E9ØØ85FB18A5FB69D485*F
    DA5FAA4FBA6FD6ØAE34*38EØ28F
    ØØFA2132Ø8316          :REM*127
340 DATA 8D4738CA2Ø83168D4838*6
    ØAE3438EØ28FØF8A213*AD47382
    Ø7716CAAD4838          :REM*16Ø
341 DATA 2Ø77166ØA2ØØ8E3E382Ø*3
    32E2ØF42E2Ø852E2ØØB*2F2Ø111
    76Ø2Ø1A2B2ØØ6          :REM*189
342 DATA 2E2ØØB2BAE3238BD8B3F*A
    8A2Ø7A9162Ø111AA2ØØ*8E4A38E
    88E4B388E4C38          :REM*78
343 DATA A91Ø8D4638A9138D3538*A
    D3238ØAA8B94D3F48C8*B94D3FA
    8682Ø222FAD3E          :REM*12Ø
344 DATA 38FØØ34C782Ø2ØØ62E2Ø*2
    733BØØ5A9ØØ8D3E38AE*6638BD5
    Ø38C9Ø3DØØ16Ø          :REM*236
345 DATA C9Ø2FØ1A2Ø1A2B2ØØB2B*2
    ØØ62EAE3238BD8D3FA8*A2Ø7A91
    72Ø111A4C9Ø32          :REM*222
346 DATA BD4E388D52382ØØ62EAE*3
    238BD873FA8A2Ø7A9ØE*2Ø111A2
    Ø9Ø322Ø5Ø32AD          :REM*2Ø6
347 DATA 3E38DØØ34CDC2F2Ø4D2B*2
    Ø1A2B2ØØ62E2ØD3162Ø*1A2B2ØØ
    B2BAE3238BD8F          :REM*143
348 DATA 3FA8A2Ø7A9192Ø111AA9*Ø
    18D4C388D5538A9ØØ8D*5638A94
    D8D72382Ø1Ø2B          :REM*217
349 DATA A91A8D3D38A9ØB8D4138*2
    ØFD312Ø7A179ØØ16ØC9*2ØFØ39C
    92BDØ17AD5538          :REM*2
350 DATA CD7238BØDDC925DØØ5A9*2
    88D5538EE55384CØE3Ø*C92DDØC
    AAD5538CD4C38          :REM*19
351 DATA FØC2AD5538C929DØØ5A9*2
    68D5538CE55384CØE3Ø*AD55388
    D7338A9Ø38D4C          :REM*87
352 DATA 38A9788D5538A9ØC8D41*3
    8A91B8D3D382ØFD31AE*3238BD9
    13FA8A2ØDA92Ø          :REM*65
353 DATA 2Ø111AAD553848AD5638*4
    8AD4C38186D73388D55*38A9ØØ8
    D5638CE55382Ø          :REM*114
354 DATA 9832A92Ø2ØD2FF688D56*3
    8688D5538207A179ØØ1*6ØC92ØF
    Ø2FC92DFØØ7C9          :REM*8Ø
355 DATA 2BFØ134C6E3ØAD4C38C9*Ø
    3FØ9FCE4C382Ø28324C*6E3Ø2Ø3
    A32AD4C38CD74          :REM*36
356 DATA 38FØ8BEE4C382Ø16324C*6
    E3Ø2ØØB2B2ØØ62EAE32*38BD853
    FA8A2Ø7A91C2Ø          :REM*76
357 DATA 111A2Ø7132AD3E38DØØ1*6
    Ø2ØØB2BAE3238BD813F*A8A2ØFA
    9212Ø111A2Ø1Ø          :REM*123
358 DATA 2B2ØØ62EAE3238BD853F*A
    88C4138A2Ø7A91D2Ø11*1A2Ø1F2
    B18AD413869ØF          :REM*87
359 DATA 8D4138A2Ø7AC41382ØØ9*3
    62Ø922A9ØØ16Ø9848A2*ØF2Ø653
    268A8A92C99ØA          :REM*2Ø
360 DATA 13C8AD733899ØA13C8A9*Ø
    Ø99ØA13C8AD553899ØA*13C8AD5
    63899ØA13C8A9          :REM*22
361 DATA 2C99ØA13C8A94399ØA13*C
    8C8C8C88CØ613A92FA2*3ØAØ3A2
    Ø84372Ø1Ø332Ø          :REM*131
362 DATA 85332ØD332AD5438FØØ1*6
    Ø38ADØ613E9Ø78DØ613*2Ø1Ø332
    Ø85332ØD332AD          :REM*197
363 DATA 5438FØØ16Ø2ØØB2BAE32*3
    8BD873FA8A2ØFA9222Ø*111A2Ø1
    Ø2B2ØØ62EAE32          :REM*13Ø
364 DATA 38BD853FA2Ø7A88C4138*A
    91E2Ø111A2Ø1F2BA2Ø7*AD41381
    869ØF8D4138A8          :REM*36
365 DATA 2ØØ9362Ø922A8CØ613EE*7
    6384C132CAE3238BD91*3FA8AE4
    138AD3D382Ø11          :REM*141
366 DATA 1A2Ø9832A92Ø2ØD2FF6Ø*1
    8AD553869288D5538AD*563869Ø
    Ø8D56386Ø38AD          :REM*121
367 DATA 5538E9288D5538AD5638*E
    9ØØ8D56386ØAD7338C9*28BØØ5A
    9284C4832A95Ø          :REM*157
