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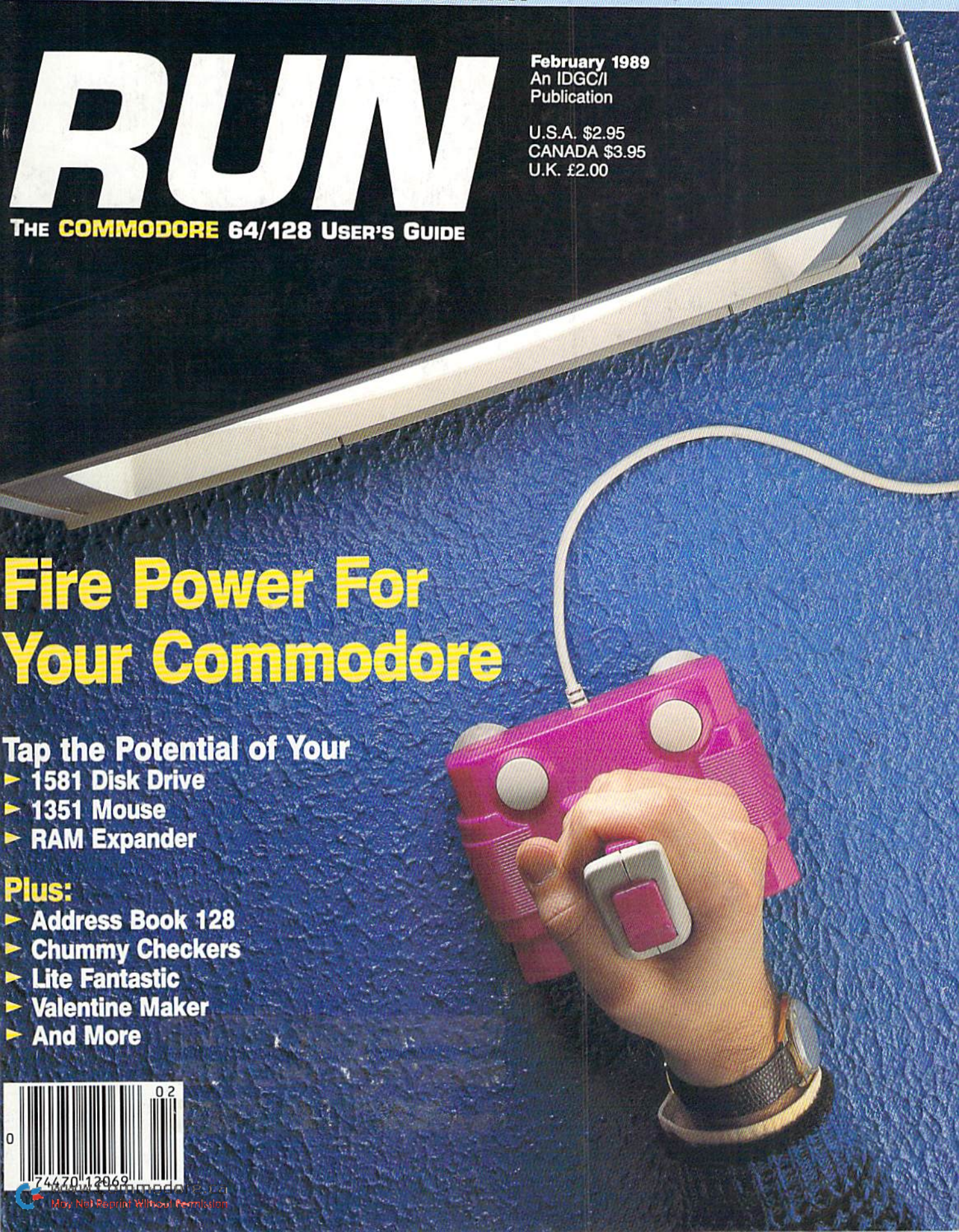

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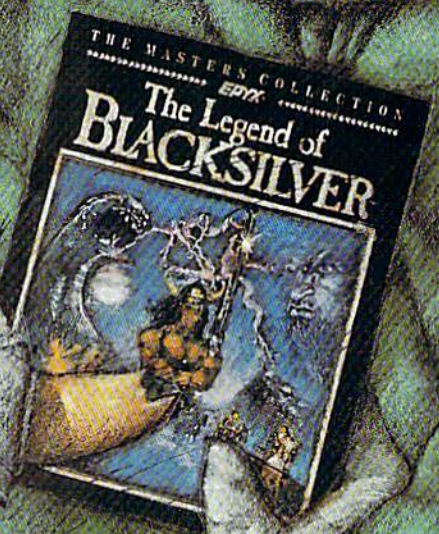

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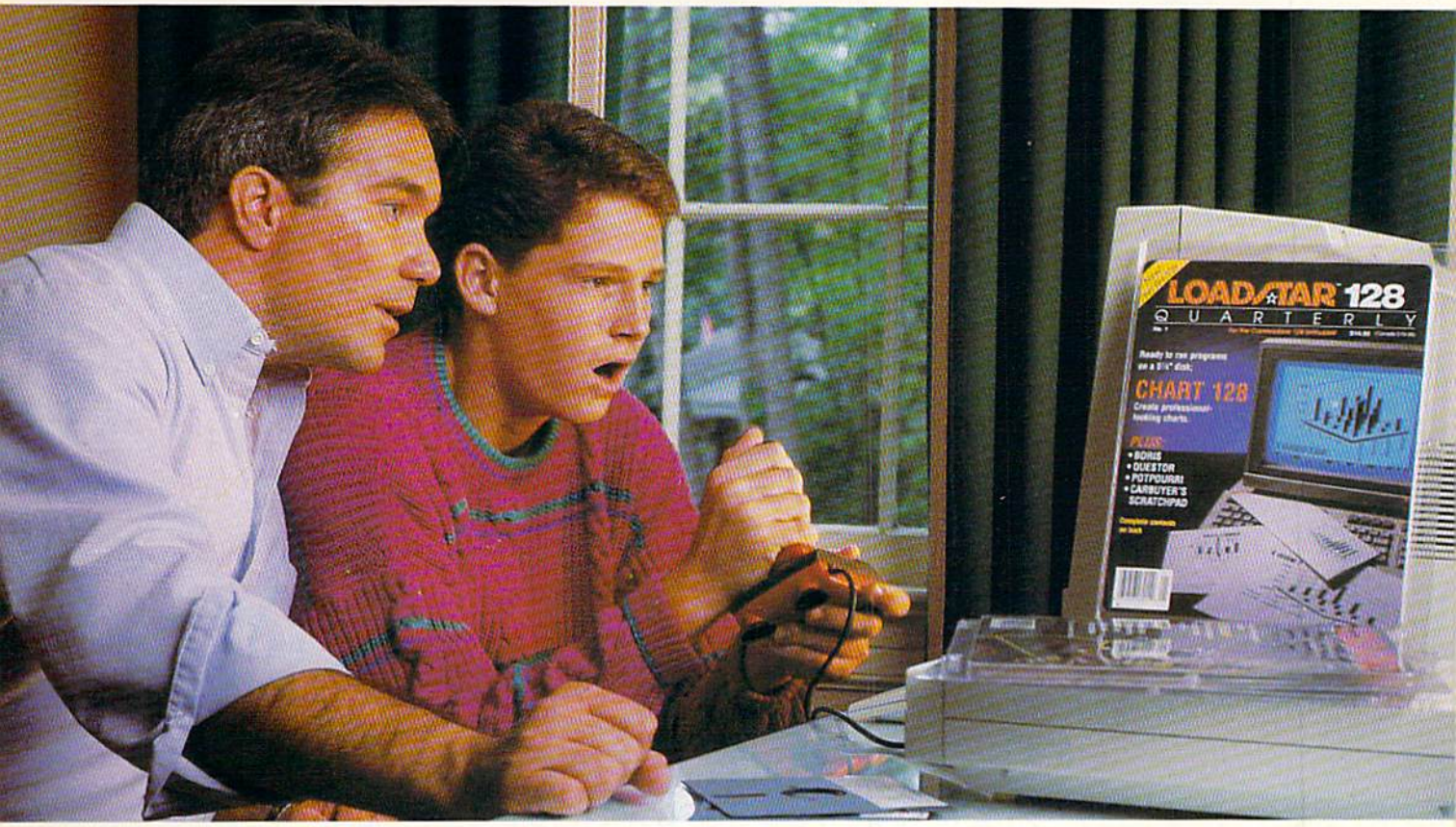

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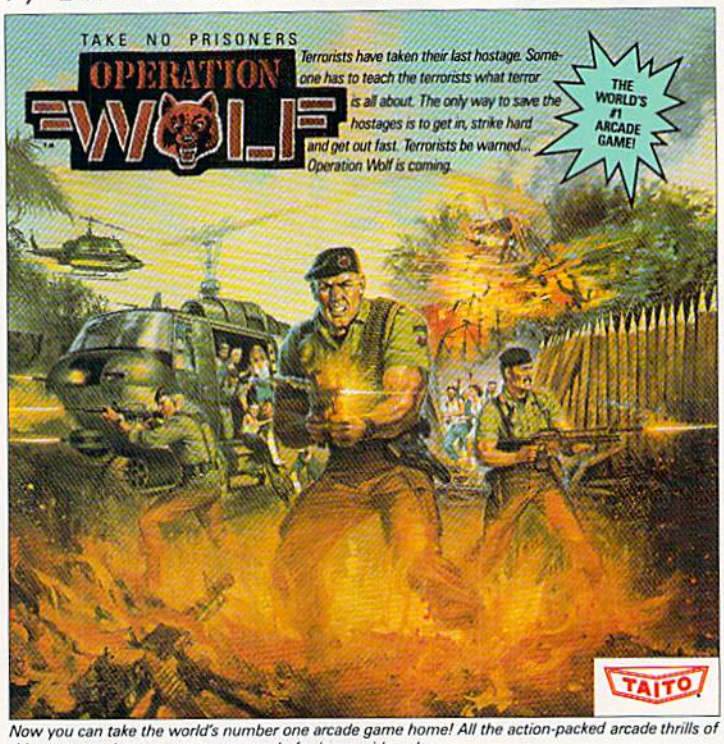

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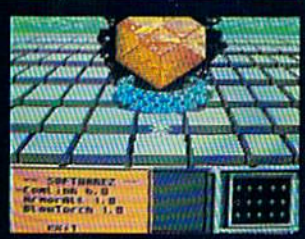

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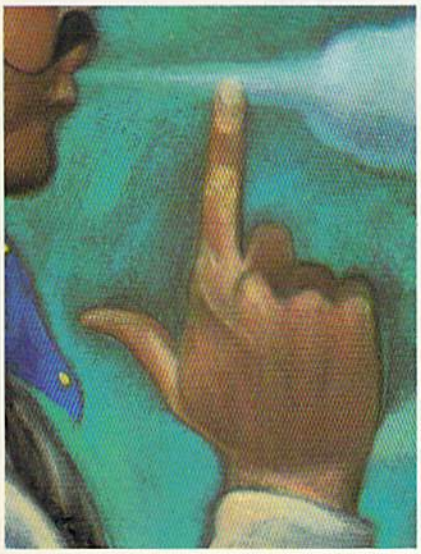

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RUNning Ruminations

HOW MUCH HAVE YOU CHANGED in the past three years? We thought it would be appropriate at this juncture to take a look back over the past three years to find out how much. In a survey of *RUN* readers conducted three years apart—one in the fall of 1985 and one in the fall of 1988—some notable differences emerged.

In comparison with the reader of three years ago, the composite *RUN* reader of 1988 is older (42 years vs. 30), better educated (71% vs. 58% attended college), more professional (fewer students), male (although the percentage of women readers has increased 6%), married (up 17%) and better paid ($44,100 vs. $36,100 annually.)

As our readers' financial status has changed, the number of peripherals purchased for their computer systems has increased. Consider this: In 1985, the typical *RUN* reader spent an average of $776 for his hardware system. By 1988, that average number had skyrocketed to $1224.

Is the Commodore user better off today than three years ago? You bet!

The class of '85 was interested in upgrading to a color monitor and a letter-quality printer (this is an aspiration of many of today's Commodore users). Many were dreaming of the day they could put away forever their Datassette and embrace floppy disk technology.

Today's user, of course, has a color monitor and disk drive and aspires to own a 3½-inch drive, or even a hard drive, a letter-quality printer and additional memory for his system.

Although some of our readers have switched to other computing systems, for the most part, they've stayed with the Commodore line of computers, upgrading from a VIC-20 to a C-64 to a C-128.

If there's one constant in the computing industry, it may be that pundits are too quick to predict the demise of the home computing market. For three years, they've been saying that the Commodore eight-bit market is dead. Several factors have forestalled this event.

First, the introduction of the 128 (and, later, the 128D). Commodore struck a winning note when they introduced this computer that's both hardware- and software-compatible with the 64, yet includes several additional features, such as an enhanced Basic, that make it a user's delight.

Second, the emergence of GEOS as the answer to 64 and 128 owners' productivity needs. This product introduces the Commodore user to menus and icons and marks the biggest difference between the user of today and that of three years ago, when this program was not yet available. GEOS appears to have taken a firm hold among *RUN* readers, about 50% of whom own and use it and its numerous related programs.

Third, the comeback of entertainment software. We've witnessed videogame conversions for the 64/128 and a renewed interest in this market by software developers. Also, games are much more sophisticated today and appeal to a larger audience. Productivity, however, remains a primary application among *RUN* readers.

In addition, some of the applications possible today, such as desktop publishing, were unheard of for the Commodore eight-bits in 1985. There's more hardware and software, including public domain sources, to choose from. The pricing is better, and users get more computing power for their buck. Given these advances, it's safe to predict that years of computing activity and discovery remain for 64/128 users.

Dennis Brisson
Editor-in-Chief

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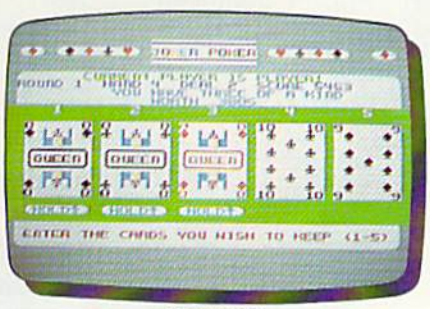

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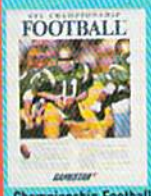

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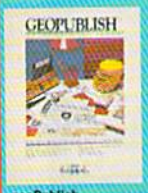

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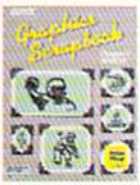

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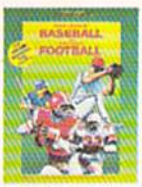

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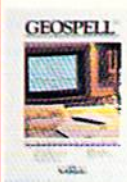

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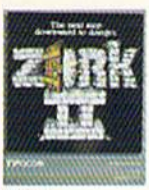

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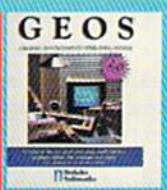

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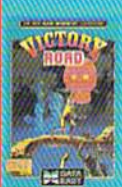

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MAGIC

Copying the C-128 DOS Shell; saving screen space with a mini-scrolling menu; and making the shift sound like a "Morse code" key.

Compiled by TIM WALSH

$503 Speaking of Quick Reference. . .

Lots of people use Rolodex card holders to keep names and addresses of friends, relatives and business contacts. Computer users like myself also find the design of these devices handy for another use—Magic tricks from *RUN*. I owned a large, cumbersome Rolodex, a birthday present that was awkward to use for business, so I switched to a smaller one for that purpose and the large one has done nicely for the last few years as a quick reference tool for locating previously published Magic tricks.

Rolodexes are arranged in alphabetical order, so cards in the A category contain tricks dealing with topics such as arrays and addition, the B category has hints and tips on binary numbers and BLoad enhancements, and so on. I also include the author's name whenever possible and the issue in which the trick appeared. If space permits, I include the trick itself.

While my friends are fussing and waiting for their databases to load so that they can retrieve computing information, I have everything I need right at my fingertips. Try the Rolodex trick; I think you'll like it!

—Marty Rivers, San Diego, CA

$504 By Jiminy, Did You Hear That?!

If you're writing a text adventure or interactive game and want to create the mood of a warm summer evening, run this little routine of mine on either your C-64 or C-128. It creates the authentic sound of crickets chirping at random intervals. Of course, this may fall into the wrong hands and kids might try to drive Mom, Dad or their favorite little sister crazy with this sound. So, listen up, kids: Be sure that you let the folks know it is just your computer, before they call in expensive exterminators!

```
Ø REM 64/128 CRICKETS - BECKY CHUNG:REM*61
1Ø A=54296:B=A-2Ø:C=B-3:D=B+1:E=B+2:POKEA,
   15:POKED,15:POKEE,Ø                :REM*214
2Ø FORT=22ØTO255:POKEB,17:FORG=1TO2:NEXT:P
   OKEC,T:POKEB,128:NEXT              :REM*234
3Ø FORS=1 TO(RND(5))*25ØØ:NEXT         :REM*28
4Ø GOTO 1Ø                            :REM*162
```

—Becky Chung, Madison, WI

$505 Mailing Label Alternative

If you want to print just one or perhaps several mailing labels, you know the process is a tedious one. First, you must remove the continuous form paper, re-adjust the tractor feed sprockets, crank in the mailing labels, waste half-a-dozen labels trying to get them aligned correctly, and. . .well, you get the picture.

So, do what I do! When printing several labels, print them out on standard continuous-form computer paper, cut the labels out with a pair of scissors, then glue them to the envelope or package with contact cement. The process wastes a sheet of computer paper, but it also saves a lot of time and aggravation.