368 DATA 38ED73388D74386Ø2ØØ6*2
    EAE3238BD833FA8A2Ø7*A9182Ø1
    11A2ØCD366ØAØ          :REM*238
369 DATA ØØ2ØØ936AE3438CA4C11*2
    EA9Ø38D46388D3538A2*Ø18E4B3
    8AD3238ØAAABD          :REM*74
370 DATA 513F48E8BD513FA8684C*2
    22F2ØE4FFC92ØDØF96Ø*2ØF916A
    E5538AD5638AC          :REM*38
371 DATA 3B38FØØ62Ø328E4CE416*2
    ØCDBD4CE416A9ØØ2ØBD*FFAD3B3
    8FØØ5A2ØF2Ø68          :REM*152
372 DATA FFA9ØFAE5238A82ØBAFF*2
    ØCØFF6ØA9Ø12ØC3FFA9*ØF2ØC3F
    F6ØA9ØØ2Ø9ØFF          :REM*113
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373 DATA A9ØØAE5238AC57382ØBA*F
    FA9ØAAAA913A8ADØ613*2ØBDFFA
    D3B38FØØ6A9ØØ       :REM*125
374 DATA AA2Ø68FFA9ØØA6FEA4FF*2
    ØD5FF8E58388C59386Ø*ADØ613A
    2Ø7AØ132ØBDFF        :REM*53
375 DATA A9ØFAE5238A82ØBAFF2Ø*C
    ØFF6Ø2Ø86172ØØ62EA9*ØØ8D663
    8AD4F38DØØ52Ø        :REM*62
376 DATA 9Ø17186ØCD4E38FØF6A2*Ø
    7AC3238DØØ5AØØ74C4F*33AØ1BA
    9Ø82Ø111AA2ØØ        :REM*6Ø
377 DATA 8E4A38E88E4B388E4C38*A
    9Ø38D46388D3538AD32*38ØAAAB
    D413F48E8BD41        :REM*9Ø
378 DATA 3FA8682Ø222FAD3E388D*6
    6382Ø9Ø17386ØA9ØØ8D*54382ØC
    CFFA2ØF2ØC6FF        :REM*2Ø5
379 DATA 2ØCFFFC9329Ø5ØAE7538*E
    ØØØFØØ34CD2338D5438*A9922ØD
    2FF2ØØ62EA91C        :REM*99
38Ø DATA 2ØD2FFAE3238BD7D3FA8*A
    2Ø72ØØ936AD54382ØD2*FF2ØCFF
    FC9ØDFØØ62ØD2        :REM*164
381 DATA FF4CC533A9Ø18D54382Ø*C
    CFFAD7538DØØ92Ø9Ø32*2ØØ7342
    ØØ62E6Ø2ØCFFF       :REM*1Ø1
382 DATA C9ØDFØØ34CE933A9ØØ8D*5
    4382ØCCFF6ØA9Ø12ØC3*FFA9ØF2
    ØC3FF6Ø6ØAE66       :REM*4Ø
383 DATA 38BD5Ø38C9Ø3DØØ34C6F*3
    52ØB232A9Ø1AE5238AØ*ØØ2ØBAF
    FAD3B38FØØ6A9        :REM*5
384 DATA ØFAA2Ø68FFA9Ø8A23BAØ*1
    32ØBDFF2ØCØFF2Ø8533*AD5438F
    ØØ42ØCE3260A2        :REM*7
385 DATA Ø12ØC6FFA2Ø52ØCFFFCA*1
    ØFAAØØ2ØCFFFC922DØ*F92ØCFF
    FFØØ799ØA13C8        :REM*231
386 DATA 4C5B34AØ1Ø99ØA132ØCF*F
    F2ØCFFF2ØCFFF8D5538*2ØCFFF8
    D56382Ø8533AD        :REM*147
387 DATA 5438FØØ42ØCE326Ø2ØCE*3
    22ØCCFFA2Ø9AD3238FØ*Ø5AØ164
    C9E34AØØ2A9Ø9        :REM*12
388 DATA 2Ø111AAE6638BD94392Ø*D
    2FFA2Ø9AD3238FØØ5AØ*214CBA3
    4AØØD2ØØ936AØ        :REM*249
389 DATA ØØB9ØA13FØØ72ØD2FFC8*4
    CBF34A2Ø9AD3238FØØ5*AØ324CD
    934AØ1E2ØØ936        :REM*62
39Ø DATA 2Ø9832A2Ø9AD3238FØØ5*A
    Ø374CED34AØ23A9ØA2Ø*111A6ØA
    99A2ØD2FFA2ØA        :REM*67
391 DATA AØØØ2ØØ936AE3438A92Ø*2
    ØD2FFCADØFAA9Ø28D5F*38A9ØØ8
    D4138A2ØAA9Ø5        :REM*51
392 DATA 186D4138A8A9ØB2Ø111A*A
    2ØA18A9ØC6D4138A8A9*ØC2Ø111
    AA2ØA18A91F6D        :REM*7Ø
393 DATA 4138A8A9ØD2Ø111AAD32*3
    8FØØDCE5F38FØØ8A928*8D41384
    C14356Ø6Ø18A5        :REM*23Ø
394 DATA FE692Ø85FEA5FF69ØØ85*F
    F6Ø18A5926D5A388592*A59369Ø
    Ø85936ØA213BD        :REM*188
395 DATA 96399DØA13CA1ØF7AD8A*3
    88D5538AD8B388D5638*2Ø152B4
    C9Ø34A9932ØD2        :REM*25Ø
396 DATA FFA9972ØD2FF2Ø152BA2*Ø
    ØAØØØ2ØØ936A92Ø2ØØE*362Ø1Ø2
    BA2Ø18E3738AE        :REM*1Ø1
397 DATA 3738AØØØ2ØØ936A2ØØA9*2
    Ø2ØD2FFE8EC3438DØF5*EE3738A
    D3738C9Ø6DØE1        :REM*164
398 DATA 2Ø1A2BA9ØD2ØD2FFA2Ø6*A
    ØØØ2ØØ936A9B82ØØE36*A9972ØD
    2FFA2Ø8AØØØ2Ø        :REM*171
399 DATA Ø936A9B92ØØE362Ø152B*A
    2Ø9AØØØ2ØØ936A2ØØA9*AØ2ØD2F
    FE8EC3438DØF5        :REM*87
4ØØ DATA 6Ø182ØFØFF6Ø2ØD2FFC8*C
    C3438DØF76Ø2Ø1A2B2Ø*Ø62E2Ø2
    733AE3E38BD5Ø        :REM*229
4Ø1 DATA 38C9Ø3DØØ16ØBD4E388D*5
    2382Ø1738A9Ø28DØ613*A9568DØ
    713A93Ø8DØ813        :REM*169
4Ø2 DATA 2Ø1Ø332Ø85336Ø2Ø2733*B
    ØØ5A2ØØ8E3E38AE3E38*BD5Ø38C
    9Ø3FØ1DBD4E38        :REM*79
4Ø3 DATA 8D5238A9Ø18D6B388D6F*3
    82Ø5A1A2Ø1A2B2ØØB2B*2ØØ62E2
    Ø7D366ØAE3238        :REM*84
4Ø4 DATA BD833FA8A2Ø7A9132Ø11*1
    A2ØCD36AD3E38DØØ16Ø*A2ØØBDØ
    Ø4AC9Ø1FØØ4E8        :REM*82
4Ø5 DATA DØF66ØA9ØØ9DØØ4A8E6D*3
    82Ø1C2ØE8E8E88EØ613*A9538DØ
    713A93Ø8DØ813        :REM*1Ø1
4Ø6 DATA A93A8DØ9132Ø1Ø332Ø85*3
    32ØD3324C9436A2Ø38E*35388E4
    638A2Ø18E4B38        :REM*195
4Ø7 DATA 8E4C38CA8E4A38AD3238*Ø
    AAABD493F48E8BD493F*A8682Ø2
    22F6Ø2ØF937BØ        :REM*43
4Ø8 DATA 34A2Ø18E7Ø388E6B388E*6
    F382Ø5A1AAD5438DØ21*2Ø1A2B2
    ØØ62E2ØØB2BAE        :REM*23
4Ø9 DATA 3238BD833FA8A2Ø7A915*2
    Ø111A2ØCD36BØØ5AD3E*38DØØ16
    ØA2ØØBDØØ4ADØ        :REM*2Ø4
41Ø DATA Ø6E8EØFFDØF66Ø2Ø8E37*A
    9ØØ9DØØ4A8E6D38EØØ1*FØØ62Ø9
    937CADØFAAØØØ        :REM*123
411 DATA B1A9FØØ799ØA13C84C52*3
    7A93D99ØA13C88C7138*2Ø1C2ØE
    8E8E88EØ613A9        :REM*131
412 DATA 52A23ØAØ3A2Ø84372Ø1Ø*3
    32Ø85332ØD3324C2E37*8DØ7138
    EØ8138CØ9136Ø        :REM*12Ø
413 DATA AD583885A9AD593885AA*6
    Ø18A5A9691185A9A5AA*69ØØ85A
    A6Ø2Ø1A2B2Ø1Ø        :REM*1Ø9►
```


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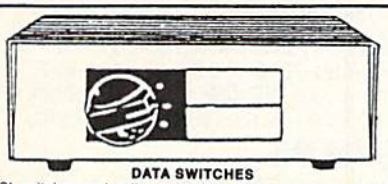

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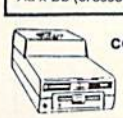

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```
414 DATA 2B2Ø062EAE3238BD853F*A
    81869ØF8D4138A2Ø7A9*142Ø111
    A2Ø222BA2Ø7AC          :REM*241
415 DATA 41382ØØ9362Ø922A2Ø8E*3
    7AE3E38EØØ1FØØ62Ø99*37CADØF
    AAØØØB9ØA1391          :REM*31
416 DATA A9FØØ4C84CE4372Ø1A2B*2
    ØØ62E2ØFØ2D6Ø2Ø2733*BØØ5A9Ø
    Ø8D3E38AE3E38          :REM*118
417 DATA BD5Ø38C9Ø3FØØ8BD4E38*8
    D5238186Ø386Ø2Ø1Ø2B*AE3238B
    D813FA8A2ØBA9          :REM*1ØØ
418 DATA 122Ø111AAE6638BD9439*2
    ØD2FF6ØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØØ         :REM*133
419 DATA ØØØØØØØØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*1Ø
42Ø DATA ØØØØØØØØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*11
421 DATA ØØØØØØØØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*8
422 DATA ØØØØØØØØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØØØØØØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*9
423 DATA ØØØØØØØØØØØØØØØ2Ø8Ø3*Ø
    8Ø4Ø8Ø21AØ31AØ41AØ2*2DØ32DØ