—Dave Wilson, Marietta, GA

$506 C-64 Text Screen Saver

Wouldn't it be nice to save a screen containing text *and* graphics characters? The next time you create a screen worth saving, run 64 Screen Saver first. When the screen you want to save appears, press the Commodore and F1 keys at the same time. The screen will be saved as a four-block file called TEXT, as you can see in F$ in line 10 (but you can use any filename). To load and display your creation, enter LOAD "TEXT",8,1.

```
Ø REM 64 TEXT SCREEN SAVER - MICHAEL ONSTA
  D                                    :REM*15
1Ø F$="TEXT":P=679:GOSUB2Ø:GOTO3Ø     :REM*13
2Ø Q=LEN(F$):POKE P,Q:FOR I=1TOQ:POKE P+I,
   ASC(MID$(F$,I,1)):NEXT:RETURN       :REM*36
3Ø FOR J=828 TO 988:READA:POKE J,A:NEXT
                                       :REM*212
4Ø SYS 828                             :REM*174
5Ø PRINT"CREATE SCREEN, THEN PRESS"
                                       :REM*251
6Ø PRINT"COMMODORE KEY & F1 TOGETHER"
                                       :REM*125
7Ø PRINT"TO SAVE SCREEN."               :REM*56
8Ø NEW                                 :REM*242
9Ø DATA 12Ø,169,78,141,2Ø,3,169,3,141,21,3
   ,169,Ø,141,219,3,88,96,173          :REM*161
1ØØ DATA 219,3,24Ø,3,76,49,234,165,2Ø3,2Ø1
   ,4,2Ø8,124,173,141,2,2Ø1,2,2Ø8:REM*185
11Ø DATA 117,141,219,3,165,157,141,22Ø,3,1
   69,Ø,133,157,162,1,134,2Ø5,166:REM*253
12Ø DATA 2Ø7,2Ø8,252,169,1,133,2Ø4,173,Ø,2
   21,73,3,133,252,173,24,2Ø8,41 :REM*1Ø1
13Ø DATA 24Ø,1Ø2,252,1Ø6,1Ø2,252,1Ø6,133,2
   52,169,Ø,133,251,169,1,162,8    :REM*85
14Ø DATA 16Ø,Ø,32,186,255,173,167,2,162,16
   8,16Ø,2,32,189,255,162,232,24   :REM*15
15Ø DATA 165,252,1Ø5,3,168,169,251,32,216,
   255,162,Ø,134,251,16Ø,216,132   :REM*38
16Ø DATA 252,173,184,2,162,185,16Ø,2,32,18
   9,255,169,251,162,232,16Ø,219 :REM*235
17Ø DATA 32,216,255,169,Ø,141,219,3,173,22
   Ø,3,133,157,76,49,234,Ø,Ø       :REM*47
```

—Michael Onstad, Van Nuys, CA

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$507 C-128 DOS Shell Copier

Creating a working copy of the C-128 DOS Shell from the 1571 Test/Demo disk perplexes all but the most skilled programmers. My listing, DOS Shell Copy Boot, simplifies the procedure to give a copy that works as well as the original.

Boot the DOS Shell program. Once it's activated, select the File Copy option. Copy the file named DOS Shell and save it to a second disk. Then save my program to the second disk. Whenever you want to activate the Shell, just run my program. There you have it: a perfect DOS Shell copy!

```
Ø REM 128 DOS SHELL COPY BOOT - RICK CRUZ
                                        :REM*47
1Ø A$="BANK12:SYS6656":KEY1,A$+CHR$(13)
                                        :REM*71
2Ø PRINTA$+"{4 CRSR UPs}":POKE 2Ø8,1:POKE
   842,13:BLOAD"DOS SHELL"          :REM*172
```

—Rick Cruz, San German, PR

$508 64 Mini-Scrolling Menu

When your screen space is limited, but you need to display a menu with many options, a stationary display is not the answer. You can display the needed text along with eye-catching animation by using 64 Mini-Scrolling Menu, a horizontally scrolling menu routine that uses only one screen line to display the options.

To incorporate the routine into your own programs, use lines 20–110 of the listing. In line 30, C$ defines which keys are used to make a selection. A$ in line 40 contains the message to be scrolled. You'll also need to modify the On-GoTo statement in line 80 to direct program execution after you make a selection. The menu outline matches the current cursor color, while the color of the menu bar is determined by the last CHR$ code in line 60.

```
Ø REM 64 MINI-SCROLLING MENU - RICHARD PEN
  N                                     :REM*17
1Ø PRINTCHR$(147)CHR$(5):POKE 5328Ø,14:POK
   E 53281,Ø:POKE 214,17:PRINT          :REM*19
2Ø REM SCROLLING MENU ROUTINE           :REM*1Ø9
3Ø C$="1234":REM SELECTION KEYS         :REM*15
4Ø A$="[1] PURPLE{5 SPACEs}[2] BLUE{5 SPAC
   Es}[3] YELLOW{5 SPACEs}[4] GREEN{5 SPAC
   Es}":REM MESSAGE                     :REM*177
5Ø X$=CHR$(164):FORX=1TO2:FORT=1TO4Ø:PRINT
   X$;:NEXT:X$=CHR$(163):PRINT:NEXT:REM*1Ø
6Ø N$=A$+A$:PRINTCHR$(145)CHR$(145)CHR$(14
   5)CHR$(159);:REM MENU BAR COLOR:REM*17Ø
7Ø FOR T=1TOLEN(N$)/2:PRINTCHR$(18)MID$(N$
   ,T,4Ø):GETK$:Z=1                     :REM*85
8Ø IF K$=MID$(C$,Z,1)THENONZGOTO12Ø,13Ø,14
```

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```
   Ø,15Ø:REM EXIT MENU                    :REM*151
9Ø Z=Z+1:IF Z<=LEN(C$)THEN8Ø              :REM*181
1ØØ FOR DL=1TO3Ø:NEXT:PRINTCHR$(145)CHR$(1
    45)CHR$(145);:NEXT:GOTO7Ø             :REM*2
11Ø REM YOUR PROGRAM CONTINUES HERE:REM*13
12Ø POKE5328Ø,4:END                       :REM*254
13Ø POKE5328Ø,6:END                       :REM*5
14Ø POKE5328Ø,7:END                       :REM*19
15Ø POKE5328Ø,5                           :REM*4
```

—Richard Penn, Montreal, Quebec, Canada

$509 Morse Code Key 128

Make the shift key on your C-128 sound just like a "Morse code" key. Use my program, Morse Code Key 128, as a routine in your own programs, or use it as a stand-alone program. You can alter the sound tone by changing the value 3000 in line 20.

```
Ø REM MORSE CODE KEY 128 - LOUIS R. FERNAN
  DEZ                                     :REM*41
1Ø IF PEEK(211)=ØTHEN 1Ø                  :REM*172
2Ø SOUND 1,1E4,3ØØØ                       :REM*152
3Ø IF PEEK(211)=1THEN 3Ø                  :REM*255
4Ø SOUND 1,1,Ø                            :REM*172
5Ø GOTO1Ø                                 :REM*172
```

—Louis R. Fernandez, Cedar Grove, NJ

$50A Linespace 64

Linespace 64 is an interrupt-driven program that changes the line spacing of a Basic listing as it's being printed. After loading and running the program, enter a Poke 681,X command, where X is any value from 1 to 255, to determine the spacing. As a demonstration, the program defaults to triple line spacing. You can direct the output to the screen, a printer or a disk drive.

```
Ø REM LINESPACE 64 - LEON S. BRANDY
                                          :REM*168
1Ø SA=49152:FOR T=Ø TO 39:READ A:B=B+A:POK
   E SA+T,A:NEXT                          :REM*188
2Ø IF B<> 517Ø THENPRINT"ERROR IN DATA STA
   TEMENTS...":END                        :REM*34
3Ø PRINT"POKE 681,X TO SET LINESPACING"
                                          :REM*197
4Ø HI=SA/256:LO=SA-(HI*256)               :REM*128
5Ø POKE 8Ø6,LO:POKE 8Ø7,HI:POKE 681,3:END
                                          :REM*37
6Ø DATA 141,167,2,142,168,2,173,167,2,2Ø1,
   13,24Ø,3,76,2Ø2,241,173                :REM*84
7Ø DATA 167,2,174,169,2,2Ø2,24Ø,6,32,2Ø2,2
   41,24,144,247,173,167,2                :REM*237
8Ø DATA 174,168,2,76,2Ø2,241              :REM*1Ø
```

—Leon S. Brandy, Christiansted, St. Croix, VI

$50B More on GEOS and Printers

Because of space constraints in last month's geoWatch column, I was unable to address a GEOS question posed by many readers. In my most recent printer article ("Printers on Parade," *RUN*, October 1988), I mentioned that printers can be set to a desired graphics density and that line spacing can also be set prior to activating GEOS. How, many readers have written in to ask, is that accomplished?

Actually, no secret programming skills are needed to perform the magic on either GEOS 64 or GEOS 128, but you need a printer with more than one graphics density. If you're using an interface, set it to Transparent mode so that unwanted codes do not interfere with your printer commands. Next, with the computer and disk drive(s) on and the printer on and online, enter the command that sets the desired density, followed by the command to set line spacing. (Check your printer manual for exact details on selecting densities and line spacing.) For demonstration purposes, a typical density command might appear as:

```
OPEN 4,4: PRINT#$, CHR$(27),CHR$(90),CHR$(2),CHR$(3),
  CHR$(1),CHR$(255):CLOSE4
```

A typical line spacing command might appear as:

```
OPEN 4,4:PRINT#4, CHR$(27),CHR$(51),CHR$(22):CLOSE4
```

Once you enter the command to set the density, the printhead will move a fraction of an inch or make a sound. At that time, you can activate the GEOS System disk. C-64 users should enter: LOAD "0:*",8,1. C-128 users just type in BOOT and press return.

Be sure to select a printer driver, such as Epson FX-80, that will allow the printer commands to remain active. Commodore-compatible printer drivers will corrupt the printer commands you entered prior to booting GEOS. Have fun experimenting with various densities and line spacings!

—Tim Walsh, Magic Columnist

$50C Stars and Spheres Spectacular

Once you type in and run Stars and Spheres 128, a 40-Column mode program, the fun begins. First, stars slowly fill the black screen, after which five overlapping spheres are drawn in 3-D. Once the drawing is complete, pressing a key brings you back to the text screen. Pressing a key again redisplays the graphics screen.

```
Ø REM STARSCAPE & 3-D SPHERES - STAN BANAS
  H                                       :REM*1Ø4
1Ø COLORØ,1:GRAPHIC1,1                    :REM*82
2Ø FORT=ØTO1ØØØ                           :REM*225
3Ø X=INT(RND(Ø)):Y=INT(RND(Ø)):C=INT(RND(Ø
   ))                                     :REM*25Ø
4Ø X=INT(RND(Y)*319):Y=INT(RND(X)*199):C=I
   NT(RND(C)*16+1)                        :REM*12
5Ø COLOR1,C:DRAW1,X,Y TO X,Y              :REM*132
6Ø NEXTT                                  :REM*1Ø3
7Ø COLOR1,8                               :REM*241
8Ø GRAPHIC1,Ø:FORC=ØTO4:READX,Y           :REM*19
9Ø FORZ=ØTO5ØSTEP5                        :REM*93
1ØØ CIRCLE1,X,Y,Z,5Ø                      :REM*32
11Ø CIRCLE1,X,Y,5Ø,Z                      :REM*186
12Ø NEXTZ:NEXTC                           :REM*182
13Ø DATA159,99,1Ø9,49,2Ø9,149,2Ø9,49,1Ø9,1
    49                                    :REM*11
14Ø GETKEYA$:GRAPHICØ:PRINT"{SHFT CLR} PRE
    SS A KEY TO SEE AGAIN":GETKEYA$:GRAPHI
    C1,Ø:GOTO14Ø                          :REM*1ØØ
```

—Stanley D. Banash, Jr., Los Angeles, CA

$50D 64/128 Spinner

In fairness to 64 owners who can't view the above program

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in action, I've written a program that's almost as exciting. 64/128 Spinner draws and animates a figure that looks like an anemometer. When the program runs, it gives the illusion that the figure is spinning. 64/128 Spinner works on the 64 and on the C-128 in 40-Column mode. To change the background color in 80-Column, Direct mode, use the command Color 6,X, where X is a value from 2 to 15.