    42DØ23EØ1Ø2Ø2          :REM*24
424 DATA Ø2Ø3Ø2Ø4Ø2Ø5Ø2Ø119Ø2*1
    9Ø319Ø419Ø519ØØ4449*534B2Ø5
    345545500001           :REM*192
425 DATA 52454E414D452Ø412Ø46*4
    94C45ØØØ25343524154*4348204
    12Ø46494C45ØØ          :REM*116
426 DATA Ø3464F524D41542Ø412Ø*4
    449534BØØØ4434C4541*4E555Ø2
    Ø412Ø4449534B          :REM*19
427 DATA ØØØ5434F5Ø592Ø46494C*4
    5ØØØ6434F5Ø592Ø4449*534BØØØ
    7435245415445          :REM*148
428 DATA 2Ø4449522F52414DØØØ8*4
    449534B4C4F47ØØØ944*4952454
    3544F5259ØØØØ         :REM*119
429 DATA ØØEF64ED6EØØØ4ØØØØØ8*Ø
    9ØAØB91111D9DØE1CCØ*CØ3EØØ4
    2414E4B31353A          :REM*7
43Ø DATA 53595334383637ØD4142*5
    2414D2Ø4449524543544*4F5259Ø
    Ø2Ø2Ø2Ø2Ø524E          :REM*197
431 DATA ØØØ197124D4F56452Ø43*5
    552534F522Ø5448454E*2Ø5Ø524
    553532Ø92535Ø          :REM*151
432 DATA 414345122Ø544F2Ø5345*4
    C4543540ØØ297125Ø52*4553532
    Ø924635122Ø54          :REM*237
433 DATA 4F2Ø554E2D53454C4543*5
    42Ø2F2Ø9253544F5Ø12*2Ø544F2
    Ø43414E43454C          :REM*116
434 DATA ØØØ31F92444556494345*2
    Ø413AØØØ44445564943*452Ø423
    AØØØ52Ø3Ø382Ø          :REM*44
435 DATA 2Ø3Ø392Ø2Ø313Ø2Ø2Ø31*3
    12ØØØØ62Ø313534312Ø*2Ø31353
    7312Ø2Ø313538          :REM*64
436 DATA 312Ø2Ø52414D2Ø2ØØØØ7*1
    C924D4F56452Ø435552*534F522
    Ø5448454E2Ø5Ø          :REM*117
437 DATA 52455353 2Ø535Ø414345*2
    Ø544F2Ø53454C454354*ØØØ81C5
    553494E472Ø57          :REM*92
438 DATA 484943482Ø4452495645*3
    A2Ø2Ø412Ø2Ø422ØØØØ9*9712445
    24956453AØØØA          :REM*5
439 DATA 4652454 5ØØØB53495A45*Ø
    ØØC46494C452Ø4E414D*45ØØØD5
    4595Ø45ØØØE49          :REM*235
44Ø DATA 4E534552542Ø412Ø424C*4
    14E4B2Ø4449534B2Ø41*4E442Ø5
    Ø524553532Ø53          :REM*68
441 DATA 5Ø414345ØØØF454E5445*5
    22Ø4449534B2Ø4E414D*453AØØ1
    Ø4F4B41592Ø54          :REM*95
442 DATA 4F2Ø464F524D41542Ø44*4
    9534B2Ø2Ø4E2Ø2Ø592Ø*ØØ114F5
    Ø454E2Ø535542          :REM*112
443 DATA 2D4449524543544F5259*3
    F2Ø2Ø4E2Ø2Ø592ØØØ12*4449534
    B2Ø434C45414E          :REM*82
444 DATA 55Ø2Ø574F524B494E47*2
    Ø4F4E2Ø44524956453A*ØØ134F4
    B41592Ø544F2Ø          :REM*2Ø6
445 DATA 44454C4554452Ø46494C*4
    52D4C4953543F2Ø2Ø4E*2Ø2Ø592
    ØØØ14454E5445          :REM*255
446 DATA 522Ø4E4557 2Ø4E414D45*3
    AØØ154F4B41592Ø544F*2Ø52454
    E414D452Ø4649          :REM*23
447 DATA 4C452D4C4953543F2Ø2Ø*4
    E2Ø2Ø592ØØØ16435245*4154452
    Ø444952454354          :REM*2Ø2
448 DATA 4F52592Ø2Ø2Ø41434345*5
    3532Ø52414D2Ø434152*542ØØØ1
    74552524F522Ø          :REM*21
449 DATA 2D2Ø53454C4543544544*2
    Ø4445564943452Ø4953*2Ø4E4F5
    42Ø412Ø313538          :REM*52
45Ø DATA 31ØØ18464F524D41542Ø*4
    4455354494E4154494F*4E2Ø444
    9534B3F2Ø2Ø2Ø          :REM*82
451 DATA 4E2Ø2Ø59ØØ195553452Ø*2
    B2Ø2D2Ø2Ø4B4559532Ø*544F2Ø5
    3454C45435420          :REM*4Ø
452 DATA 545241434B2F424C4F43*4
    B53ØØ1A535441525449*4E472Ø5
    45241434B3AØØ          :REM*224
453 DATA 1B424C4F434B2Ø53495A*4
    53AØØ1C4F4B41592Ø54*4F2Ø435
    2454154452Ø44          :REM*86
454 DATA 49524543544F52593F2Ø*2
    Ø4E2Ø2Ø59ØØ1D5Ø4152*5449544
    94F4E2Ø4E414D          :REM*72
455 DATA 453AØØ1E444952454354*4
    F5259 2Ø4E414D453AØØ*1F5Ø524
    553532Ø3C5354          :REM*242
456 DATA 4F5Ø3E2Ø544F2Ø414343*4
    553532Ø524F4F542Ø44*4952454
    3544F5259ØØ2Ø          :REM*6Ø
457 DATA 454E44494E472Ø545241*4
    34B3AØØ214558414D5Ø*4C453A2
```


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```
    Ø5Ø4152544954          :REM*211
458 DATA 494F4E2Ø4E414D452Ø3C*5
    2455455524E3EØØ2245*58414D5
    Ø4C453A2Ø4E41          :REM*113
459 DATA 4D452C2Ø3C322D4C4554*5
    445522Ø49443E2Ø3C52*4554555
    24E3EØØ232Ø44          :REM*65
46Ø DATA 49534B2Ø544F2Ø45585Ø*4
    14E53494F4E2Ø52414D*2Ø2Ø2ØØ
    Ø242Ø45585Ø41          :REM*177
461 DATA 4E53494F4E2Ø544F2Ø53*5
    95354454D2Ø52414D2Ø*ØØ252Ø4
    5585Ø414E5349          :REM*45
462 DATA 4F4E2Ø52414D2Ø544F2Ø*4
    449534B2Ø2Ø2ØØØ2649*4E53455
    2542Ø534F5552          :REM*255
463 DATA 43452Ø4449534B2Ø494E*5
    44F2Ø44524956453AØØ*27494E5
    345525425Ø441          :REM*88
464 DATA 52474554Ø4449534B2Ø*4
    94E544F2Ø4452495645*3AØØ284
    F4B41592Ø544F          :REM*133
465 DATA 2Ø4C4F41442Ø4449534B*2
    Ø46494C45533F2Ø2Ø2Ø*4E2Ø2Ø5
    92ØØØ2952414D          :REM*163
466 DATA 2Ø4449534B2Ø46554C4C*Ø
    Ø2A4F4B41592Ø544F2Ø*434F5Ø5
    92Ø46494C452D          :REM*125
467 DATA 4C4953543F2Ø2Ø2Ø2Ø4E*2
    Ø2Ø592ØØØ2B52454144*494E472
    Ø46524F4D2Ø53          :REM*126
468 DATA 4F5552434520449534B*Ø
    Ø2C57524954494E472Ø*544F204
    4455354494E41          :REM*188
469 DATA 54494F4E2Ø4449534BØØ*2
    D46494C452Ø434F5Ø59*2Ø574F5
    24B494E472Ø46          :REM*2Ø1
47Ø DATA 524F4D2Ø44524956453A*2
    ØØØ2E4F4B41592Ø544F*2Ø434F5
    Ø592Ø4449534B          :REM*128
471 DATA 3F2Ø2Ø2Ø4E2Ø2Ø592ØØØ*2
    F52454144494E472Ø46*524F4D2
    Ø4449534B3AØØ          :REM*34
472 DATA 3Ø57524954494E472Ø54*4
    F2Ø4449534B3AØØ3144*49534B2
    Ø434F5Ø592Ø57          :REM*132
473 DATA 4F524B494E472Ø46524F*4
    D2Ø44524956453AØØ32*3135343
    12F36342Ø4D4F          :REM*212
474 DATA 4445204E4F542Ø494E53*5
    4414C4C45442D5Ø5245*5353205
    35Ø4143450Ø33          :REM*41
475 DATA 53544152543AØØ34454E*4
    43AØØ3542595445533A*ØØ36534
    54C4543542Ø45          :REM*115
476 DATA 582D4D4F442Ø54595Ø45*3
    A2Ø3137363422Ø2Ø231*373Ø3Ø2
    Ø2Ø2Ø31373530          :REM*39
477 DATA ØØ374F4B41592Ø544F2Ø*4
    34C45414E2D555Ø2Ø44*49534B3
    F2Ø2Ø2Ø2Ø4E             :REM*199
478 DATA 2Ø2Ø592ØØØF2Ø5D2Ø392*Ø
    612Ø53E866E04DE06AE*Ø532Ø55
    EØ233Ø55FØ236          :REM*124
479 DATA Ø562Ø21AØ546Ø237Ø563*Ø
    2BF058B031E054AØ22D*Ø559Ø2Ø
    Ø75ØØ1ØØØ75ØØ          :REM*181
48Ø DATA 1ØØØ75ØØ1ØEC03EC01EC*Ø
    75BØØB5ØØ5345515Ø52*47Ø71BØ