```
Ø REM 64/128 3-D SIMULATION - STAN BANASH
                                        :REM*13
1Ø POKE 5328Ø,12:PRINTCHR$(142);"{SHFT CLR
   }{12 CRSR DNs}";TAB(19);"{CTRL 4}{SHFT
   B}{CRSR UP}"                         :REM*92
2Ø FORC=ØTO9:READA$(C):NEXTC            :REM*194
3Ø FORC=ØTO9:PRINTTAB(11);"{CRSR UP}";A$(C
   ):NEXTC                              :REM*17
4Ø FORC=9TOØSTEP-1:PRINTTAB(11);"{CRSR UP}
   ";A$(C):NEXTC                        :REM*2ØØ
5Ø GOTO 3Ø                              :REM*176
6Ø DATA"{CTRL 2} {COMD M}{6 COMD @s}{CTRL
   4}{COMD @}{CTRL 1}{6 COMD @s}{COMD G}{4
    SPACEs}"                            :REM*183
7Ø DATA"{CTRL 2} {COMD M}{6 COMD @s}{CTRL
   4}{COMD @}{CTRL 1}{6 COMD @s}{COMD G}{4
    SPACEs}"                            :REM*169
8Ø DATA"{CTRL 2}{2 SPACEs}{COMD N}{5 COMD
   @s}{CTRL 4}{COMD @}{CTRL 1}{5 COMD @s}{
   COMD H}{5 SPACEs}"                   :REM*135
9Ø DATA"{CTRL 2}{3 SPACEs}{COMD L}{4 COMD
   @s}{CTRL 4}{COMD @}{CTRL 1}{4 COMD @s}{
   COMD J}{6 SPACEs}"                   :REM*145
1ØØ DATA"{CTRL 2}{4 SPACEs}{CTRL 9}{COMD K
    }{CTRL Ø}{3 COMD @s}{CTRL 4}{COMD @}{C
    TRL 1}{3 COMD @s}{COMD K}{7 SPACEs}"
                                        :REM*163
11Ø DATA"{CTRL 2}{5 SPACEs}{CTRL 9}{COMD K
    }{CTRL Ø}{2 COMD @s}{CTRL 4}{COMD @}{C
    TRL 1}{2 COMD @s}{COMD K}{8 SPACEs}"
                                        :REM*1ØØ
12Ø DATA"{CTRL 2}{6 SPACEs}{CTRL 9}{COMD H
    }{CTRL Ø}{COMD @}{CTRL 4}{COMD @}{CTRL
     1}{COMD @}{CTRL 9}{COMD N}{CTRL Ø}{9
    SPACEs}"                            :REM*31
13Ø DATA"{CTRL 2}{7 SPACEs}{CTRL 9}{COMD G
    }{CTRL Ø}{CTRL 4}{COMD @}{CTRL 1}{CTRL
     9}{COMD M}{CTRL Ø}{1Ø SPACEs}"
                                        :REM*121
14Ø DATA"{CTRL 1}{8 SPACEs}{CTRL 9} {CTRL
    Ø}{1Ø SPACEs}"                      :REM*153
15Ø DATA"{CTRL 2}{8 SPACEs}{CTRL 9} {CTRL
    Ø}{1Ø SPACEs}"                      :REM*61
```

—STANLEY D. BANASH, JR., LOS ANGELES, CA ■

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—SIMON THOMAS, DIRECTOR
BROOKLYN, NY

PETS FOR CHILDREN

I'm trying to acquire several used Commodore PETs and CBM machines (8K–32K) that I'll recondition and donate to a nearby children's center. If any of your readers would like to donate old tape and disk libraries and Commodore-specific publications that they have no use for, I'll edit them into levels appropriate for each age group. I won't be able to return the items, so please don't send anything valuable. My address is PO Box 401, St. Vital Post Office, Winnipeg, Manitoba, Canada R2M 5H3.

—STEVE GREENE
WINNIPEG, MANITOBA, CANADA

GEOREAD

I regularly read your geoWatch column. Is there a publication dedicated to GEOS applications?

—CLAUDE BLAIS
ST. HUBERT, ONTARIO, CANADA

There sure is! It's called geoWorld *and is published monthly at 38 Santa Ynez St., Santa Barbara, CA 93103.*

—EDITORS

HELP WHEN YOU NEED IT

A few months ago I had a problem with my disk drive, and I called the *RUN* offices for help. Everyone there was very nice and tried their best to solve my problem. When they couldn't, they called me back long distance, just to give me some phone numbers of people who might be able to help. I'll remember this come subscription renewal time. Thank you for your assistance.

—GLEN DRAKE
GRAND BLANC, MI

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You are deceptive advertisers. Allow me to quote from your "Magic Trick Writer's Guide": "If you have an idea to make computing easier. . .send it to: Magic. . .*RUN* pays $10 to $40 for each trick published. . ." While you go to great lengths to tell readers what they'll get, you never tell them what they must give up. Magazines like *RUN* hold a copyright on every piece of software they publish, which means that contributors must give up *their* rights to the software. I have a couple of routines and programs I'd like to share, but I'll never contribute them to *RUN*—I might want to sell them someday.

—GLENN C. PARKS
WASHINGTON, NJ

When RUN *buys software from an author, it is paying fair market value for the right to use that software in its publications and to ensure that such software does not appear in any other publication not affiliated with* RUN *magazine. If computer magazines did not purchase the rights to programs, there would be no point in having more than one publication, since it would leave authors open to selling their programs over and over again to anyone who wants to buy them, which in turn would lead to publications offering exact "clones" of programs.*

Besides, if another publication were aware that a program submitted to them had been published elsewhere, they wouldn't purchase it anyway, copyright or no.

Also, it's really up to the authors whether or not they wish to sell their rights to a program—if they don't, they simply needn't sign a contract.

—EDITORS

DOUBLE TROUBLE

I've been a computer user for 25 years and a systems engineer for a computer company. I own a C-128 and several Atari machines. I have had absolutely no problems with my two Atari 800XLs, a 130XE and a 1040ST. Even after years of using the Ataris, none has broken down, and I have never lost a file or had a disk go bad. However, I cannot get my new 128 to perform consistently. Now I know why Atari users are so loyal—the Ataris are far better.

—DANIEL L. O'BRYANT
BLAINE, MN

We've a feeling we haven't heard the last of this. Let's hear from C-128 owners.

—EDITORS

SACKING, CRACKING & HACKING

I agree with reader Dan Crockett ("Why We Buy Through Mail Order," Mail RUN, October 1988). I have searched everywhere for software for my C-64, but every place I go, salespeople seem to think the 64 is a game machine. It's for this reason that I have resorted to sacking, cracking and hacking as a means of expanding my software library. No wonder 64 users choose mail order over driving 20 miles to a store that doesn't look down on the 64.

—ZACK POWER
OSHAWA, ONTARIO, CANADA

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Now, That's Fast!

In your review of fast-load cartridges ("Rapid Transit Systems," August 1988), in reference to Final Cartridge III, you stated that you "could not save with the DSave command; possibly an equipment problem."

I am the proud owner of the Final Cartridge III, and I have never encountered such trouble. In a table accompanying the article, you listed the other five cartridges as all saving 130 blocks in 88 seconds. I checked the Final Cartridge III's save time—using the DSave command—and it saved 130 blocks in only 36 seconds.

—Robert Karon
Brooklyn, NY

Plea for Multiplan 128

For my spreadsheet purposes, I use Swiftcalc 128. However, this program lacks some functions I need for some of my applications. Could you tell me how to get a copy of Multiplan 128?

—E. F. Robinson, Jr.
985 Woodbridge Way
Conyers, GA 30207

Unfortunately, Epyx no longer markets Multiplan 128. We are publishing your full address so that distributors who still carry this program might get in touch with you.

—Editors

A Good Rule

Congratulations to Ellen Rule on her article, "Journey to the Center of Your Commodore," in your December 1988 issue. It gave me a new awareness of my computer's insides. Let's see more articles like this!

—Doug McNees
Ft. Pierce, FL

Candid Look at Q-Link

Please thank Loren Lovhaug for his revealing article on QuantumLink ("Telecomputing Workshop," *RUN*, December 1988). I'd been thinking of signing up with Q-Link, but no thanks; I'll shop for a *professional* service.

—Bob Renaud
Washington, MA

For an overview of the networks serving the Commodore market, be sure to read Loren's reviews of the GEnie and CompuServe systems in the January and February 1989 issues, respectively.

—Editors ■

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—Thumbnail is a unique program that reduces full-page geoPaint images for display on the screen and to save to disk. Catalog your geoPaint collection or paste images into a geoWrite document.

—geoOrganizer is a disk utility that lets you rearrange your GEOS files quickly and easily.

—Pattern Editor lets you create your own fill patterns for use within geoPaint.

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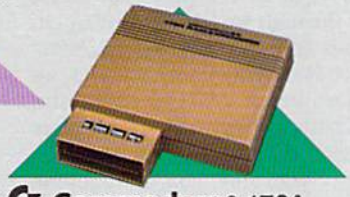

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NEWS AND NEW PRODUCTS

Games, books, music, several serious software packages and a bouncing baby Butterfield.

Compiled by HAROLD R. BJORNSEN

BE ALL YOU CAN BE

BOUNTIFUL, UT—In Heavy Metal: Modern Land Combat, Volume I, an action-strategy war simulation, players start out as second lieutenants with the opportunity to work up through the ranks based upon performance in the field. Play begins in the war room where you devise a strategy to overrun enemy positions. Once the strategy is set, you then move directly to the front line, in command of any of three modern weapons systems in battles going on at three different fronts at once. It's available for the C-64 for $39.95. Access Software, Inc., 545 West 550 South, Suite 130, Bountiful, UT 84010.

Check Reader Service number 400.

DO YOU KNOW WHERE YOUR FATHER IS?

CAMBRIDGE—Your name is Jason Youngblood, and you're living in a desperate world far in the future on an unknown planet. You learn that your father has led a crack squadron to meet the principals of an invasion, but has never returned. You're determined to fight off the enemy with 30-foot-tall combat robots and find your father, hopefully alive. BattleTech: The Crescent Hawk's Inception is available for the C-64 from Infocom (125 Cambridgepark Drive, Cambridge, MA 02140) for $39.95.

Check Reader Service number 401.

THREE NEW GAMES

NORTHBROOK, IL—Mindscape (3444 Dundee Rd., Northbrook, IL 60062) has released three games for the C-64.

Out Run is a racing car game where players drive at speeds up to 200 miles per hour through woods, European cities, beaches and the Swiss Alps. $34.95.

In Space Harrier, you are Harrier, an astral exterminator charged with obliterating ghastly creatures with your laser blaster. $29.95.

In Alien Syndrome, you must rescue your comrades trapped inside an alien-infested genetic laboratory before it explodes. $29.95.

Check Reader Service number 402.

COLOR-IN, PRINT-OUT

BATAVIA, IL—With Holidays and Seasons, a coloring book program for the C-64, children (and adults!) can color 24 line drawings of their favorite holidays and seasons. (An Okimate 20 color printer is required for color printouts. A Commodore 1200 black-and-white printer makes pictures that can be colored in by hand.) They can also make banners and posters, and calendars with four-color stickers (included) for colorful illustrations. It's available from Polarware (1055 Paramount Pkwy., Suite A, Batavia, IL 60510) for $29.95.

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Make banners, posters and calendars with Polarware's Holidays & Seasons.

WITHOUT A CLUE

MOUNTAIN VIEW, CA—Pool of Radiance, the first in a series of fantasy role-playing C-64 games based on the Advanced Dungeons and Dragons game system, now has a clue book available separately for $12.95. *Pool of Radiance Clue Book* is a player's guide with maps of every location in the game and with all major encounters located and described. It also includes specific tactics on how to defeat the most challenging encounters, and all the passwords, mazes and illusions are delineated. In addition, the book tells you how to be a more effective player. Strategic Simulations, Inc., 1046 N. Rengstorff Ave., Mountain View, CA 94043.

Check Reader Service number 403.

BOOK OF LAW

NEW YORK—A new book from LLM Press (150 Broadway, Suite 610, New York 10038), entitled *SYSLAW: A Legal Guide for SYSOPS*, explains the legal rights and responsibilities of BBS operators. Written by two lawyers who are both veteran SYSOPs, the 100-page book concerns the legal consequences for those who run BBSs. You may order the book directly from the company for $19 plus $2 shipping and handling.

Check Reader Service number 404.

BRAVO!

OAKLAND, CA—The C-64 music program, The Maestro!, claims the company (Zwetzig Associates, 5932 Bruns Court, Oakland, CA 94611), is almost entirely menu-driven and self-explanatory. Note, pitch, octave and duration are selected in a single operation. It provides the entire chromatic range of the 64's SID chip and any note duration from a 32nd note up-

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ward, including triplets, dotted notes, double-dotted notes, grace notes, tied notes and nonstandard durations. It permits up to 1023 notes for each of the chip's three voices. $24.95 plus $3 s/h.

Check Reader Service number 405.

Crib Notes

ENGLEWOOD CLIFFS, NJ—*Keys to Solving Computer Adventure Games, Book II*, helps gamers work through their ideas with hints, maps and solutions to 23 current computer adventure games, many of them for the C-64. The hints and clues are in a scrambled format for seasoned players, detailed maps are keyed to the hints and clues and there are step-by-step solutions for new players. In addition, there's a special section giving tips on playing adventure games. It's available from Prentice Hall, Englewood Cliffs, NJ 07632. Price unavailable at press time.

Check Reader Service number 406.

Giddyap!

ASHEVILLE, NC—Turbo Master CPU is a cartridge for the C-64 that makes software run up to four times faster. In addition, it has turbo disk routines in ROM for five times faster loads and saves, and a DOS wedge in ROM. Turbo Master is compatible with most C-64 software, including programs written in Basic, machine language programs, GEOS, programs that move screen memory, and bitmapped graphics screens. A 24-page manual is included in the package. Available from Schnedler Systems, PO Box 5964, Asheville, NC 28813. $179.

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For Quick Brown Boxes

TORONTO—QDisk, Version 2.0, a device driver for the Quick Brown Box RAM cartridge, which allows it to be used as a non-volatile RAM disk in the C-128's CP/M mode, is application transparent and can be used with all standard CP/M software. It allows partitioning of the 64K QBB into two 32K areas, so that the areas can be used for 64/128 Native mode applications or as separate CP/M drives. In addition, QDisk does not lose its contents when you turn the computer off: program and data files are safely stored. It's available for $9.95 plus $2 s/h from Herne Data Systems Ltd., PO Box 714, Station C, Toronto, Ontario, Canada M6J 3S1.

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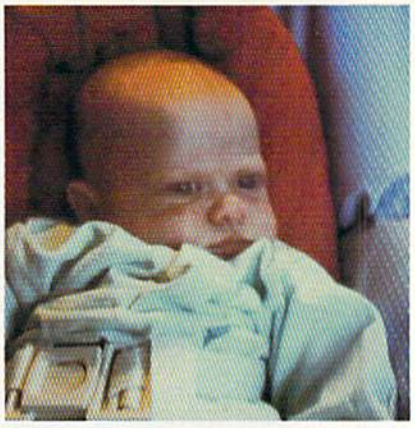

Suzannah Emily Butterfield comes complete with her own power supply; no disk drive required. However, issuing commands may be a little rough at first.

Baby Butterfield No Batteries Required

TORONTO—Mrs. Jim Butterfield, wife of the well-known Commodore guru, has released Suzannah Emily, a new daughter for the Butterfield family and hopefully compatible with a C-64/C-128 environment. Born last fall, Suzannah Emily presumably comes with a user's manual (*Baby Care*, by Dr. Benjamin Spock?). No word yet on any sequels. Stay tuned.

Awards Night

LONDONDERRY, NH—The Computer Games Developer's Conference, held annually in California, has given Origin, a games publisher, the Best Publisher award. Origin's executive producer Dallas Snell was pleasantly surprised. "Totally unexpected. . .I never even considered us to be in the running." Robert Garriott, the company's president, said, "This. . .shows that Origin's overall direction and positive author policies have been noticed and recognized by the industry as a whole."

HUNT VALLEY, MD—MicroProse Software, a publisher of simulation software, swept all three computer gaming awards at the 1988 Origins Convention, held in Milwaukee last August.

Pirates! was named the Best Fantasy or Science Fiction Game and for Best Screen Graphics, and Project: Stealth Fighter was named Best Military or Strategy Game. The Origin Awards are presented by the Academy of Adventure Gaming Arts and Design, an association of professional game designers, artists and developers.

Believe It or Not!

PHILADELPHIA—Heard out of the mouths of Commodore officials at last November's World of Commodore Show: ". . .Commodore will support the C-64 and 128. . ."; ". . .abandoning the C-64 would be dumb. . ."; "Commodore has agreed to work closely with educators. . .and get back into using Commodores for education. . ."; ". . .it's reasonable to be bitter about the past." [regarding getting someone in West Chester to answer the phone]; ". . .products are available upon demand. . ."; "Parts are available for responsible dealerships, regardless of machine."

The Philadelphia Civic Center was the site of the first annual World of Commodore U.S.A. According to a spokesperson for the organizers of the show, The Hunter Group, attendance was excellent, and it was a success for everyone involved.

A majority of the displays featured Amiga software and hardware, but end-user loyalty seemed to be split between 64/128 and Amiga.

Commodore manned a large booth, conducted a number of seminars and reiterated their support for the 64/128 line. They also promised, once again, to become a major force in the education market.

Stay tuned to this magazine for the latest from World of Commodore Toronto, held this past December, and from the World of Commodore show planned for this coming May in Los Angeles. (We'll also let you know if Commodore's quotes and assurances ring true in 1989.)

Talking Head

MARLTON, NJ—YodaHead Software (PO Box 177, Marlton, NJ 08053) has released Dragonfire BBS 128, a fully remote SYSOP bulletin board system for the C-128. The program supports 300-, 1200- and 2400-baud modems and is 1581 and IEEE compatible. Its 80-Column Fast mode allows up to 100 public message bases and 40 private message bases that can contain 100 messages each, and requires no SYSOP attention. ASCII and graphic output supports both sets of Commodore graphics and a full Email system is provided. It's available for $75.

Check Reader Service number 407. ■

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SOFTWARE GALLERY

Gladden your Valentine's heart with a gift of arcade action, productivity or strategy software!

Compiled by BETH S. JALA

BUBBLE BOBBLE ..... A+

Help Bub and Bob
Beat the Bad Guys
In Battle!

Dinosaurs are hot! It's only natural that software developers would use these creatures in games. Taito has created gentle versions of the prehistoric animals for its C-64 adaptation of Bubble Bobble, a coin-op game that enjoyed great success in Europe.

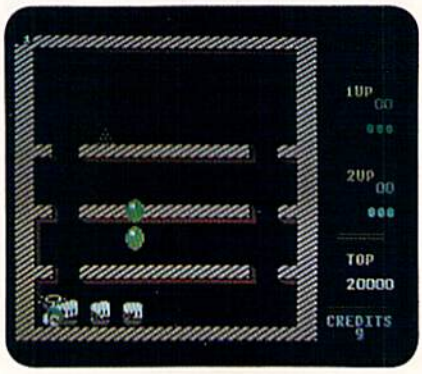
The story line goes that the evil Baron von Bonner has abducted two dinosaurs. Bub is the brontosaurus that one player guides in an attempt to free the captives, and a second player can simultaneously participate in the quest through an electronic surrogate named Bob.

Villains continuously attack the rescuers throughout their 100-level journey. Bub and Bob can dispose of these scoundrels by imprisoning them in magic bubbles. However, if the attackers get past this defense, they stun the dinosaurs; the game ends if this happens once too often.

In addition to their enemies, Bub and Bob encounter many exotic objects during their adventures. For instance, point-rich fruits, gems and crowns are theirs for the taking. If the dinosaurs can reach other items before they fade from the screen, they can activate bombs, fire rings and other powerful weapons.

Bubble Bobble's excellent graphics are a major reason for the game's addictiveness. The Taito conversion also has superior sound effects, which include a perky and hummable background tune.

The only possible problem with the program lies in its cartoonish packaging, which may give the false impression that the software is a mindless recreation suitable only for children. Although youngsters will indeed enjoy it, the game also has features that make it attractive to others. The instructions, for example, are deliberately brief, letting individuals who relish mixing thought with action develop personalized tactics.



Imprisoning the baron's cohorts in magic bubbles helps you make it through Bubble Bobble.

Bubble Bobble has it all—alluring graphics, outstanding sound, intriguing mental challenges and the option of two-person play, all wrapped up in the adventures of engaging dinosaurs.

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!

It is one of those rare games that should appeal to all types of players. *(Taito Software, Inc., 267 West Esplanade, North Vancouver, British Columbia, Canada, V7M 1A5. C-64/$34.95.)*

—WALT LATOCHA
OAK PARK, IL

PRO TUTOR ACCOUNTING .. A

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Of Accounting

When career-minded professionals and small-business owners seek to increase their knowledge of accounting, but don't have the time to attend traditional classes, what better way to learn than in front of their Commodore computers?

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Two types of assistance are given toward solving the practice problems: a help key for cursor and procedure instructions, and a Tutorial option for general information on problem solving. If your answer is incorrect, another chance is given. If the answer is wrong a second time, the program displays it correctly, and gives you the option to try a similar problem. The session is analyzed after a series of problems are answered.

A typical journal-entry problem displays the chart of accounts and gives a transaction. The bottom of the screen has a blank journal form where you enter the date, choose an account for the debit and one for the credit.

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on the back of an ordinary bank statement is displayed, and your objective is to categorize each item as either an outstanding check or deposit. Each group of checks and deposits is then subtracted or added to the book and bank balances.

The trial balance uses a simple approach to what can often be a difficult subject for a new learner. The program asks that each account be listed as either a debit or credit with the remaining entry going to the capital account.

The final selection gives you a choice of learning to adjust entries in either a journal or T-account style. Depreciation, prepaid expenses and accruals for revenues and expenses are explained. The emphasis here is on selecting the correct account for sample problems. It is an excellent review of account classification.

Overall, Pro Tutor Accounting is comprehensive and easy to use. I strongly recommend it. *(Professional Software, Inc., 51 Fremont St., Needham, MA 02194. C-128/$99.)*

—SANDRA COOK JEROME
SHELL BEACH, CA

BUBBLE GHOST ..... B+

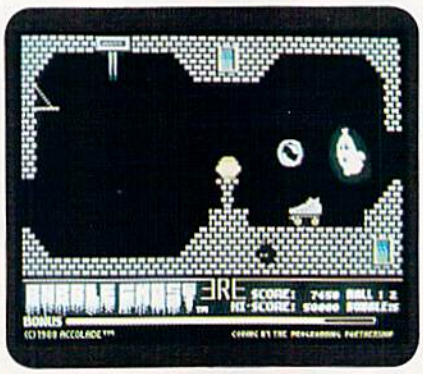
This Ghost Isn't Scary, But He Sure Is Challenging!

The object of Bubble Ghost is to blow a fragile soap bubble through an old castle. The castle has 35 rooms or halls, each containing a variety of hazards like burning candles, slashing blades, electronic force fields and electric fans. The bubble can be blown in any of eight directions by maneuvering an indestructible ghost into position behind the floating bubble and pressing the joystick button to release the ghost's "breath." The closer your ghost is to the bubble, the more the bubble moves. Blow too often or too hard, and the ghost changes from white to red while he tries to regain his breath. This slows down your progress as a bonus timer ticks away.

As you'll quickly learn, the ghost's breath must be used for more than a means of propulsion. A quick puff, for instance, is occasionally needed to extinguish candles which, if left burning, heat and burst the bubble. On other screens, the ghost must use his breath to toot horns or activate switches that eliminate obstacles in the bubble's path.

You begin the game with six bubbles, but earn a bonus bubble for every five levels you complete. While most levels have only one exit, some have secret passageways which, if discovered, let you skip entire levels. All but the final hall can be practiced individually.

Bubble Ghost can be played as a one- or two-player game, with players alternating turns. It would've been interesting to have a two-player, cooperative



Blow, blow, blow that bubble down in Accolade's Bubble Ghost!

game option in which two separately controlled ghosts combine wind power to propel a single bubble through the castle, but unfortunately, that's not a feature.

Despite Bubble Ghost's slow pace, it's not the type of game you should boot up if you're looking for a relaxing evening in front of the C-64. Watching your delicate soap bubble floating straight toward the sharp points of spikes, knives, pins and scissors while you frantically try to position the ghost to blow the bubble to safety isn't exactly an effective stress-reduction technique. However, if you thrive on challenging arcade-style games that keep you on the edge of your seat through level after level, then Bubble Ghost is one of the best new titles available. *(Accolade, Inc., 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128. C-64/$29.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

PLATOON ..... B+

Realistic to a Fault

The problem with most computer programs based on novels or movies is that they often bear little resemblance to the original work. The problem with Data East's Platoon is that it may resemble the original a little too closely.

While the computer version of Platoon certainly doesn't touch most of the emotional chords the movie does, it has full potential to leave you frustrated, unless you're an absolute computer-gaming wizard. As the package says, "At times, the odds may seem insurmountable. But don't think about winning—to survive is enough."

I played Platoon for about 25 hours and was unable to get past the third of the six game segments. An option that lets you begin a new game where the old one ended would be welcome.

However, what I saw of Platoon is enough to recommend it to anyone interested in action or strategy games with good graphics, accurate response and an interesting concept.

In the first segment, you must guide your platoon through the jungle in search of some explosives. Next, you have to locate a village occupied by the North Vietnamese Army. In the third phase, your men must explore a tunnel in search of a compass and two boxes of flares. Surviving long enough to reach the fourth phase places you in a bunker at night, when flares help you spot the Viet Cong guerrillas who are sneaking up on you.

If you make it through the night, you return to the jungle in search of your platoon leader, Sergeant Elias, only to find that he's been betrayed by Sergeant Barnes. Before you can react, you learn that the jungle around you is going to be napalmed in two minutes.

Escaping the jungle, however, does not guarantee your safety. Sergeant Barnes doesn't want you to survive, so he begins firing his machine gun and tossing grenades at you.

The game can end at any time in one of two ways: by taking too many hits from enemy gunfire or booby traps, or by morale falling too low and rendering your platoon inactive. Morale level and number of hits are shown at the bottom of the screen throughout the game.

Survival requires quick reflexes, good eye-hand coordination and the mapping skills of a Ferdinand Magellan. Mapping is difficult, because the game doesn't have a Pause option. You're constantly being attacked, so diverting your attention to draw or follow the map usually results in your soldier being shot.

Another complaint is that Platoon won't load with my 1571 disk drive. I tried two copies of the program, and neither loaded, although both worked fine with my 1541.

A spokesperson for Data East said

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mine is the only problem they've heard of regarding 1571 loading difficulties. If that's your only drive, I suggest you find a way to test Platoon before buying it, or make sure you can return it if you run into a problem.

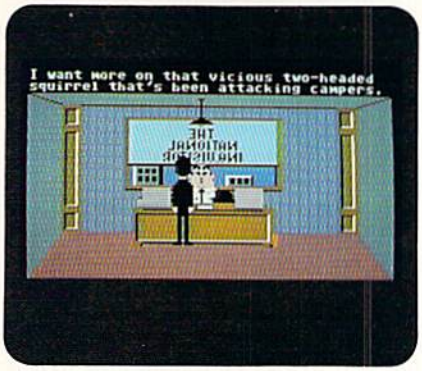
It's worth the effort, because Platoon really is a good program. It's one that you'll play again and again, because you just know you're going to make it all the way through on one of those tries! *(Data East USA, Inc., 470 Needles Drive, San Jose, CA 95112. C-64/$29.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

ZAK MCKRACKEN AND THE ALIEN MINDBENDERS ..... A

A Funny, Contemporary Plot With Easy-to-Play Action

When you design a computer game, it's important to keep the basic concept plausible. Zak McKracken and the Alien Mindbenders opens with the premise that people are getting dumber and dumber.



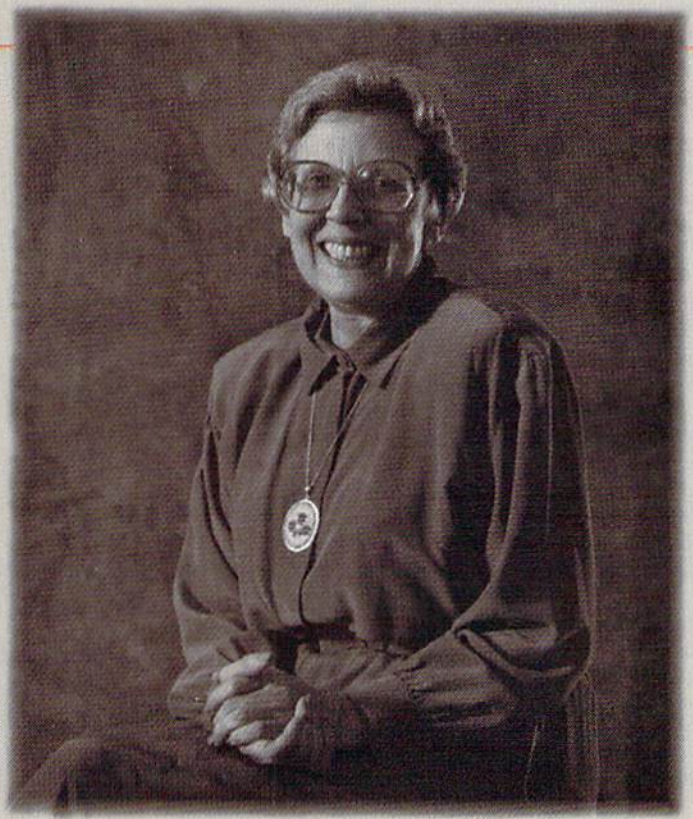
The movie-like introduction to Zak McKracken finds our hero arguing with his boss at *The National Inquisitor*.

Although it's set in 1997, some of you might think this plot is eight years ahead of its time. Turn on the six o'clock Mindwitless News broadcast tonight for proof.

Coincidentally, that's exactly what Zak McKracken finds out when he tunes into the news in his apartment. The announcer seems to be having problems remembering what she's just said. She does say that there's a 60-cycle hum in the telephone lines and people seem to be getting dumber and repeating themselves and getting dumber and repeating themselves. Zak, however, has a more immediate worry: Why is his telephone bill $1138?

Zak is a disgruntled reporter for *The National Inquisitor*, a tabloid found at supermarket checkouts that contains stories about carnivorous cantaloupes and two-headed squirrels. "I'm tired of making up stupid stories," Zak complains to his boss in the game's introduction. "Then go make up some that aren't stupid," his editor advises.

The game closely follows the Maniac Mansion (Lucasfilm's previous release) pattern: It fills most of the screen with graphics while covering the bottom with words and phrases with which to command the characters. ►



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Moving Zak and his friends around couldn't be easier. Using the joystick, point to one out of a list of verbs at the bottom of the screen and then where you want Zak to go—click, and he's on his way. A sentence line appears, noting what the characters have been instructed to do. This logical way of issuing commands without typing makes the game—which covers two disks—move right along.

The first rule in playing Zak McKracken is: Take everything that's not wired down. The second rule is: If it's wired down, try to cut it loose. Zak would need pockets the size of moving vans to haul all the paraphernalia that the inventory list says he's toting, but don't worry about how he does it. Worry about how he's going to use it.

That's where *The National Inquisitor* comes in handy. There's a full-size, eight-page issue included with the game. You'll find some hints among the bizarre headlines: "Scrambled Son Tries To Kill Parents With Eggs" tells about exploding eggs in a microwave; and the "Blend-O-Rama" ad hypes a gimmick that converts a garbage disposal into a food processor.

The game has its high and low points. On the high side, it's a technical masterpiece—smooth-scrolling screens, easy-to-use commands and some good puzzles to solve.

On the low side, it uses the "find the crystals" theme employed in other adventures. Some of the puzzle solutions require more luck than logic.

All in all, Zak McKracken is a bigger—and in many ways, better—version of Maniac Mansion. Maybe the crystal-finding-expedition script is a little overworked, but then again, how many games do you know of where Groucho Marx nose glasses play an important part? *(Lucasfilm Games, PO Box 2009, San Rafael, CA 94912. C-64/$34.95.)*

—LONNIE BROWN
LAKELAND, FL

MACRO SET 1 ..... B

A New Resource
For Programmers

One of the main problems with assembly language programming is that you must pay a lot of attention to detail. Simple chores like clearing the screen, displaying a message or inputting a filename that can be done with a single line of Basic often may take hundreds of machine language instructions. Don't despair! Help has arrived in the form of Macro Set 1, from Xytec Corp.

This software is *not* an assembler; it is a comprehensive library of machine language macros and subroutines. Over 4000 lines of written and debugged code are available.

You can select functions you need in your ML programs from five library files. One equates symbolic names to Kernal routines and important memory locations. It also provides two-byte register and address manipulation functions, as well as subroutines for screen and keyboard I/O. Other libraries provide sophisticated window input routines; disk I/O routines that support both fixed- and variable-length record formats; multi-byte precision decimal arithmetic, including output masks; and debugging and tracing facilities.

The macros and subroutines are powerful and easy to use. Within an hour after opening the package, I was running a short ML program that used half-a-dozen subroutines from two of the libraries. Coding the same program from scratch would have taken hours. So far, so good—now for the bad news.

Macro Set 1 is designed to run specifically with the Commodore Assembler Development System. Since I was favorably impressed with the software, I called the president of Xytec to express my concern at this limitation, and was reassured by his telling me that Xytec is working on versions for the Merlin and PAL assemblers.

If the package has a weak point, it's with the documentation. More text examples would be helpful for beginning ML programmers, and sample programs that demonstrate the package's powerful features would also be nice. The descriptions of the various functions are good, but the manual is sometimes difficult to navigate through when you're looking for a specific capability: a cross-referenced index would be useful.

If you use the Commodore Assembler Development System, Merlin or PAL, this package definitely belongs in your ML toolbox. If you own another macro assembler and are a reasonably adept ML programmer, it may still be worthwhile to obtain Macro Set 1 and put the effort into converting these well-conceived utilities to your assembler's format. With a name like Macro Set 1, can a sequel be far behind? *(Xytec, 1924 Divisadero, San Francisco, CA 94115. C-64/$29.95.)*

—MICHAEL BROUSSARD
HERNDON, VA

ROAD RUNNER ..... C–

Maybe It's Better
On Saturday Mornings?

It's a natural, right? I mean, what cartoon lends itself more to the computer game medium than Road Runner. You have a lightning-fast bird who does all of his travelling by foot, and an inventive coyote who's determined to catch the speeding bird even if he has to send away for every contraption Acme sells.

A Seed Meter at the top of the screen indicates the Road Runner's strength.

Unfortunately, despite on-screen action and the cartoon's theme music, Road Runner's designers missed a golden opportunity to create an exceptional game. This is the type of game that may leave you counting the ways it could have been made better.

As Road Runner, your object is to evade the coyote while avoiding a variety of hazards like sand traps, falling boulders and head-on collisions with speeding trucks. If you can lure the coyote into these dangers, you're awarded 500 bonus points.

To keep up your strength as you travel through the desert, you must pick up small piles of birdseed. A Seed Meter at the top of the screen gauges the Road Runner's strength. If you collect all of the seed on one level, you receive 10,000 bonus points.

While I have no problem with any of these game elements, I do feel that there's plenty of room for improvement. For starters, Road Runner is a one-player game, and that one player must always control the bird while the coyote remains under computer control. It would've been nice to be able to have a friend maneuver the coyote around the scrolling desert landscape, or at least to have the option of switching characters yourself.

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Another complaint I have is the Road Runner's lack of much of his famous speed and agility. When travelling over the narrow, maze-like roadways of level 2, for instance, the bird has an uncharacteristically difficult time maneuvering around corners, and he easily becomes stuck, while the coyote easily zips all over the screen.

The straw that broke the coyote's back for me was the absence of a particular sound effect. Not once throughout the entire game did I hear a "Beep Beep!" This game cries out for an authentic, digitized "Beep Beep" taken right from the cartoon's soundtrack. Even a little tweaking around with the C-64's SID chip could've produced an acceptable "Beep Beep." Instead, you must repeatedly listen to that familiar Warner Brothers theme which, after a few minutes, has you reaching for your monitor's volume control. *(Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/$34.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

COSMIC RELIEF C

Another Search-and-Rescue Mission

Thirty days. That's all the time you have to locate the world-famous inventor, Professor K. K. Renegade. Renegade's prediction that an asteroid would collide with the earth was ignored until the approaching asteroid was sighted. Now, with time running out, Renegade must be found and persuaded to build an asteroid deflector to save the planet.

You begin your search for the inventor by choosing one of five internationally known explorers as your on-screen adventurer. You must then guide him through a scrolling obstacle course consisting of a desert, cloud-filled sky and underground passageways. Along the way, you'll face many dangers, such as acid rain, snakes and pterodactyls.

During your travels, you'll also find several unusual items, some of which are needed to help you reach the professor. If you're not sure which item is called for in a particular situation, you can ask your adventurer for a suggestion by pressing "T" for Think.

Each adventurer has his own secret item that must be found before the world can be saved. Cheat notes listing all 24 and their uses are included on a map of the playing area.

An information window below the main screen shows three native bearers and the items they are carrying, the time remaining to complete your search, your score and the number of lives left.

Cosmic Relief has no major flaws, but, at the same time, the game has no features that distinguish it from countless other obstacle and search games. The graphics are colorful, but nothing extraordinary, and the sound is standard arcade fare. The manual is slightly amusing in sections, but on the whole, Cosmic Relief is an unspectacular action/adventure game ►

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that breaks little, if any, new ground. *(Datasoft; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$24.95.)*

—BOB GUERRA
SOUTH BOSTON, MA

Editor's Note: To give our readers more coverage of the many C-64/128 software products available, RUN *is broadening the scope of Software Gallery by presenting more reviews in capsule form.*

STAR RANK BOXING II .. B+

The sequel to the original Star Rank Boxing is a knockout. Besides sparring, it gives you the opportunity to play trainer and promoter.

A breeze to learn, SRB II is completely menu-driven except for the fighting. Joystick response is quick and accurate, and it's easy to master the available techniques. The animation and fight graphics are first rate, although the menu screens are nothing to brag about. Sound effects are also good.

My complaints are that fighters can only move forward or backward, and that long pauses occur whenever the computer accesses the disk.

Star Rank Boxing II has its minor flaws, but like a true champion, it still packs quite a wallop. *(Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$29.95.)*

—SCOTT WASSER

MIGHT AND MAGIC'S BOOK ONE: SECRET OF THE INNER SANCTUM ... A-

Combine the premise of demons, dragons and other lurking monsters with single-key controls, 3-D perspective, forward view and easily managed non-tactical combat. The result is Might and Magic: a game you can "get into" with barely a glance at the manual.

The software isn't going to bowl anyone over with format innovations or special effects. It can, however, stagger you with sheer size. This is one "swords and sorcery" undertaking that takes map devotees seriously.