    71BØ418Ø418Ø5          :REM*86
481 DATA 19Ø216Ø115Ø216Ø115Ø2*1
    6ØA1EØ61AØ71BØD21Ø7*1BØC2Ø2
    3ØØ111D919D94          :REM*88
482 DATA 13931Ø2ØD3322ØE7FFA2*Ø
    18E84388EA638CA8EA8*388E973
    8A9FE8DB9Ø22Ø          :REM*173
483 DATA EE24AD3E388D82382ØCØ*4
    42Ø3328AD89383ØØ34C*F53FA9Ø
    Ø8DA538A9558D          :REM*38
484 DATA Ø713A9498DØ813A9Ø28D*Ø
    6132Ø1Ø332ØD3324CØ5*4ØA9Ø18
    DA5382Ø1E25AD          :REM*62
485 DATA A838DØØ32Ø8425201A2B*2
    ØØ62E2ØØB2BAE3238BD*7F3FA8A
    2Ø7A92E2Ø111A          :REM*153
486 DATA 2Ø442CAD3E38DØØ16ØAD*A
    938FØ3CA9Ø18D9738AD*52388D9
    1382Ø97449Ø1Ø          :REM*254
487 DATA 2ØCE32AD52382ØC3FFAD*5
    3382ØC3FF6ØAD8938C9*FFFØ55A
    D53388D52388D          :REM*47
488 DATA 91382Ø97449ØØ72ØB232*2
    Ø85336ØADA938DØØ34C*864ØAE8
    238BD4E388D52          :REM*159
489 DATA 388D91382Ø6844AD5338*8
    D91382Ø6844201A2B2Ø*Ø62E2Ø1
    Ø2BAE3238BD85          :REM*183
49Ø DATA 3FA8A2Ø7A9312Ø111AAE*8
    238BD94392ØD2FF2Ø6B*42A9Ø18
    DA238A9ØØ8DA4          :REM*149
491 DATA 38ADA438DØ472Ø5542AD*A
    7388DA438ADA538DØ39*ADA638D
    ØØ32Ø3328A9ØØ          :REM*1ØØ
492 DATA 8DA638AE8238BD4E388D*5
    2388D91382Ø6844200 6*2E2Ø1Ø2
    BAE3238BD913F          :REM*117
493 DATA A8A2Ø7A92F2Ø111AAE82*3
    8BD94392ØD2FFAE8238*BD4E388
    D52388D91382Ø          :REM*162
494 DATA BB428D9438ADA2388D92*3
    8A9ØØ8D9338ADA938DØ*Ø62Ø174
    54C3541ADA838          :REM*141
495 DATA FØØ62ØFØ424C35412ØFD*4
    2AD8F3829ØFC9Ø39ØØA*AEA138C
    A8EA2382Ø6844          :REM*159
496 DATA EEA238CEA438FØØBADA2*3
    8CDA138BØØ34CFF4Ø2Ø*554238A
    DA738EDA4388D          :REM*2ØØ
497 DATA A43838ADA238EDA4388D*A
    238AD89381Ø382Ø1E25*ADA838D
    ØØDAD8438FØØ8          :REM*41
498 DATA A9ØØ8D84382ØB4252Ø68*4
    42ØØ62E2Ø1Ø2BAE3238*BD9B3FA
    8A2Ø7A93Ø2Ø11          :REM*149
499 DATA 1AAE8238BD94392ØD2FF*4
    CB541AD53388D9138AD*A2388D9
    2382ØBB428D94          :REM*36
5ØØ DATA 38A9ØØ8D9338ADA938DØ*Ø
    CAD53388D52382ØF145*4CF441A
    DA838FØØ62Ø7D          :REM*92
5Ø1 DATA 434CE5412Ø8A43AD8F38*2
    9ØFC9Ø39ØØ62Ø68444C*ØB42CEA
    438AEA238E88E          :REM*56
5Ø2 DATA A238ECA138BØØ8ADA438*D
    ØAD4CB34ØAD53388D52*382ØAF4
    42Ø1A2B2ØØ62E          :REM*28
5Ø3 DATA 2ØØB2BAC3238B9853FA8*A
    2Ø7A9372Ø111AA9Ø18D*4C382Ø7►
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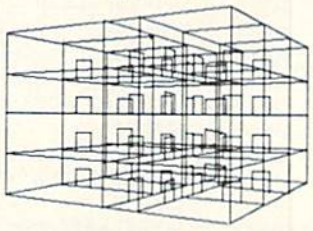

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    132AD3E38D0Ø3       :REM*110
5Ø4 DATA 4C3A4Ø2ØØ62E2Ø1738A9*5
    68DØ713A9Ø18DØ6132Ø*1Ø334C3
    A4ØØØ5ØØØ1ØAD       :REM*198
5Ø5 DATA 3B38ØAAABD514285FEE8*B
    D514285FFA9FE8DB9Ø2*6ØAE823
    8BD5Ø38FØØAC9       :REM*59
5Ø6 DATA Ø1FØØCA9518DA1386ØA9*2
    48DA1386Ø2ØB2322ØDA*452ØØ73
    42ØB232A2ØF2Ø       :REM*164
5Ø7 DATA C9FFBØØEAØØØB9D848FØ*1
    Ø2ØD2FFC84C98422ØC7*45A9248
    DA1386Ø2ØC745       :REM*226
5Ø8 DATA AD8533DØEFA9478DA138*6