Might and Magic features nearly 100 cleverly contrived sorcerer and clerical spells, countless nifty magical implements, good weapons variety and a solid emphasis on character development. If you wanted a long-playing, believable adventuring challenge—it has arrived! *(New World Computing; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$39.95.)*

—JEFF HURLBURT

CLUB BACKGAMMON .... B+

It's been said that the way to judge a computer adaptation of a traditional board game is by how the computer's special attributes are used to enhance the game. Club Backgammon is enhanced by a point-and-click player interface that lets you use your joystick to move markers around the board and by a variety of options accessible through pull-down menus.

Club Backgammon can be played against the computer or a friend, or the computer can play against itself. Other options let you pick the board and marker colors, slow the speed or bypass the computerized dice to enter rolls from real dice.

Games in progress can be saved to disk and, as you play, a log of all moves is kept in computer memory. New players will find useful an evaluation feature, which can be selected at any time to help decide an upcoming move.

The program isn't copy-protected, but you're required to enter a letter from a specific part of the manual before starting to play.

If you've always wanted to know how to play backgammon but thought it was too complicated or boring, Club Backgammon will change your mind. It's a surprisingly entertaining version of a game that's been around for a long time. *(California Dreams, 780 Montague Expressway, #403, San Jose, CA 95131. C-64/$29.95.)*

—BOB GUERRA

SINBAD AND THE THRONE OF THE FALCON ..... B+

Borrowing freely from numerous motion picture storylines, this software employs detailed, full-screen graphics, animation and music to create a convincing Arabian Nights backdrop. Here, earthquake magic is as deadly as the sword, a cyclops gobbles unwary adventurers, and the Black Prince's minions roam the earth and sail the skies in search of any who would oppose their master's evil design.

Sinbad presents a myriad of challenges. Your quest to free the caliph from ensorcellment involves both action, and, in the best Arabian Night's tradition, solution of a mystery.

The requisite deadly encounters with evil magic, perilous waters, enemy swordsmen and monsters are supplied via several arcade sequences. Inserted more or less at random throughout your travels, these contests are entertaining and offer good variety, but each is also a potential game-ender and far too difficult for quick mastery. With no Practice option, you should count on playing through many unwinnable "try-out games."

Sinbad and the Throne of the Falcon can make you very proud of your C-64—the graphics are beautiful—and yet have you pulling your hair out in frustration. No two games are the same, and it's easy to try new scenarios. If you can stomach the unfortunate arcade apprenticeship requirement, look forward to a magical adventuring experience. *(Cinemaware Corp., 4165 Thousand Oaks Blvd., Westlake Village, CA 91362. C-64/$34.95.)*

—JEFF HURLBURT

NAVCOM6 C

NavCom6 is a naval combat simulator that places you in full control of an Aegis guided-missile cruiser stationed in the Persian Gulf. You orchestrate its offensive and defensive moves through use of a massive control panel.

The program's graphics are generally crisp and detailed. Some of the sprite graphics are blocky and tend to wrap, but that's merely a distraction.

I am, however, becoming weary of trying to decipher Cosmi's documentation. Written as though for seasoned naval personnel rather than the computing public, it's cryptic and frustrating. Activating the various shipboard systems is a real trial because alphanumeric codes must be looked up and typed in.

NavCom6 is well done and methodically researched from bow to stern, but the ambiguous documentation and awkward player interface make it too much work to really enjoy. *(Cosmi, 415 North Figueroa St., Wilmington, CA 90744. C-64/$24.95.)*

—JOHN RYAN

SCRUPLES C

Scruples is classified as a conversation/strategy game, a "social game of moral dilemmas." Given questions dealing with a wide range of social issues, you attempt to answer according to what you think is the response

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that best fits your personality.

In many instances, the two don't match up, which is half the fun. . .and frustration. The object is to be the first player to discard all of his or her dilemma cards.

Scruples' sound and graphics are fairly basic, yet effective. Game play tends to be very fast until you get used to it. It often gets confusing as to who is doing what, asking whom and answering whom.

While Scruples certainly follows the conventions of the original, it also suffers from a problem common to most board-to-computer game conversions: lack of atmosphere. Part of the fun of playing Scruples is the ability to interact with the people around you. Even though eight others can play the C-64 version, I can't picture nine people in front of a computer, passing a joystick around. Perhaps it would be better to save the computer Scruples for those lonely rainy days.

Scruples certainly means well and tries hard to bring its particular brand of magic to the screen—but the magic is just not there. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95.)*

—JOHN RYAN

MASTER NINJA ..... D

Master Ninja has some features that favorably set it apart from similar programs of the oriental combat-game genre, but other elements will alienate a lot of fans.

Although ambitious in scope, the software's problems start with its documentation. The three sources of information—an instruction manual, a reference card and a help screen—do not all contain the same facts.

The program's control system can cause games to end very quickly. The necessity of waiting three minutes to reach the first combat screen, even with a fast loader present, is another problem. And because the program indicates only between battles how much damage the ninja has suffered, a player often has little idea of how close he or she is to losing. I also felt that the game is mean-spirited in its comments about defeated players. Words such as "disgraceful" and "disgusting" are used to describe their performance.

Master Ninja is not totally without merit, however. Although its on-screen combatants are little more than electronic stick figures, the background graphics are often splendid. The sound effects are also good, and the publishers should take credit for trying to make its martial arts action more interesting by placing it in the context of a fully developed story.

Yet, the program's positive features are ultimately outweighed by its drawbacks. Although Master Ninja is significantly different from other martial arts games, different does not, in this case, mean better. *(Paragon Software; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—WALT LATOCHA ■

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Kraft Systems' Ace, Starmaster and Mazemaster joysticks.

Ready! Aim! Fire! Sounds of artillery whiz from your monitor, accompanied by a deafening click. Many computer applications require non-keyboard input from the user, and numerous devices have been invented for the purpose. They include joysticks, mice, light pens and even voice-activated gadgets. Your C-64 or C-128 is remarkable in accepting a wide range of these devices without needing additional hardware, and, because the Commodore's built-in joystick ports are easily programmed, there's an abundance of software available for many Commodore-compatible input devices.

However, these input devices may or may not come equipped with software. Joysticks do not, as a rule, because there's a seemingly endless variety of both commercial and public domain programs available for them. Furthermore, the joystick you use with your 8-bit Commodore will also work with an Amiga or Atari, but software would not be compatible with all three machines. Light pens and mice generally do come with software, because few commercial packages are available for use with them, and they are not adaptable to other computers.

Now let's look at a number of the input devices available for ►

By TIM WALSH

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Commodore computers today. You'll find distributor and price information in Table 1.

Joysticks

Joysticks for Commodores date back to the heyday of the VIC-20. Since that time, the two most notable advancements in their design have been remote (wireless) control and micro-switch operation. Wireless joysticks never caught on, but micro switches have become the de facto standard, thus providing improved sensitivity and responsiveness.

The **Starmaster** joystick from Kraft Systems, one of the foremost third-party joystick manufacturers, offers a number of worthy features. Four suction pads on the bottom of the unit allow one-handed use, as long as you have a handy flat surface on which to mount it, and the two fire-buttons, one on the base and the other on top of the control stick, provide a choice of shooting styles. In addition, the positive clicking action in the control stick's movement makes the unit responsive and accurate, and the clicking action in the fire-buttons lets you know your finger press has actually registered. On the negative side, Starmaster's large pistol grip is more conducive to brute strength than the speed and sensitivity required by most joystick games.

I would heartily recommend another Kraft joystick, the unresponsive and cumbersome **Ace**, to any opponent whose skills at a game were better than mine. The stubby control stick offers no clicking or other feedback, and the obtrusive fire-button is mounted on the top-left side of the base, a cumbersome arrangement at best for left-handed users. Furthermore, the four tiny pads on the bottom of the unit provide little adhesion to desktop surfaces. At least, the fire-button does click nicely, just like the one on the Ace's well-designed big brother, the Starmaster.

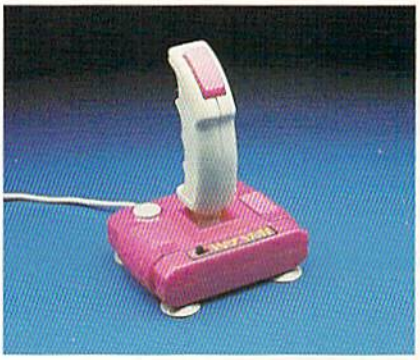
After reading about the Ace, you may be surprised to learn that one of my all-time favorite joysticks is also a Kraft—the **Mazemaster**. I've hit nearly all my high scores with this gem. It's accurate, provides feedback, and, most important, is delightfully small—a near-perfect fit for my average-size hands. I can control it with just my fingertips, and its light weight makes for hours of tireless play.

Many joysticks are cumbersome for left-handers to use.

Other pleasing features of the Mazemaster include an 8-foot cord and a switch on the underside of the base that selects four-way horizontal and vertical movement or eight-way movement that includes diagonal directions. The single fire-button on the upper-left corner of the base is awkward for southpaws, though, and the Mazemaster won't stick to a desk, so it must be used with two hands. It also lacks the positive clicking action characteristic of other premium joysticks. In spite of these drawbacks, the Mazemaster's precision and responsiveness make it the joystick I nearly always reach for in my daily work.

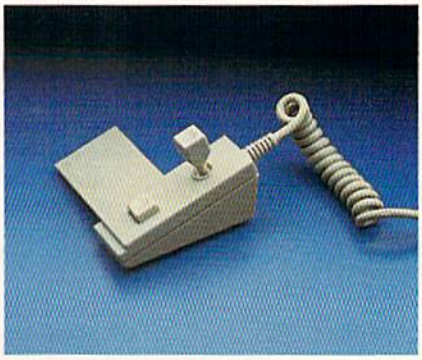
No fewer than four fire-buttons are found on the big, colorful **Hot Stuff** joystick from Beeshu. The base has two, and the large gray pistol grip has two more. The base also sports an autofire switch that's handy for repeated firing. Note, however, that in Autofire mode, some software gives the fire-button priority over the control stick, so you can't control the other joystick movements while firing. Oddly, the fire-buttons on the base of the Hot Stuff click nicely when pressed, but those on the pistol grip don't click at all. Four suction pads on the base provide a tenacious grip on any desk surface, and the pistol-grip fire-buttons make this unit suitable for right- and left-handed gamers alike. Overall, this is a decent joystick, offering the autofire switch as an unusual touch.

If you're the type of computerist who wants all the latest gimmicks, the **Freedom Stick** by Camerica might be your choice. This big, battery-operated device communicates with the computer not through a cable, but by infrared signals, which means you can sit ten or more feet from your computer and still control the on-screen action. The installation instructions for this joystick are rather confusing, but they boil down to loading in four AA batteries (not included), inserting the unit's two joystick plugs into the ports on your computer and plugging the opposite ends into the infrared receiver. You activate the joystick by flipping the three-position Player switch, which also lets two Freedom Sticks be used concurrently.



The Hot Stuff joystick, from Beeshu, Inc.

Camerica Ltd.'s Freedom Stick.



Suncom's IconTroller.

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Many joysticks are cumbersome for left-handers to use, but the Freedom Stick is awkward for right-handed users. The control stick is mounted on the top-left side of the base, while the fire-button is on the right, so you must either cross your hands or learn to operate the control stick with your left hand and the fire-button with your right. Left-handers, of course, feel right at home with the Freedom Stick. Also, when holding the Freedom Stick in your lap, not only will you have to lower the infrared receiver to a comparable level, but you must also limit your body English during spirited play. Overall, I'm impressed with the Freedom Stick's infrared technology, but disappointed with the functional aspects of the unit.

The **IconTroller** joystick from Suncom is unusual in that you can stick it by an adhesive pad onto the side of the computer, next to the joystick ports. It then connects to either port with a coiled wire. The unit's light-beige color nicely matches the C-128 and C-64C cases, and it's probably the smallest joystick on the market. It also provides acceptable control and accuracy, but unfortunately is awkward to use.

In fact, design flaws make the Suncom more a novelty than a serious joystick. If you're right-handed, the control stick is mounted so your thumb and index finger can move it comfortably, but your palm is left covering the fire-button. You can use it more easily by holding it with two hands instead of attaching it to the computer. Especially if you're left-handed, you'll have great difficulty using it effectively when it's mounted on the keyboard. Also note that this product is designed for mounting on the older, flat C-128s, not the C-128D with its detachable keyboard.

The good news here is that the Suncom provides a second joystick port on its jack. Thus, you can plug the Suncom into the computer and then plug a "real" joystick into the Suncom. In summary, this joystick was a good idea, but it left the drawing board too soon.

Hear the name Mindscape, and you think of high-quality entertainment software, so it should come as no surprise that they sell a high-quality joystick to complement the software. Billed as the "ultimate high-tech joystick," the **PowerPlayers** features a comfortably contoured pistol grip, with a built-in fire-button and a control stick mounted on top—somewhat like a handgun without a barrel. Because of the pistol grip and built-in fire-button, this is one of the few joysticks that can be used equally well by left- and right-handers.

Quality-wise, you'd be hard pressed to find fault with the Ergostick.

Besides comfort, the PowerPlayers offers precision, with positive clicking in both the control stick and fire-button, and an overall high-quality feel. Also, its long cable lets you move as far from the screen as you wish. The only disadvantage is that it must be operated with two hands. The PowerPlayers would probably be my favorite joystick except for one problem: The *RUN* editorial office possesses only one, and someone else usually has it.

Everything about another one of my favorite joysticks, WICO's **Ergostick**, looks good at a glance. It's the only joystick in this roundup that's covered with a porous material, providing for a good grip. It's also the only joystick I reviewed that has a base contoured to fit most normal-size hands. Also, thanks to the miracle of micro switches, it offers perfect response and sensitivity.

Left handers might have a tough time using it, however. It's designed to be held in the palm of your left hand and controlled with the fingers of your right. Southpaws who must reverse this arrangement will find their hands in an awkward position.

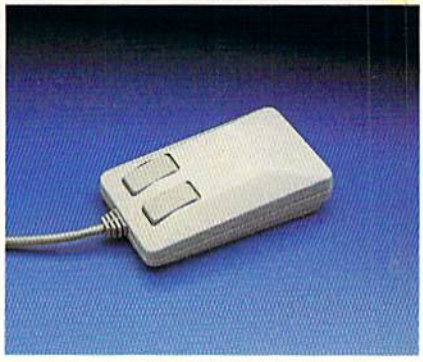
Quality-wise, you'd be hard pressed to find fault with the Ergostick. A long cord and all-around precision make it an easy device to like. Most of all, the rubbery material that covers the unit gives it a distinctive feel that's unlike any other joystick I've used. I find it to be one of my favorites.

The Proportional Mouse

The first mouse for the Commodore, the 1350, was really just a joystick in a different guise. Newer proportional mice, which are slowly but steadily gaining acceptance in the Commodore community, register motion in any direction and translate it to the computer. The mouse's input comes from a ball that protrudes beneath the ►

The PowerPlayers joystick, from Mindscape.

The Ergostick, from WICO.



Commodore's 1351 Mouse.

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unit and rolls on the desk surface. The mouse plugs into the joystick port and typically has two buttons on the top for "clicking" icons, drawing and positioning the cursor. The mouse goes further than any other input device to enhance the computing experience for novice and seasoned pro alike.

Like other input devices, the proportional mouse requires software written specifically for it. Programs such as GEOS and Basic 8 already depend almost completely on the mouse, and there's an ever-expanding number of mouse-driven utilities available. However, most entertainment software still calls for a joystick, which is unfortunate, because the mouse is much more accurate and easy to use. Mouse fanatics like myself are pleased that Arkanoid, the C-64 breakout-type game from Taito, is supporting the mouse.

Two mice are currently available for use with Commodore computers. The **Commodore 1351** has been on the market for a number of years and has enjoyed a lot of commercial success. I've used a number of 1351s for over a year and have found them comfortable, responsive and reliable. The 1351 is also versatile, offering both Mouse and Joystick modes, the latter activated by holding down the right button while powering up the computer.

The 1351's long cable lets you work a considerable distance from your computer, and the buttons click with audible authority when you press them. As a bonus, the mouse comes with a disk of utilities and drivers that you can use in writing your own mouse-operated programs. Thanks to the popularity of software such as GEOS, Basic 8 and public domain programs, the 1351 is becoming a fixture, like a monitor or disk drive, with most Commodore 8-bit computerists. It's also about as flawless an input device as you're likely to find.

While Commodore dominates the mouse market with the 1351, the **M3 Mouse** from Contriver Technology is a worthy alternative. It differs in form from the 1351, but functions in much the same way and also offers both Mouse and Joystick modes, selected during power-up. Unlike the 1351, it comes with C-64 graphics software, so you don't have to buy separate programs right away. This software includes a program that's somewhat like GEOS, although nowhere nearly as sophisticated. The M3 also works well with all software that's compatible with the 1351.

Virtually any type of program could use light-pen input.

On the negative side, the M3's buttons lack the level of responsiveness found in the spring-loaded clicking action of the 1351. They click at the end of their travel, unlike the 1351's buttons, which click about halfway down. As a result, the M3 requires a little more fingertip pressure to activate program functions. In general, though, the M3 is a viable alternative to the 1351 if you're looking for a good mouse at a fair price.

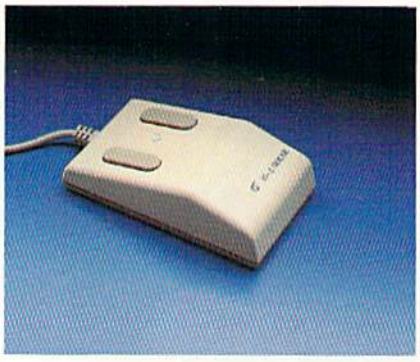
The Light Pen

Light pens differ from other input devices in that their functioning is more complex than that of a joystick or a mouse. Whenever it's working, the computer is generating an electron-beam that scans the entire screen 60 times per second. Because this process occurs faster than the human eye can detect, the display looks like a steady image, but the light pen knows differently.

When you activate the light pen with input from the screen, the pen's photo detector sees a burst of light each time the scanning beam passes. When its button is pressed, the pen converts these flashes to electrical pulses that go to the computer, where the pulse timing is converted to the instantaneous monitor beam position. The computer can then use this information to plot a point, position its cursor, identify a target or perform any number of functions.

Virtually any type of program could use light-pen input, but because of a lack of interest by both manufacturers and users, few programs provide light pen support. As a result, the selection of Commodore-compatible light pens has dwindled to only two, both from Inkwell Systems.

There's no doubt in my mind that the Inkwell Systems light pen survived its competitors simply because it worked much better. There are two models of Inkwell light pens—the 170-C and the 184-C, the latter being the most recent version. The primary difference between them is that the 170-C has a spring-loaded tip that must be phys-



The M3 Mouse, from Contriver Technology.

The 170-C and 184-C light pens, from Inkwell Systems.

Access Software's LipStick Plus.

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ically pressed against the screen when drawing, whereas the 184-C uses two buttons that activate the device without coming in contact with the screen. Both have a long (5-foot) cable that plugs into a joystick port, and both are lightweight, which makes it easy to hold them to the screen for extended periods of time.

Disk-based software and a comprehensive 19-page users guide accompany both models. The documentation is helpful and complete, and the C-64 mode software includes a menu that demonstrates the pen as an input device for a sound synthesizer, piano, memory game and screen-location program. Furthermore, the programs are written in Basic, allowing for easy examination by those who want to learn the art of programming light pens.

By gently pressing on either of the 184-C's buttons while aiming the pen at a light-pen-compatible program running on the monitor, a signal is sent to the computer. That signal, in turn, is used to trigger an action or reaction, just like a joystick or mouse. The process is similar on the 170-C, except that the spring-loaded tip is pressed against, rather than merely aimed at, the screen.

The light pen readily lends itself to Flexidraw, a popular graphics program also offered by Inkwell Systems. Artists who traditionally use either pen or brush might not feel comfortable using a mouse for drawing, but they're more likely to feel right at home drawing on the screen using these light pens. Both models work well enough that even non-artist types can enjoy and benefit from using them.

Voice Input for Gamers

Originally packaged with Access Software's Echelon game, the **LipStik Plus** is a headset and mouthpiece that serves as a fire-button for use with a joystick. A connector runs from the mouthpiece to either joystick port, and the joystick plugs into the connector.

I don't consider the LipStik particularly beneficial, since it serves a limited purpose and is uncomfortably tight to wear—not to mention the fact that most folks look pretty silly wearing a headset and yelling "Fire! Fire! Fire!" As Lou Wallace discovered when reviewing Echelon for *RUN*, an office setting is not a good LipStik Plus testing ground if you want to preserve your dignity. It's best used in a situation where no one can observe you.

Tim's Wish List

I've used a variety of input devices on Commodores, and, frankly, the proportional mouse remains my favorite. I would like to see it more widely accepted in the Commodore community, where it could help extend the life of the C-64 and C-128 and make the computing environment more user-friendly, especially for beginners. Software manufacturers have expressed a willingness to create more mouse-supported programs, so we users just need to let them know we want more. Meanwhile, the joystick remains the input device required by most entertainment software, and some excellent joysticks are available at reasonable prices. I don't see much improvement needed there.

I would like to see some brand-new input devices for the Commodore market. With both the size of the market and its demand for good-quality, innovative products, manufacturers willing to offer new products would probably be rewarded. Let's see what 1989 brings! ■

Tim Walsh, RUN's technical editor, spent hours preparing this article. He hopes readers will believe that it wasn't all just fun and games.

Table 1. Distributors and prices.

Starmaster, Ace, Mazemaster joysticks
Kraft Systems
450 W. California Ave.
Vista, CA 92083
$6.95, $5.95, $9.95, respectively

Hot Stuff joystick
Beeshu, Inc.
101 Wilton Ave.
Middlesex, NJ 08846
$11.99

Freedom Stick joystick
Camerica Ltd.
230 Fifth Ave., Suite 1100
New York, NY 10001
$69.95

IconTroller joystick
Suncom, Inc.
260 Holbrook Drive
Wheeling, IL 60090
$19.99

PowerPlayers joystick
Mindscape, Inc.
3444 Dundee Rd.
Northbrook, IL 60062
$29.95

Ergostick joystick
WICO Corp.
6400 Gross Point Rd.
Niles, IL 60648
$24.95

1351 Mouse
Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
$49.95

M3 Mouse
Contriver Technology, Inc.
18325A Valley Blvd.
La Puente, CA 91744
$79.99

170-C, 184-C light pens
Inkwell Systems
5710 Ruffin Rd.
San Diego, CA 92123
$99.95, $59.95, respectively

The LipStik Plus
Access Software, Inc.
545 W. 550 South, Suite 130
Bountiful, UT 84010
$24.95

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Computerized News: Television Takes the Plunge

By JAN GEORGE FRAJKOR

It has always struck me as ironic that television, an electronic medium, has been one of the last media to go all electronic.

When I worked as a television reporter over a dozen years ago, I had occasion to research the use of computers in the writing, layout and production of newspapers and magazines—and then I went back to the newsroom and pounded out my voice-over script on a manual typewriter!

And where did we first see the powerful graphics capabilities of small computers employed? You guessed it—desktop publishing.

There are several reasons why computerization is overtaking television newsrooms so late in the game, but the main one—expense—can now be overcome.

A Low-Cost Alternative

Here at the Carleton University School of Journalism, we don't have the kind of money major commercial newsrooms spend on powerful integrated computer systems such as Newstar, Basys and R-News. But we know we can't teach modern television journalism without giving students a chance to work with some form of computer system. That's why we equipped our television newsroom with a mini-network of eight C-64s, three disk drives, two printers and software—all for less than $12,000 Canadian (about $9000 U.S.).

We determined early on that we couldn't have everything, so we decided we'd install at least a word processing and printing system, a database to keep track of news sources and stories, a graphics program and, if possible, a terminal program for remote access.

Since we report, videotape and write all our own stories, we don't need a system to accept and edit wire-service news. And since we were already using a 40-character line for writing our news scripts, the 40-character screen of the C-64 is no disadvantage. It is, in fact, an advantage. We've found that a person can read four lines in ten seconds, so we can count the lines on the screen to get a good idea of how long the script is.

We knew the system had to be simple, because there are always some students who have absolutely no knowledge of computers. The system had to help them learn television journalism, not get in their way. We settled on a Microshare time-sharing network server, which cost $1000 and was our single most expensive piece of equipment. We bought the entire system from Comspec Communications, Inc., of Toronto, rather than shopping for parts, because we thought it best to deal with one supplier. It was a good decision.

The Hardware

The eight C-64s plug into the Microshare with cables from their serial ports, in what amounts to a star-type network, with everything radiating from the Microshare. It continuously polls the computers, checking to see which one needs service, whether it's loading something from a drive, saving to another drive or seeking to print.

The Microshare plugs into three drives—two SFD-1001s (1.2 megabytes each) for storing written news and data and an MSD2 dual drive (354K) for programs and administration. The Microshare addresses the drives through an IEEE-488 port, as on the older PETs, so it's much faster than using Commodore 1541s.

The Microshare also connects to a 64K printer buffer, made by Comspec, which in turn connects via a Centronics port to one Epson FX-85 printer. Our technical shop rigged up a switch to connect one more printer to one of the Commodores through an old Cardco/?A interface.

Our monitors are Goldstar 13-inch monochrome television sets, with monitor switches at the back for direct audio-video feed. They cost about $80 each and have amazingly good displays.

How the System Works

A student who's been out shooting a television story comes back to the newsroom, loads a word processor into her C-64 from one of the drives and then loads in a sample story. The sample contains examples of all the production directions the story will need to get on the air—things such as videotape cues in and cues out, along with instructions on when to put up captions, superimpose text on the screen or put up graphics.

The student simply overwrites the sample story with her own information, erases what needs to be erased and changes whatever needs to be changed. It's almost like filling in blanks.

The student then makes one test print on cheap newsprint just to give the desk editors something to look at and to make sure the format is correct. If all is well, the student saves the story to the SFD drives and leaves to edit the videotape, record the voice-over and have graphics made up.

Meanwhile, the desk editors load a sample "runsheet" into a C-64 and start entering the slugs (names) of the stories into it. A runsheet is a capsule summary of all the information the desk, studio and control room need, including the names of the stories, the lengths of the leads, whether they are videotaped stories or plain scripts with graphics, and anything else that might affect production.

The lineup editors can change the order of the stories in the newscast by erasing the paragraph on the runsheet containing the information about that story, moving the cursor up or down, and reinserting the story at a new location.

Around deadline time, which is 4:30 PM for a 6 PM newscast, the lineup editors print out six copies of the runsheet, us-

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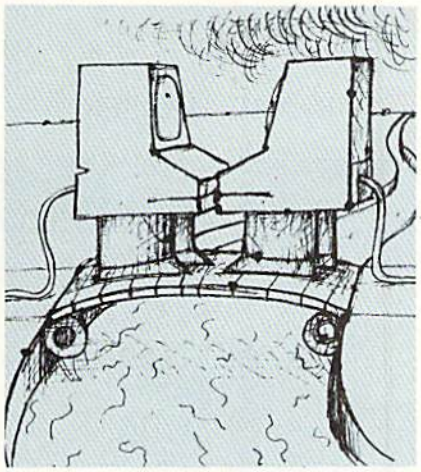
Computers are finally taking hold in television newsrooms, and Ottawa's Carleton University is prepared.



ing two printers with three-copy carbonless paper in each one. They then load the individual news scripts into one of the C-64s, in the order in which the run-sheet dictates. This becomes one long file, called News/(year)/(month)/(day), almost filling the internal memory of a C-64, but so far we haven't had any crashes, and we can always break the file in two if necessary.

The newscast file is sent to two printers, so we get six copies of a 25- or 30-page newscast in about seven minutes. We print one set in Near-Letter Quality mode for the news and sports readers and the director, and one set for the audio, video and studio crews at the full draft-quality speed of 160 characters per second. The printer buffer has a pause button so we can stop printing to clear paper jams or mechanical problems, and it has a copy button so we can reprint everything in its memory.

The source file, which we are just beginning to build up, is a database containing the names, telephone numbers, addresses, job titles and other important particulars of the people with whom we deal regularly. In our case, this includes the heads of academic departments, sports coaches and stars, campus union leaders and the contact people for important campus organizations.

Students are encouraged to get all the source file information, but they aren't allowed to enter it into the database themselves. Only teaching assistants and instructors can do that, lest an accident destroy the file.

Using the C-64

We're just starting to generate simple graphs and charts with the C-64s. Since the C-64s can't "genlock," meaning we can't plug it into an on-air show or use it directly as a text or graphics generator, we're fiddling with the output so that we can videotape it directly and then edit the tape segments into our stories. The fiddling is necessary because, while the video output of a C-64 is supposed to be standard NTSC composite video, this isn't quite the case. The signals are off just enough to make this a risky operation, but working with the programs gives students a taste of the electronic generation of graphics and gets them to think about using graphics as an integral part of their stories.

We'd prefer a more professional-quality system, but I don't think you can surpass the C-64 for cost-effectiveness. Cinequip, a professional video supplier in Toronto, has even written a teleprompter program for the Commodore so that news and sports readers can see their texts directly on a video screen in front of the cameras. This isn't for amateur use—it's intended to be used by commercial stations—but we'll probably go for it in the long run.

Nagging Problems

We've had no real problems with the Microshare or its buffer. The C-64s also have been reliable. The old problem of power supplies overheating crops up occasionally, but it's much better now that Commodore is using 8.5-watt supplies made in Taiwan instead of the 7.5-watt ones from Singapore.

The MSD2 drive is a workhorse. We needed it because most software comes on 1541-type disks, and we can transfer them easily to the SFD-1001s because the MSD has an IEEE port as well as a serial port. MSD is no longer making Commodore drives, but the people there have been very cooperative with advice and support and will sell you technical specs and manuals if you want your own technicians to fix the drives.

The Epson printers are reliable and fast, but the paper handling is a nuisance. I wouldn't put up with it if it weren't for Epson's support and the printers' other virtues.

The one real problem spot is the SFD-1001 drives. One was flaky when we bought it: It never passed its own self-tests—or passed them seemingly at random. It finally stopped working completely. We accidentally destroyed the other drive, but it wasn't working well at the time anyway. To be fair, they're working quite reliably now, and Comspec has been generously supportive.

Commodore, however, has washed its hands of these machines, so Commodore dealers won't fix them and Commodore itself won't honor any guarantee. Only Progressive Peripherals of America has specs and manuals for the drives, and it refuses to sell them to anyone. Progressive Peripherals will repair the drives if you ship them to Denver, Colorado. But let's face it, when I have a deadline in Ottawa, Canada, it's not much comfort knowing that repairs are available only in Denver.

In retrospect, we probably should have snatched up some of the Commodore 8250s or 8050s while they were available. They're also out of production, but Commodore still stands by them and fixes them.

We have been very pleased with our little newsroom network, and the C-64s have been a reliable, versatile part of the system. ■

Jan George Frajkor teaches television journalism at Carleton University in Ottawa, Ontario.

www.Commodore.ca
Illustrated by Marcel Albrecht

Address, Please?

Use a mouse or a joystick to access this handy point-and-click address book.

By NEIL HANSEN

Address Book 128 is an easy-to-use, graphics-oriented program that's operated with a joystick or a 1351 mouse, so there's no need to learn and type in commands. Just move the pointer on the screen with the mouse or joystick and press the button to activate the program functions. Names and addresses are kept in alphabetical order, with room for up to 100 names under each letter of the alphabet, and the entries can be printed out on envelope labels.

Start by typing in the program in Listing 1, which contains sprite data that Address Book 128 needs. Then save it to a blank disk and run it. Next, type in the main program (Listing 2) and save it to disk.

Program Functions

When you run Address Book 128, it first asks for your mode of input. Press 1 for a joystick and 2 for the 1351 mouse. After you make your selection, the screen goes blank for six seconds while the program is being set up. Note that the program takes full advantage of the mouse's Proportional mode.

The next display features a large rectangle on the left and a narrow rectangle on the right that contains the letters of the alphabet. Within the big rectangle, you see the following categories: Last Name, First, Middle, Address, State, Zip, Miscellaneous and Phone. At the bottom, there's an imitation page-fold and four boxes with the words Quit, Delete, Print and Save in them. The pointer rests in the center of the big rectangle, and the letter A appears in the upper-left corner, indicating that you're in the file for names beginning with A.

To enter the file for a different initial letter, move the pointer to the alphabet rectangle, place it on the letter you want to load and press the button. The new letter replaces the A in the upper-left corner of the big rectangle, showing the file you are currently in.

When you want to enter information on a person, move the pointer to Last Name and start typing. When you're finished, press return.

You can flip through your address book by moving the pointer to the lower-left corner of the screen, where there's a small square divided into two triangles by a diagonal, making it appear as though the corner of the page had been folded up. To flip to the next card, move the pointer to the upper-right triangle and press the button; to flip backward, point on the lower-left triangle and press the button.

You can delete outdated cards by moving the pointer to the box that says Delete. But watch out! Deletion is permanent; you won't be able to get your card back.

To print out a card as an address label, make sure your printer is on and then move the pointer to the Print box.

If you want to save the names you've added to a letter file, move the pointer to the Save box and press the button. Be sure not to press another letter before you've saved your current additions, or the additions will be lost!

When you insert a new record into Address Book 128, you may encounter a small problem if you press the mouse button before it reaches the "Last Name" field. If the screen pointer turns red and will not move above any particular field, just press the return key, and the pointer will turn black. You can then use the mouse to position the cursor wherever you desire.

Leaving the program is as easy as moving the pointer to the Quit box. That's it—short and simple, but very handy! R

Neil Hansen, a senior in high school, has been programming on his C-128 for over two years. He also enjoys running in marathons and playing hockey. ►

RUN it right: **C-128 (in 40-Column mode); joystick or 1351 mouse**

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2400 A.D.

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As you hurry along extensive air-jet subways and slidewalks, you'll need to solve complex mazes and other intriguing puzzles. The challenges are non-stop and full of surprises.

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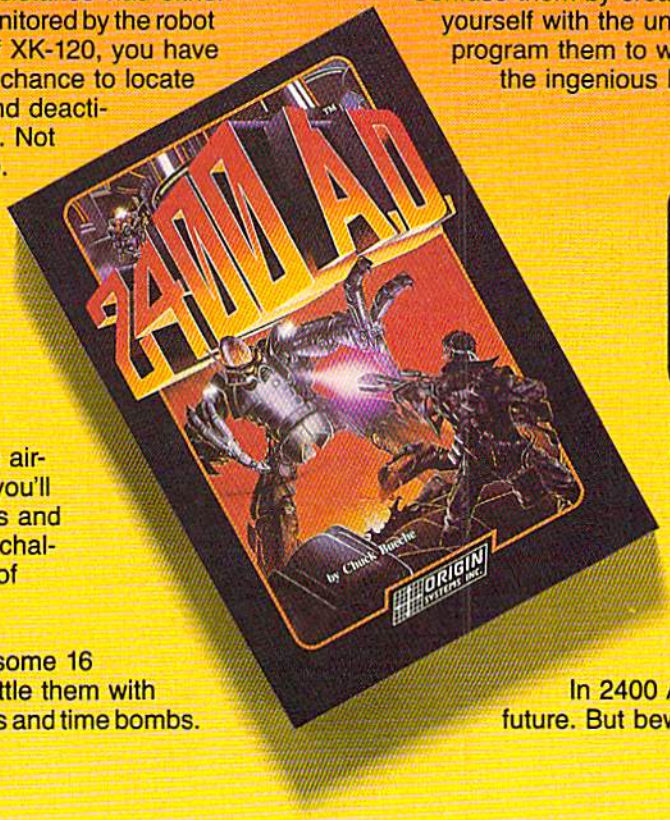

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ADDRESS, PLEASE?

Listing 1. Sprite Data program.

```
10 REM SPRITE DATA FOR ADDRESS
   BOOK 128 - NEIL HANSEN
                        :REM*105
20 COLOR0,2:COLOR 5,7:COLOR4,15
   :PRINT"{SHFT CLR}":CHAR1,12,
   11,"MAKING SPRITES"  :REM*77
30 FOR I=3584TO3648:READA:POKEI
   ,A:NEXTI             :REM*41
40 RESTORE:FORI=3648TO3712:READ
   A:POKEI,A:NEXTI      :REM*180
50 SCRATCH"AD.SPR"      :REM*9
60 BSAVE"AD.SPR",B0,P3584TOP409
   6                    :REM*163
70 DATA 248,0,0,240,0,0,248,0,0
                        :REM*153
80 DATA 220,0,0,142,0,0,7,0,0
                        :REM*110
90 DATA 3,0,0,0,0,0,0,0,0
                        :REM*156
100 DATA 0,0,0,0,0,0,0,0,0
                        :REM*152
110 DATA 0,0,0,0,0,0,0,0,0
                        :REM*142
120 DATA 0,0,0,0,0,0,0,0,0
                        :REM*132
130 DATA 0,0,0,0,0,0,0,0,0,0,0,0
                        :REM*75
```

Listing 2. Address Book 128 program.