    ØAE8238BD5Ø38C9Ø2DØ*Ø6A9288
    D94386ØADA238       :REM*174
5Ø9 DATA C924BØ18C912BØØ3A915*6
    ØC919BØØ3A9136ØC91F*BØØ3A91
    26ØA9116Ø38E9       :REM*81
51Ø DATA 234CD242A98Ø8D3113A9*Ø
    18D97384CØ943A9ØØAE*9838FØØ
    2Ø91Ø8D3113AD       :REM*131
511 DATA ØØFF48A9ØE8DØØFF2Ø38*4
    4AD92388D3213AD9338*8D3313A
    D94388D3413A9       :REM*29
512 DATA Ø68D9D382Ø1F44AØØØ8C*9
    C38782CØDDC2Ø5744AE*9738206
    Ø44ADØCDC8D8F       :REM*133
513 DATA 3829ØFC9Ø2BØ2A2Ø5744*2
    Ø6Ø442Ø57448EAØ38A2*Ø1ADØCD
    C2Ø77FFAEAØ38       :REM*25
514 DATA ØD9C388D9C38C8DØE3E6*F
    FCADØDECE3413DØC458*688DØØF
    F6ØA9828D3113       :REM*62
515 DATA A9Ø18D97384C9643A9Ø2*A
    E9838FØØ2Ø91Ø8D3113*ADØØFF4
    8A9ØE8DØØFF2Ø       :REM*145
516 DATA 3844AD92388D3213AD93*3
    88D3313AD94388D3413*A9Ø68D9
    D382Ø1F44A94Ø       :REM*213
517 DATA 8D9E38AØØØ78AE973838*2
    Ø47FFADØØDD4D9E3829*4ØFØF64
    D9E388D9E388E       :REM*45
518 DATA AØ38A2Ø1A9FE2Ø74FF8D*Ø
    CDCAEAØ382Ø6Ø44C8DØ*DAE6FFC
    ADØD5182Ø47FF       :REM*89
519 DATA 2CØDDC2Ø43442Ø6Ø44AD*Ø
    CDC8D8F38482Ø4E4468*29ØFC9Ø
    2BØØ5CE3413DØ       :REM*211
52Ø DATA AB58688DØØFF6ØAE9138*2
    ØC9FFA2ØØAC9D38BD2F*132ØD2F
    FE888DØF62ØCC       :REM*56
521 DATA FF6ØA9558D2F13A93Ø8D*3
    Ø136Ø48ADØØDDØ91Ø8D*ØØDD686
    ØADØØDD29EF8D       :REM*196
522 DATA ØØDD6ØADØØDD491Ø8DØØ*D
    D6ØA9Ø82CØDDCFØF96Ø*ADA938D
    ØØ16Ø2Ø3844A9       :REM*175
523 DATA Ø48D3113AE9838FØØ2Ø9*1
    ØA9Ø38D9D382Ø1F4478*2CØDDC2
    Ø57442Ø6Ø44AD       :REM*36
524 DATA ØCDC8D8F38586ØAD9138*A
    E5238AØØF2ØBAFFA9Ø1*A29DAØ3
    F2ØBDFF2ØCØFF       :REM*136
525 DATA 6ØA9498DØ713A9Ø18DØ6*1
    32Ø1Ø332ØD3326ØBD82*38BD5Ø3
    8FØ42C9Ø2FØØ7       :REM*174
526 DATA C9Ø1FØ2168686ØAD3B38*F
    ØØEA9Ø58DA738A9Ø18D*A9388DA
    8386ØA9Ø38DA7       :REM*181
527 DATA 38A9ØØ8DA9386ØAD3B38*F
    ØØ9EEA938A9ØA8DA738*6ØA9ØØ8
    DA938A9Ø58DA7       :REM*75
528 DATA 386ØA9ØØ8DA938AD3B38*D
    ØE54CØ4452ØB2322ØDA*452ØØ73
    42ØB232AE9438       :REM*72
529 DATA CA8E9338A9Ø18DAC48AD*9
    238ØA8DAD4818ADAD48*6DAD48A
    ABDC6468DB648       :REM*64
53Ø DATA E8BDC6468DB748E8BDC6*4
    68DB848AD9338ØA8DAD*4818ADA
    D486DAD48AABD       :REM*248
531 DATA Ø9488DBA48E8BDØ9488D*B
    B48E8BDØ9488DBC48A2*ØF2ØC9F
    FBØ18AØØØB9AF       :REM*252
532 DATA 48FØØ72ØD2FFC84C7E45*2
    ØCCFFA2Ø12ØC6FF9ØØ6*A98Ø8D8
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    F386ØAØØØ2ØCF       :REM*1Ø4
533 DATA FFAE3B38EØØØFØØC78AØ*Ø
    ØA2Ø12Ø77FF584CB645*AØØØ91F
    EE6FEDØE2E6FF       :REM*133
534 DATA 2ØCCFFCE93383ØØ34C2F*4
    5A9Ø12ØC3FFA9ØF2ØC3*FF2ØCCF
    FA9ØØ8D8F386Ø       :REM*128
535 DATA A9Ø1AE5238AØØ32ØBAFF*A
    9Ø2A239AØ132ØBDFF2Ø*CØFF6ØA
    E9438CA8E9338       :REM*186
536 DATA 2ØB2322ØDA4520Ø7342Ø*B
    232A2ØF2ØC9FF9ØØ34C*94452ØB
    7462ØCCFFAD92       :REM*57
537 DATA 38ØA8DAD4818ADAD486D*A
    D48AABDC6468DC648E8*BDC6468
    DC748E8BDC646       :REM*127
538 DATA 8DC848AD9338ØA8DAD48*1
    8ADAD486DAD48AABDØ9*488DCA4
    8E8BDØ9488DCB       :REM*85
539 DATA 48E8BDØ9488DCC48A2Ø1*2
    ØC9FF9ØØ6A98Ø8D8F38*6ØAØØØA
    D3B38FØØC78A2       :REM*68
54Ø DATA Ø1A9FE2Ø74FF584C7C46*B
    1FE2ØD2FFC8DØE7E6FF*2ØCCFFA
    2ØF2ØC9FF9ØØ6       :REM*8
541 DATA A98Ø8D8F386ØA2ØF2ØC9*F
    FBØF3AØØØB9BF48FØØ7*2ØD2FFC
    84C9D462ØCCFF       :REM*11Ø
542 DATA CE93383ØØ34C14464CC7*4
    5AØØØB9CF48FØØ72ØD2*FFC84CB
    9466Ø3Ø3Ø3Ø2C       :REM*2
543 DATA 3Ø3Ø312C3Ø3Ø322C3Ø3Ø*3
    32C3Ø3Ø342C3Ø3Ø352C*3Ø3Ø362
    C3Ø3Ø372C3Ø3Ø       :REM*194
544 DATA 382C3Ø3Ø392C3Ø313Ø2C*3
    Ø31312C3Ø31322C3Ø31*332C3Ø3
    1342C3Ø31352C       :REM*56
545 DATA 3Ø31362C3Ø31372C3Ø31*3
    82C3Ø31392C3Ø323Ø2C*3Ø32312
    C3Ø32322C3Ø32       :REM*121
546 DATA 332C3Ø32342C3Ø32352C*3
    Ø32362C3Ø32372C3Ø32*382C3Ø3
    2392C3Ø333Ø2C       :REM*75
547 DATA 3Ø33312C3Ø33322C3Ø33*3
    32C3Ø33342C3Ø33352C*3Ø33362
    C3Ø33372C3Ø33       :REM*19
548 DATA 382C3Ø33392C3Ø343Ø2C*3
    Ø34312C3Ø34322C3Ø34*332C3Ø3
    4342C3Ø34352C       :REM*211
549 DATA 3Ø34362C3Ø34372C3Ø34*3
    82C3Ø34392C3Ø353Ø2C*3Ø35312
    C3Ø35322C3Ø35       :REM*137
55Ø DATA 332C3Ø35342C3Ø35352C*3
    Ø35362C3Ø35372C3Ø35*382C3Ø3
    5392C3Ø363Ø2C       :REM*26
551 DATA 3Ø36312C3Ø36322C3Ø36*3
    32C3Ø36342C3Ø36352C*3Ø36362
    C3Ø36372C3Ø36       :REM*96
552 DATA 382C3Ø36392C3Ø373Ø2C*3
    Ø37312C3Ø37322C3Ø37*332C3Ø3
    7342C3Ø37352C       :REM*226
553 DATA 3Ø37362C3Ø37372C3Ø37*3
    82C3Ø37392C3Ø383Ø3Ø*3Ø3Ø2C3
    Ø3Ø312C3Ø3Ø32       :REM*11Ø
554 DATA 2C3Ø3Ø332C3Ø3Ø342C3Ø*3
    Ø352C3Ø3Ø362C3Ø3Ø37*2C3Ø3Ø3
    82C3Ø3Ø392C3Ø       :REM*35
555 DATA 313Ø2C3Ø31312C3Ø3132*2
    C3Ø31332C3Ø31342C3Ø*31352C3
    Ø31362C3Ø3137       :REM*138
556 DATA 2C3Ø31382C3Ø31392C3Ø*3
    23Ø2C3Ø32312C3Ø3232*2C3Ø323
    32C3Ø32342C3Ø       :REM*91
557 DATA 32352C3Ø32362C3Ø3237*2
    C3Ø32382C3Ø32392C3Ø*333Ø2C3
    Ø33312C3Ø3332       :REM*9
558 DATA 2C3Ø33332C3Ø33342C3Ø*3
    3352C3Ø33362C3Ø3337*2C3Ø333
    82C3Ø33392C3Ø       :REM*192
559 DATA 343ØØØØØØ55413A332C*3
    Ø2CØØØØØØ2CØØØØØØD*ØØ55423
    A332C3Ø2CØØØØ       :REM*118
56Ø DATA ØØ2CØØØØØØDØØ422D5Ø*3
    A332Ø3ØØDØØ55413A33*2Ø3Ø2Ø3
    4312Ø3ØØØØ2C        :REM*162
561 DATA -1             :REM*162
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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

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=0TO169:READB:CK=CK+B:POKE SA+I,B:NEXT
40 IFCK<>20651 THENPRINT"DATA ERROR!":END
50 POKESA+110,240:POKESA+111,38:POKESA+140,234
60 PRINTCHR$(147)STR$(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 statement 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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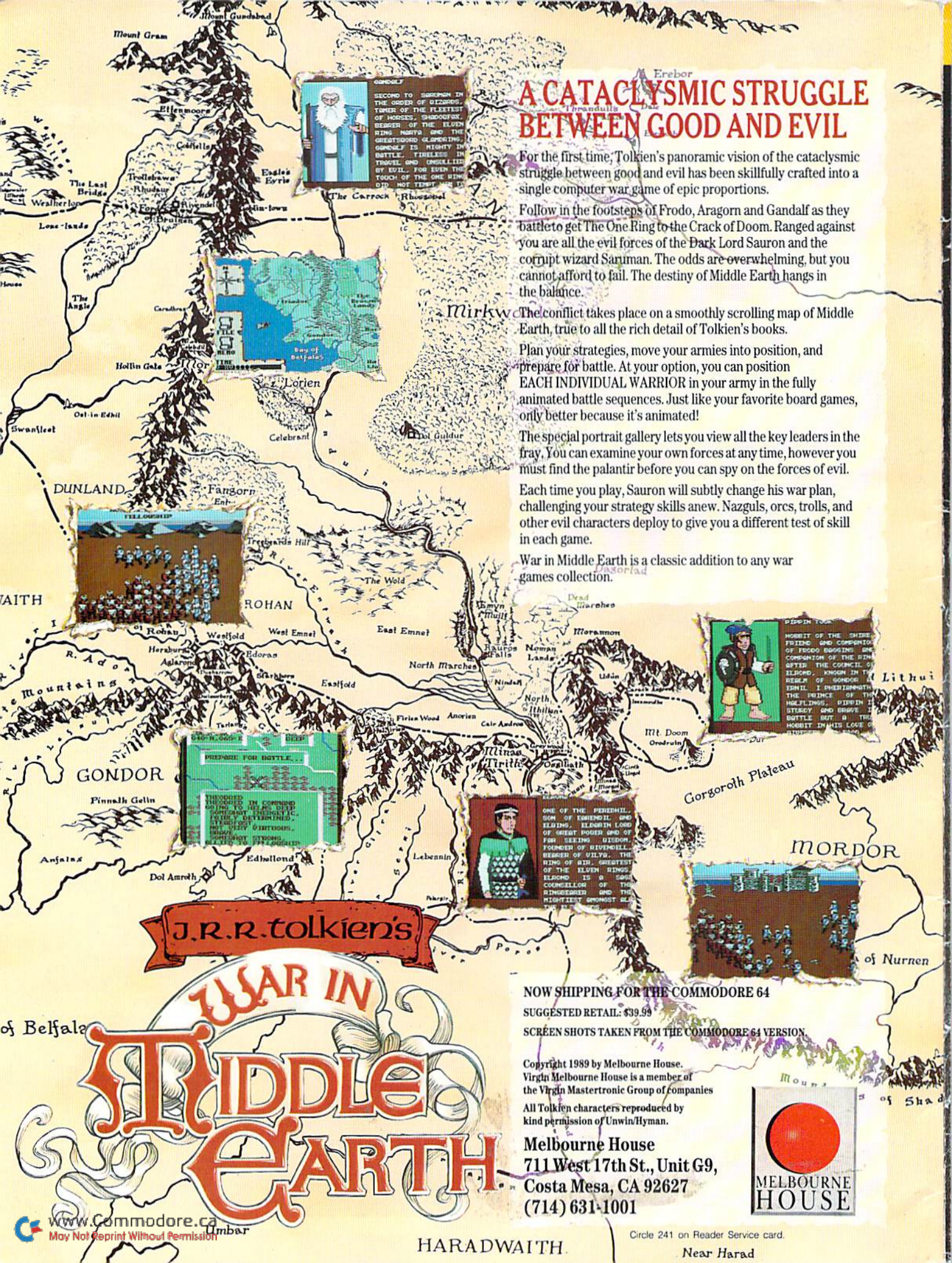

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