```
10 TRAP1390:FORI=1TO8:KEYI,"":N
   EXTI:GOSUB1590       :REM*218
20 COLOR5,2:COLOR0,15:COLOR4,7:
   SCNCLR:CHAR1,12,10,"SELECT I
   NPUT:",1:CHAR1,12,12,"1- JOY
   STICK":CHAR1,12,14,"2- 1351
   MOUSE":GETKEYA$:IFA$="1"THEN
    OJ=2:GOTO 40        :REM*252
30 CHAR1,9,16,"PLUG MOUSE IN PO
   RT 1",1:GOSUB1410:SYS6144:BA
   =DEC("0A04"):POKEBA,1OR PEEK
   (BA):OJ=1:GOTO50     :REM*20
40 CHAR1,7,16,"PLUG JOYSTICK IN
    PORT 2",1:SLEEP4    :REM*113
50 FAST:BLOAD"AD.SPR",B0,P3584:
   GOTO860              :REM*186
60 CHAR1,12,6,CH$+N$(1) :REM*68
70 CHAR1,8,8,CH$+N$(2) :REM*236
80 CHAR1,30,8,CH$+N$(3):REM*132
90 CHAR1,7,10,CH$+N$(4):REM*184
100 CHAR1,7,12,CH$+N$(5)
                        :REM*224
110 CHAR1,29,12,CH$+N$(6)
                        :REM*220
120 CHAR1,6,14,CH$+N$(7):REM*39
130 CHAR1,21,14,CH$+N$(8)
                        :REM*59
140 CHAR1,8,16,CH$+N$(9):RETURN
                        :REM*217
150 FOR I=1TO9:N$(I)="":NEXTI
                        :REM*13
160 FORI=1TO9:N$(I)=M$(I):NEXTI
    :GOTO60             :REM*75
170 N$="":FOR I=1TOW(Z)+1:N$=N$
    +" ":NEXTI          :REM*184
180 CHAR1,X3(Z)-1,Y(Z),N$:RETUR
    N                   :REM*129
190 GETB$(1):IFB$(1)<>""THEN GO
    SUB 490             :REM*104
200 IF OJ=1 THEN 210:ELSE 220
                        :REM*216
210 IF JOY(1)<>0 THEN 340
                        :REM*253
220 J%=JOY(OJ):IF J%>8 THEN 340
                        :REM*214
230 IF J%=0 THEN 190    :REM*235
240 ON J% GOSUB 260,270,280,290
    ,300,310,320,330    :REM*230
250 MOVSPR1,X1,Y1:GOTO190
                        :REM*201
260 Y1=Y1-8:RETURN      :REM*148
270 X1=X1+8:Y1=Y1-8:RETURN
                        :REM*171
280 X1=X1+8:RETURN      :REM*157
290 X1=X1+8:Y1=Y1+8:RETURN
                        :REM*173
300 Y1=Y1+8:RETURN      :REM*186
310 X1=X1-8:Y1=Y1+8:RETURN
                        :REM*139
320 X1=X1-8:RETURN      :REM*175
330 X1=X1-8:Y1=Y1-8:RETURN
                        :REM*233
340 RS=RSPPOS(1,0):IF RS>=288 T
    HEN 1190            :REM*73
350 IF RSPPOS(1,1)<192THEN 190
                        :REM*119
360 IF RS<=56THEN410    :REM*131
370 IF RS<=118 THEN GRAPHIC0,1:
    END                 :REM*220
380 IF RS<=120THEN450   :REM*70
390 IF RS<=176THEN1300  :REM*233
400 IF RS<=224THEN1320:ELSE 133
    0                   :REM*16
410 IF RS<=36THEN 440   :REM*207
420 IF RS<=40 THEN 430:ELSE450
                        :REM*30
430 IF RSPPOS(1,1)<=208 THEN 45
    0:ELSE440           :REM*242
440 C=C-1:IFC<=0 THEN C=1:GOTO1
    90:ELSE1270         :REM*195
450 C=C+1:IFC>=100 THEN NT=100:
    C=100:GOTO190       :REM*195
460 IF C>NT THEN NT=C   :REM*65
470 IF A$(1,C-1)="" THEN C=C-1:
    GOTO190             :REM*44
480 GOTO1270            :REM*40
490 RS=RSPPOS(1,0)      :REM*53
500 P=INSTR(NU$,B$(1)):IF P<>0
    THEN RETURN         :REM*26
510 IF RS>270 THEN RETURN
                        :REM*160
520 IF RSPPOS(1,1)>184THEN RETU
    RN                  :REM*146
530 II=0:FORI=106TO192STEP16:II
    =II+1:IFI=>RSPPOS(1,1)THEN
    GOTO 540:ELSENEXTI:RETURN
                        :REM*241
540 ON II GOTO 550,560,590,600,
    620,640             :REM*38
550 Z=1:GOTO650         :REM*79
560 IFRS<208THENZ=2:GOTO650
                        :REM*208
570 IF B$(1)=CHR$(13) THEN B$(1
    )=" "               :REM*64
580 CHAR1,30,8,CHR$(14)+B$(1):A
    $(3,C)=B$(1):MOVSPR1,80,136
    :RETURN             :REM*34
590 Z=4:GOTO650         :REM*120
600 IF RS<208 THEN Z=5:ELSEZ=6
                        :REM*242
610 GOTO650             :REM*178
620 IF RS<144 THEN Z=7:ELSEZ=8
                        :REM*50
630 GOTO650             :REM*206
640 Z=9                 :REM*237
650 IF A$(Z,C)<>"" THEN GOSUB 1
    70                  :REM*73
660 IF B$(1)=CHR$(13) THEN A$(Z
    ,C)=" ":GOTO850     :REM*38
670 N$="":CHAR1,X3(Z)-1,Y(Z),CH
    R$(14)+B$(1):Y1=RSPPOS(1,1)
    :X1=X2(Z):N$=B$:W=W(Z)+1:TT
    =1:X=X3(Z)          :REM*60
680 MOVSPR2,X1,Y1:SPRITE2,1,3:S
    PRITE1,0:FORI=2TOW  :REM*148
690 GETB$(I)            :REM*65
700 IF B$(I)=""THEN 690 :REM*82
710 P=INSTR(NU$,B$(I)):IF P<>0
    THEN I=I-1:NEXTI    :REM*59
720 IF B$(I)=CHR$(20) THEN I=I-
    1:X=X-1:ELSEGOTO750 :REM*5
730 IF I<=0 THEN I=0:TT=1:X=X3(
    Z)-1:X1=X2(Z)-8:GOTO760:ELS
    ECHAR1,X,Y(Z)," ":I=I-1:X1=
    X1-8:MOVSPR2,X1,Y1:IFI<0THE
    NI=1                :REM*27
740 TT=TT-1:GOTO760     :REM*135
750 IF B$(I)=CHR$(13) THEN 840:
    ELSEX1=X1+8:CHAR1,X,Y(Z),CH
    R$(14)+B$(I):MOVSPR2,X1,Y1:
    X=X+1:TT=TT+1       :REM*25
760 NEXTI               :REM*8
770 W1=W+X3(Z)-1:TT=TT+1:T=1
                        :REM*192
780 GETKEYQ$:IF Q$=CHR$(13) THE
    NTT=TT-1:GOTO 840   :REM*65
790 IF TT<>1 THEN 810   :REM*128
800 GETKEYB$(1):IFB$(1)=CHR$(20
    )THEN 790:ELSE 650  :REM*31
810 IF Q$=CHR$(20) THEN X=X-1:T
    T=TT-1:CHAR1,X,Y(Z)," ":X1=
    X1-8:MOVSPR2,X1,Y1:T=0:GOTO
    780                 :REM*19
820 IF T=0 THEN CHAR1,X,Y(Z),CH
    $+Q$:B$(TT)=Q$:X=X+1:X1=X1+
    8:TT=TT+1:MOVSPR1,X1,Y1:IF
    X>=W1 THEN T=1      :REM*200
830 GOTO780             :REM*152
840 SPRITE2,0:FOR U=1 TO TT:N$=
    N$+B$(U):NEXTU:A$(Z,C)=N$:I
    FRQ=1 THEN RQ=0:RETURN
                        :REM*196 ►
```

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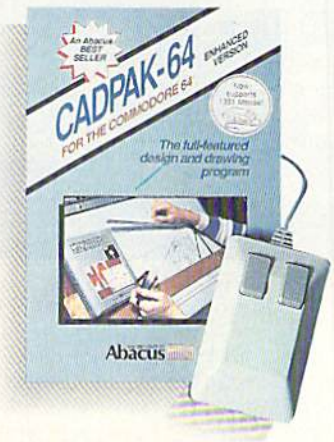

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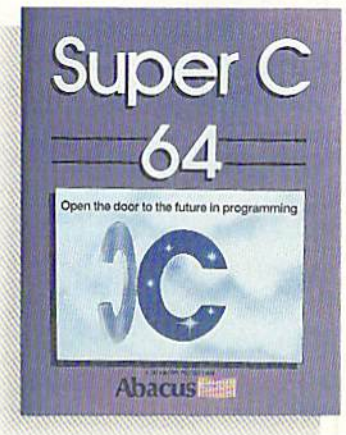

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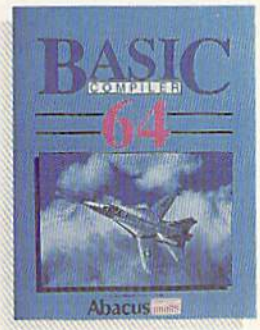

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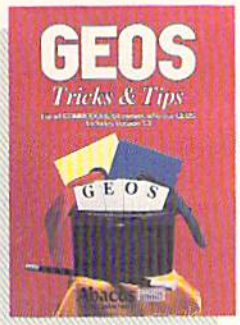

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```
85Ø MOVSPR1,X4(Z),Y1+V(Z):SPRITE1,1,1:X1=X4(Z):Y1=Y1+V(Z):RETURN :REM*122
86Ø DIM B$(3Ø),A$(1Ø,1Ø6) :REM*214
87Ø A(1)=19:A(2)=14:A(3)=1:A(4)=24:A(5)=15:A(6)=2:A(7)=8:A(8)=1Ø:A(9)=23 :REM*51
88Ø X3(1)=13:X3(2)=9:X3(4)=8:X3(5)=8:X3(6)=3Ø:X3(7)=7:X3(8)=22:X3(9)=9 :REM*21Ø
89Ø X2(1)=128:X2(2)=96:X2(4)=88:X2(5)=88:X2(6)=262:X2(7)=8Ø:X2(8)=2ØØ:X2(9)=96 :REM*117
9ØØ X4(1)=88:X4(2)=264:X4(4)=8Ø:X4(5)=256:X4(6)=72:X4(7)=192:X4(8)=88:X4(9)=88:REM*93
91Ø Y(1)=6:Y(2)=8:Y(4)=1Ø:Y(5)=12:Y(6)=12:Y(7)=14:Y(8)=14:Y(9)=16 :REM*1Ø6
92Ø W(1)=18:W(2)=13:W(4)=23:W(5)=14:W(6)=1:W(7)=7:W(8)=9:W(9)=22 :REM*149
93Ø V(1)=16:V(2)=Ø:V(4)=16:V(5)=Ø:V(6)=16:V(7)=Ø:V(8)=16:V(9)=16 :REM*247
94Ø FORI=1TO9:FORT=1TOA(I):M$(I)=M$(I)+" ":NEXTT:NEXTI :REM*1Ø6
95Ø COLOR1,1:COLORØ,15:GRAPHIC1,1 :REM*223
96Ø T=65:FOR I=6TO18:CHAR1,34,I,CHR$(14)+CHR$(T)+"{2 SPACEs}"+CHR$(T+1):T=T+2:NEXTI :REM*61
97Ø CHAR1,34,19,"{6 SPACEs}",1 :REM*165
98Ø FORI=7 TO 18:CHAR1,39,I," ",1:NEXTI:COLOR1,2 :REM*2Ø1
99Ø CHAR1,2,6,CH$+"{SHFT L}AST NAME:" :REM*139
1ØØØ CHAR1,2,8,CH$+"{SHFT F}IRST:" :REM*192
1Ø1Ø CHAR1,2,1Ø,CH$+"{SHFT A}DDR:" :REM*75
1Ø2Ø CHAR1,2,12,CH$+"{SHFT C}ITY:" :REM*91
1Ø3Ø CHAR1,2,14,CH$+"{SHFT Z}IP:" :REM*11
1Ø4Ø CHAR1,2,16,CH$+"{SHFT P}HONE:" :REM*4Ø
1Ø5Ø CHAR1,23,8,CH$+"{SHFT M}IDDLE:" :REM*76
1Ø6Ø CHAR1,23,12,CH$+"{SHFT S}TATE:" :REM*16
1Ø7Ø CHAR1,15,14,CH$+"{SHFT M}ISC.:" :REM*252
1Ø8Ø BOX1,264,48,311,151:DRAW1,288,48TO288,151 :REM*237
1Ø9Ø FORI=48 TO 151STEP8:DRAW1,264,ITO311,I:NEXTI:REM*12Ø
11ØØ BOX1,63,61,179,73:BOX1,238,61,249,73 :REM*197
111Ø BOX1,55,77,249,89:BOX1,63,125,249,137:BOX1,95,45,249,57 :REM*155
112Ø BOX1,55,93,179,1Ø5:BOX1,23Ø,93,249,1Ø5 :REM*7
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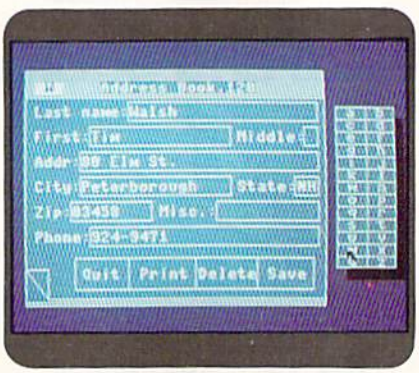

Address Book 128's main screen.

```
113Ø BOX1,47,1Ø9,114,121:BOX1,167,1Ø9,249,121 :REM*31
114Ø FORI=26TO42STEP2:DRAW1,8,ITO255,I:NEXTI :REM*186
115Ø CHAR1,7,19,CH$+"{SHFT Q}UIT{2 SPACEs}{SHFT P}RINT {SHFT D}ELETE {SHFT S}AVE" :REM*75
116Ø CHAR1,9,4,CH$+"{SHFT A}DDRESS {SHFT B}OOK.128":E=1:BOX1,95,145,245,165:BOX1,15Ø,145,2ØØ,165:BOX1,5Ø,145,95,165 :REM*49
117Ø BOX1,8,24,255,175:DRAW1,8,173TO255,173:DRAW1,27,171TO255,171:DRAW1,27,152TO27,171:DRAW1,8,152TO27,152:DRAW1,8,152TO27,171:COLOR1,7:PAINT1,Ø,Ø :REM*183
118Ø SPRITE1,1,1:X1=16Ø:Y1=X1:MOVSPR1,X1,Y1:SLOW:GOTO123Ø :REM*184
119Ø T=Ø:FORI=1Ø4TO2ØØSTEP8:T=T+1:IFI=>RSPPOS(1,1)THEN12Ø:ELSENEXTI:GOTO19Ø :REM*221
12ØØ IF RSPPOS(1,Ø)>=312 THEN 122Ø :REM*2Ø
121Ø U=T-1:E=T+U:GOTO123Ø :REM*241
122Ø E=T+T :REM*19Ø
123Ø COLOR1,2:BE=E+64:CHAR1,2,4," "+CHR$(BE)+" ",1:N$="AD."+CHR$(BE) :REM*149
124Ø FAST:FORI=1TO NT:FORT=1TO9:A$(T,I)="":NEXTT:NEXTI:NT=Ø:SLOW :REM*21
125Ø OPEN1,8,3,N$+",S":INPUT#1,NT :REM*239
126Ø FORI=1TONT:FORT=1TO9:INPUT#1,A$(T,I):NEXTT:NEXTI:CLOSE1:DCLEAR:C=1 :REM*62
127Ø GOSUB 15Ø :FORI=1TO9:N$(I)="":NEXTI :REM*93
128Ø FOR I=1 TO 9:N$(I)=A$(I,C):NEXTI:GOSUB6Ø:SLOW:GOTO19Ø :REM*216
129Ø GOTO19Ø :REM*1Ø3
13ØØ OPEN4,4,7:PRINT#4:PRINT#4,A$(2,C)+" "+A$(3,C)+" "+A$(1,C) :REM*173
```

```
131Ø PRINT#4,A$(4,C):PRINT#4,A$(5,C)+","+A$(6,C):PRINT#4,A$(7,C):PRINT#4:CLOSE4:GOTO19Ø :REM*238
132Ø FAST:FOR I=CTONT:FORT=1TO9:A$(T,I)=A$(T,I+1):NEXTT:NEXTI:NT=NT-1:SLOW:GOTO127Ø :REM*19Ø
133Ø IF A$(1,1)=""THEN19Ø :REM*23
134Ø N$="AD."+CHR$(BE):SCRATCH(N$) :REM*62
135Ø OPEN1,8,3,N$+",S,W":PRINT#1,NT :REM*151
136Ø FORI=1TONT:FORT=1TO9 :REM*185
137Ø IF A$(T,I)="" THEN A$(T,I)=" " :REM*24Ø
138Ø PRINT#1,A$(T,I):NEXTT:NEXTI:CLOSE1:DCLEAR:GOTO19Ø :REM*82
139Ø IF ER=5 THEN GRAPHICØ,1:CHAR1,11,11,"TURN ON PRINTER!":CHAR1,7,12,"PRESS (ESC) TO CONTINUE.":GETKEYA$:IF A$=CHR$(27) THEN GRAPHIC1,Ø:RESUME:ELSE139Ø:REM*127
14ØØ GRAPHICØ,Ø:END :REM*16
141Ø FORX=ØTO135:READA$:POKE6144+X,DEC(A$):NEXTX:RETURN :REM*9Ø
142Ø DATAAD,15,Ø3,C9,18,FØ,19,Ø8 :REM*91
143Ø DATA78,AD,14,Ø3,8D,FØ,18,AD :REM*112
144Ø DATA15,Ø3,8D,F1,18,A9,21,8D :REM*185
145Ø DATA14,Ø3,A9,18,8D,15,Ø3,28 :REM*4Ø
146Ø DATA6Ø,D8,AD,7E,11,DØ,33,AD :REM*22
147Ø DATA19,D4,AC,F2,18,2Ø,5D,18 :REM*1
148Ø DATA8C,F2,18,18,6D,D6,11,8D :REM*42
149Ø DATAD6,11,8A,69,ØØ,29,Ø1,4D :REM*155
15ØØ DATAE6,11,8D,E6,11,AD,1A,D4 :REM*253
151Ø DATAAC,F3,18,2Ø,5D,18,8C,F3 :REM*15Ø
152Ø DATA18,38,49,FF,6D,D7,11,8D :REM*171
153Ø DATAD7,11,6C,FØ,18,8C,F5,18 :REM*214
154Ø DATA8D,F4,18,A2,ØØ,38,ED,F5 :REM*216
155Ø DATA18,29,7F,C9,4Ø,BØ,Ø7,4A :REM*248
156Ø DATAFØ,12,AC,F4,18,6Ø,Ø9,CØ :REM*1Ø8
157Ø DATAC9,FF,FØ,Ø8,38,6A,A2,FF :REM*9
158Ø DATAAC,F4,18,6Ø,A9,ØØ,6Ø,ØØ :REM*243
159Ø CH$=CHR$(14):NU$=",:{SHFT CLR}{HOME}{CRSR UP}{CRSR DN}{CRSR LF}{CRSR RT}":RETURN :REM*96 ■
```


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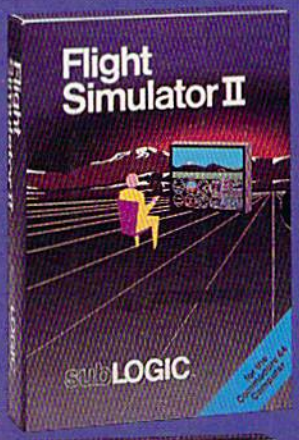

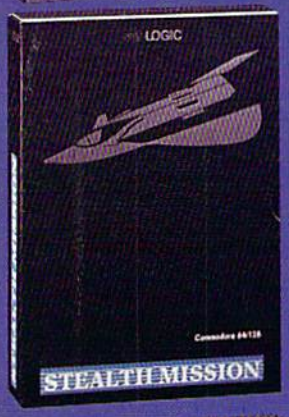

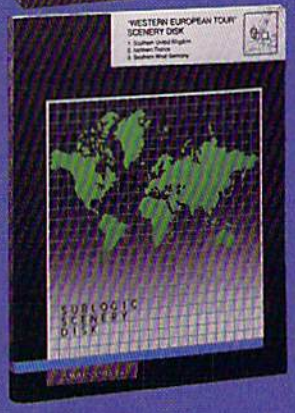

FLIGHT SIMULATOR

$49.95

Nearly 1.5 million copies of this classic, premium flight simulation program have been sold to date, and there's still nothing even close to it. Compatible with SubLOGIC Scenery Disks.

STEALTH MISSION

$49.95

Winner of the 1988 CES "Best Strategy Game" Software Showcase Award. This advanced-technology strategic simulation is a stunning success, with sales challenging those of Flight Simulator. With nothing comparable on the market (despite similar titles), Stealth Mission's programming polish and strategic gaming excellence set new industry standards. Scenery Disk compatible.

JET

$39.95

This award-winning jet fighter simulator defines the state of the art in action/combat simulation. Exciting and beautiful carrier-based sea missions complement multiple land-based combat scenarios. Jet's quick-reading documentation and easy flight controls provide unequalled action and fun. Scenery Disk compatible.

Special "Discover the World of SubLOGIC" promotional packaging:

- Jet for the Commodore 64/128 now includes a FREE beautiful Japan Scenery Disk, a $24.95 extra value!
- Jet is also available without Japan Scenery Disk for the special low "discover SubLOGIC" price of $29.95 through selected discount channels.

SCENERY DISKS

$24.95 each. For use with all SubLOGIC flight simulation products.

WESTERN EUROPEAN TOUR
Our latest and hottest! Detailed scenery covering southern Great Britain, northern France, and southern West Germany. The basis of our fun "Find Red Square" promotion.

JAPAN SCENERY DISK
Detailed scenery from Tokyo to Osaka. Delightful international adventure!

SAN FRANCISCO
Concentrated scenery covering San Francisco and the Bay area. A consistently best-selling favorite!

SCENERY DISK # 7
Eastern Seaboard. Includes: Washington, Charlotte, Jacksonville, Miami. Another best-seller!

SCENERY DISK # 11
North-Eastern Border. Includes: Detroit, Lake Huron. Incredible variety, from industrial Detroit to beautiful Niagara Falls!

See your dealer, or write or call for more information. All products are available on disk for the Commodore 64/128 computers. For direct orders please indicate which product you want, and enclose the correct amount plus $2.50 for shipping and handling ($1.50 for each additional package). Please specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club charges accepted.

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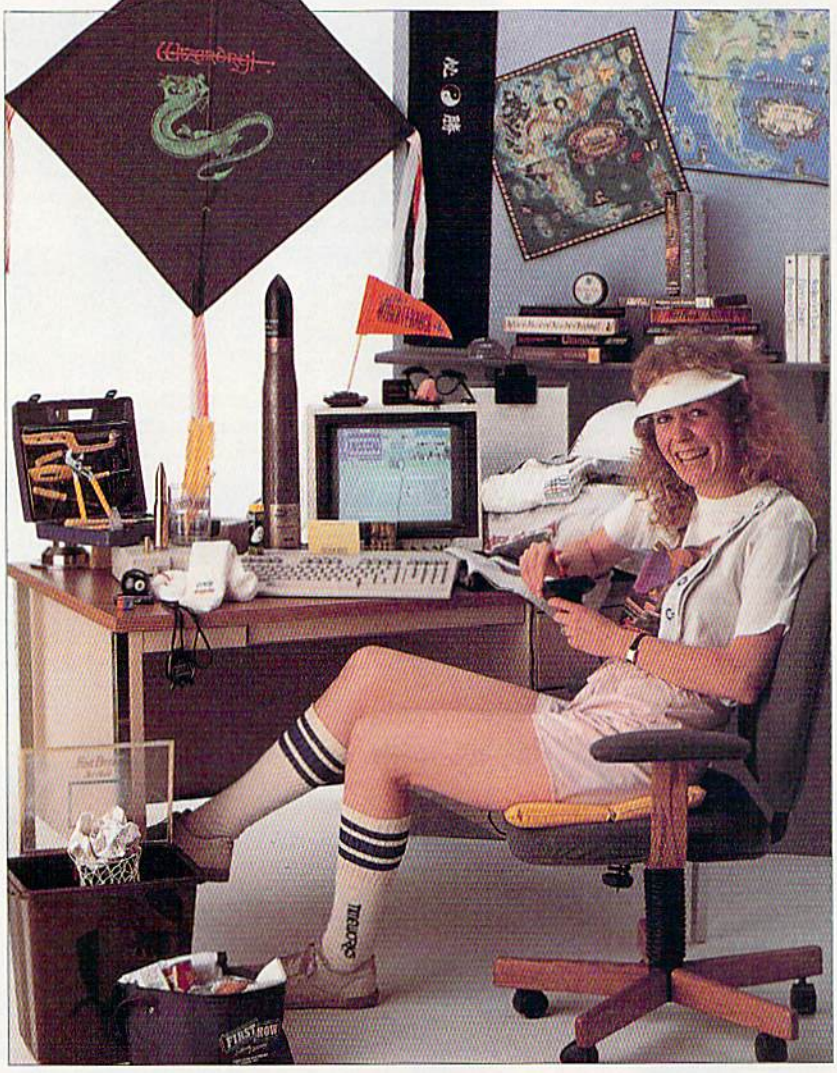
Gumballs And Alarm Clocks



You'll be amazed and amused by some of the gimmicks used to promote software introductions.

What if Robin Leach were to take his "Lifestyles of the Rich and Famous" television show into the home of a software reviewer? Well, for one thing, he'd probably have to rename it "Lifestyles of the Bleary-Eyed and Unnoted."

The introduction might start something like this: "Here we are in the home of the best-known software reviewer in the world, Meg A. Byte. Naturally, we begin in the most important area of the house—the computer room. The Commodore 64 is here, with a digital travel clock perched atop the monitor. A clipboard sits beside the keyboard, and a stopwatch rests next to the clipboard. Meg's golf cap partially obscures a coffee cup, and, right beside the desk, a large life preserver dangles from a hook."

All and all, a curious collection for a computer room! What's the story behind this miscellany? Well, Meg's unusual computer-room furnishings are all promotional materials sent to her for free by software companies. Look around ►

By LONNIE BROWN

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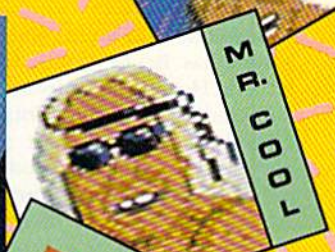
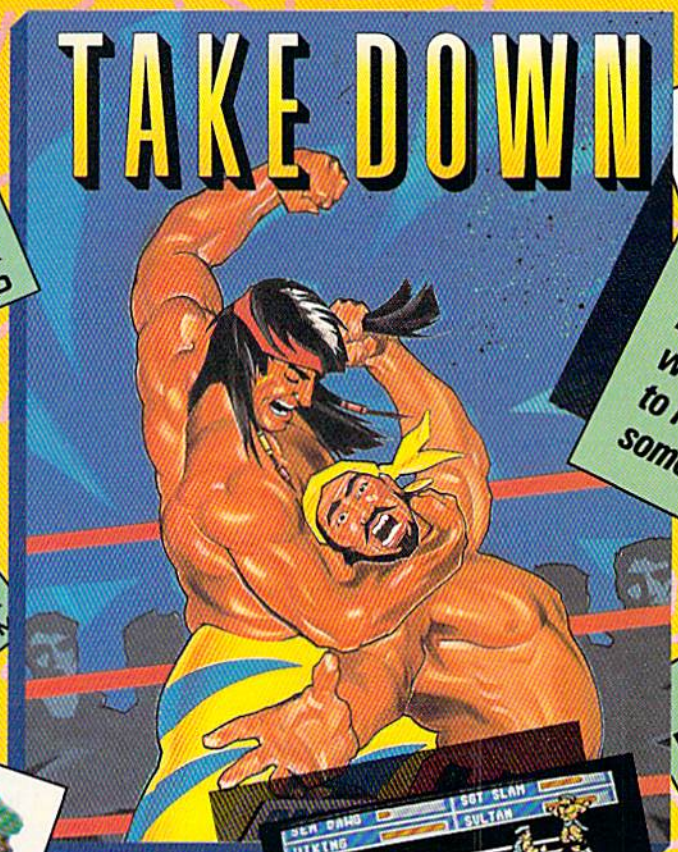
THINK YOU'RE BAD? PROVE IT.

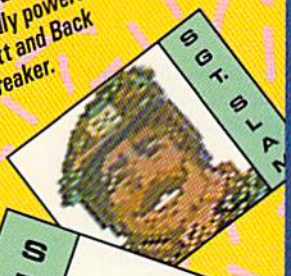
TAKE ON THE BODY-BASHING BAD BOYS OF THE GWF.

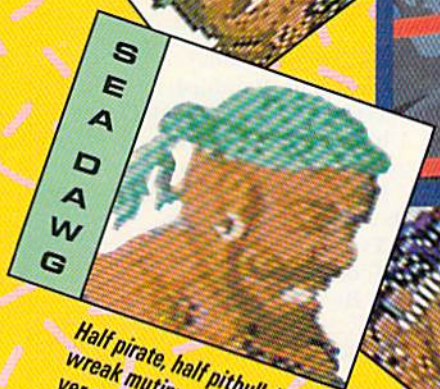
The Dark Raider of gladiators, his deadly powers include the Head Butt and Back Breaker.



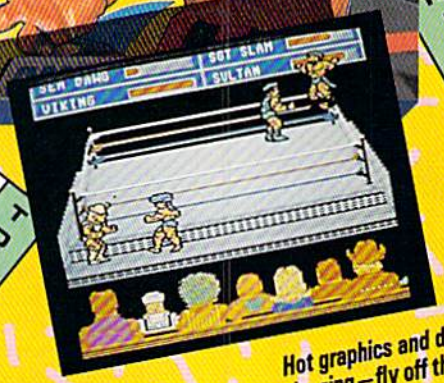


BEWARE: Eight wimp-wasting wrestlers are ready to rack you raw with some serious pain.





Half pirate, half pitbull, his Body Slams wreak mutiny on the mat! He'll feed yer carcass to the sharks with one hardy Head Slap.



The Oriental assassin with a ginsu style, his Head Throw and Drop Kick will chop you into a slab of sniveling sushi. Banzai!

Hot graphics and digitized sound put you right in the ring—fly off the top rope for a Big Splash!

GAMESTAR WRESTLING FEDERATION HIGHLIGHTS

- Intense 1- or 2-player tag team action lets you thrash computer challengers or bust up your buddies—with pain-inflicting ease!
- Each GWF maniac has his own mean set of merciless moves—Pile Drivers, Airplane Spins, Gut Busters, and more!
- Win the GWF championship belt, then strut your stuff around the ring so the chicks can check you out!

HOW TO ORDER: Visit your retailer or call 800-227-6900 for direct Visa/MasterCard orders. Direct price is $29.95 for the Commodore 64/128® version. A shipping and handling charge of $4.50 applies to all direct orders. Sales tax will be added to orders in California and Texas.

GAMESTAR

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Circle 18 on Reader Service card.

the homes or offices of computer magazine editors, reviewers, programmers or anyone who has many dealings with software companies, and you're bound to find similar artifacts.

In a sea of software, it isn't enough to send out a black, 5¼-inch floppy disk containing a program and hope that an editor or reviewer will latch on to it. Hundreds of disks with programs on them are sent out each year by software publishers. The trick is to get them some attention.

Budweiser has Spuds MacKenzie, Seagram's has Bruce Willis, IBM has the M*A*S*H gang, but software companies don't have that kind of money to spend. They'd be happy if their annual sales matched the advertising budgets of those industry leaders. Ad account executives are still glad to serve them, and where there's an ad account executive, there's a gimmick to get reviewers hooked.

Baiting the Hook

You never know what will wind up on a software reviewer's desk. A lifejacket. Stadium cushion. Duck feather. Hockey puck. (Duck feather? Did he say duck feather?) A pair of glasses with fake nose and mustache attached.

Not all gimmicks are tangible. One of the biggest extravaganzas in the industry has to be Mindscape's rock 'n' roll party each year at the summer Consumer Electronics Show. Admission is by invitation only, and the event plays to a standing-room-only crowd at a swank Chicago nightclub. It's a memorable occasion, featuring rock stars of the 50s, 60s and 70s.

Of course, the reviewers, magazine publishers, editors and advertising executives in the audience aren't going to run right out and buy a Mindscape product to show their appreciation. This is Mindscape's way of saying "thanks," but it's also done in the hope that when a reviewer hears The Beach Boys singing "California Girls," he or she will remember the party and, hence, the Mindscape disk that came in last week's mail.

Dennis Brisson, *RUN*'s editor-in-chief, lists as his favorite promotional item a beautiful silk-screen calendar depicting Mt. Fuji from, appropriately enough, the Fuji Company. "For three consecutive years, I've received a calendar from them. This year, at the risk of ruining a good thing, I wrote to the company thanking them for the calendar, but explaining that the magazine would be very unlikely to provide editorial coverage of their product in the foreseeable future. We'll see what happens next year."

Susan Dorn, former public relations contact for Progressive Peripherals and Software, baited her hooks with candy. She used to mail her press releases in a small shipping box instead of an envelope, and in each box she would include a small candy bar. "It cost a little more to send out the announcements," Dorn explained, "but it got attention. Software reviewers open boxes first and letters second. And people remembered us as the company that sent the candy."

Losing the Bait

Sometimes things don't work out quite as hoped. L. R. Shannon, who writes the peripherals and software col-

Name That Gimmick

WOULD SOFTWARE MANUFACTURERS' marketing ploys work with you? Put yourself in an editor's or reviewer's chair: match the following gimmicks with the appropriate software package.

Marketing Gimmick	Software
1. hockey puck	a. Rack 'Em (Accolade)
2. cartridge shells	b. Corruption (Rainbird)
3. backboard, net	c. Serve & Volley (Accolade)
4. black hood	d. Ultima series (Origin)
5. stadium cushion, peanuts, pennant	e. Superstar Ice Hockey (Mindscape)
6. miniature tank	f. Mavis Beacon Teaches Typing (Software Toolworks)
7. fake glasses, nose, moustache	g. Fast Break (Accolade)
8. poker chips, matchbook with note and phone number written inside	h. Murder on the Atlantic (Intracorp)
9. paper clip, wire	i. 4th & Inches (Accolade)
10. athletic socks	j. Heavy Metal (Access)
11. eight-ball, chalk, rack	k. Zak McKracken & the Alien Mindbenders (Lucasfilm)
12. tool kit	l. The Last Ninja (Mediagenic)
13. token and map	m. Steel Thunder (Accolade)

ANSWERS: 1. e; 2. j; 3. g; 4. l; 5. i; 6. m; 7. k; 8. b; 9. h; 10. c; 11. a; 12. f; 13. d.

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umn for *The New York Times*, remembers one promotional item but not the game it came with. "I got a clock from a software company, and they didn't send any instructions with it. Now, I work with about 12 people—presumably intelligent people—and it took us at least ten man-hours to get this clock set right. Please," concluded Shannon, "tell them to send the instructions, too!"

Like most other professional software reviewers, Shannon retains the disks for future comparative articles but gives away the promotional "freebies." He's parted with Transformer toys, cushions, painter's hats, notepads—and the clock. "I think somebody's still trying to figure out how it works," he quipped.

Scott Wasser, who frequently writes reviews for *RUN*'s Software Gallery, asked, "Remember the feather?" Yes, as a fellow reviewer, I was tickled by the feather, too. It (and a cigar) preceded a review copy of Mediagenic's Howard the Duck, an arcade-type game that, like the movie, never progressed far beyond the nest.

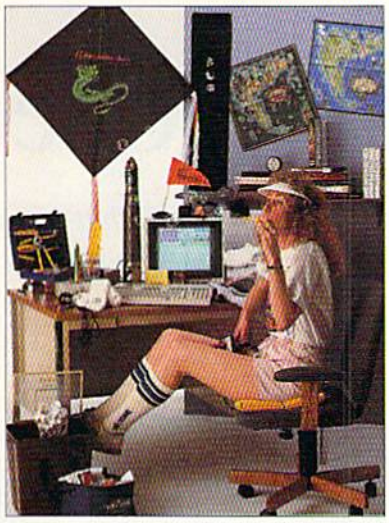
That the feather is remembered better than the product is a telling lesson about software promotions: A clever gimmick can't save a bad program. But then, most companies don't waste time or money promoting marginal software. "I figure that if a company has gone to the expense of sending along promotional items, the software must be worth a look," said Wasser.

The Better Baiter

That's exactly what Diane Orr and other account executives at Darien and Morra want to happen. From soap bubbles (packaged with Accolade's Bubble Ghost) to brightly colored gumballs (accompanying a swizzle-stick golf putter with Accolade's Mini-Putt), the goodies say, "Hey, look me over!"

Orr said her firm's promotional kits range in price from one dollar up to ten, depending on the product and how much the software company wants to spend. The number of kits they distribute also depends on the situation. "If it's a Commodore product, we'll send out lots of the kits, because we have a lot of reviewers working on Commodore products. If it's for IBM, we probably won't send as many."

Of the two Darien and Morra promotional kits that have drawn the most comment, one was inexpensive and one wasn't. "The gumballs we sent with Mini-Putt drew attention," she said, "and they didn't cost us a lot. On the other hand, when you have a custom-



More than the other gimmicks, the ever-present reminders are made to last.

ized promotional item—like the clock with Killed Until Dead—it can become a little more expensive."

Digital travel alarms are more expensive than gumballs to begin with, and, when you silk-screen the product's name on in red letters, attach fake sticks of dynamite and wrap the whole surprise in brown paper, the costs go up. "But it got a lot of attention," said Orr, who added that the reason they didn't include instructions for setting the clock was that it wouldn't have done most recipients any good. "The company that procured the clocks for us got them at a good price, partly because the instructions were all in Japanese."

What's in the Bait Bucket?

The little extras reviewers find in the mail sort out into three categories: the teasers, the clothing and the ever-present reminders. A teaser might be the ripped and scuffed left-handed racing glove that arrives in the mail with a note saying the glove's last wearer had a thrilling time. A few days later, a right-handed racing glove arrives—accompanied by the new car-racing program, Formula One.

The clothing includes the pair of surfer shorts Electronic Arts sent to promote its Skate or Die skateboard game. Sega's Out Run race-car game came with a baseball cap, and Commodore—accused of not giving good support to editors—mailed out a set of suspenders one Christmas. Then, of course, there are the myriad posters and T-shirts—emblazoned with the name and logo of the software developer or the game.

More than the other gimmicks, the ever-present reminders are made to last. "We don't want these to wind up in the closet or in the trash," said one public relations worker. "We want them to find their way into the everyday life of a writer or reviewer. Every time he or she looks at it, we want that person to think of our product and ask, 'Did I do that review yet?' " The clock with Killed Until Dead, the lifejacket with Apollo 18, the clipboard with Test Drive are all items that can't disappear into a stack of software. They stay out as reminders.

Then there are the gimmicks packaged with the software. Origin, for example, takes great pains to include cloth maps with the fantasy role-playing Ultima series. These maps are functional—to help guide the player through the game—but they also make excellent wall decorations.

Shrewd consumer that you are, you're probably asking, "Why don't these software companies knock off the $10 freebies and drop the price of their disks a few bucks?" Shrewd marketing consultants have the answer. For one thing, for each promotional kit sent out, a software company will sell thousands of disks, so the kit adds only a cent or two to production costs. Secondly, if a promotional kit gets a reviewer to boot up the disk, and if the review winds up in *RUN*'s Software Gallery, the kit has more than paid for itself. A favorable review—or any review at all, for that matter—frequently translates into increased sales.

Do promotional gimmicks work? Oh, yes! As one advertising executive said: "I know half of them work. The trouble is, I don't know which half." ■

Lonnie Brown writes a computer column for a newspaper in Florida, is a regular contributor to RUN *and has a computer room that's filling fast.*

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Chummy Checkers

A new twist to an old game that you can play on your own or with another.

By TONY BRANTNER

Bet you haven't played checkers for a long time—or maybe you've never even learned. My computer version is designed to change all that by breathing life into the old game.

If you're unfamiliar with checkers, the board is divided into eight rows of eight squares each—just like a chessboard. The two players must try to clear each other's pieces from the board or hem the pieces in so they can't be moved. In my version, you can play against another person or the computer, and you can also watch the computer play itself. When people play, a single joystick plugged into port 2 controls both sides.

Type in Listing 1, using *RUN*'s Checksum program, and save a copy to disk before running it. When you start the game, you must first enter the number of people playing; then the player with the white pieces moves first.

Moving a piece involves two steps. First, use the joystick to position the flashing yellow cursor over the piece you want to move and press the fire-button. This makes the entire square flash. Next, move the cursor to the destination square and press the fire-button again. If the move is legal, the piece advances to the new square and your turn ends. If it's illegal, the coordinates clear so you can try again.

Jumping an opponent's piece to banish it from the board is done in the same manner, except your turn doesn't end automatically after you move. Instead, you have the option of jumping again by repeating the second step. When you want to end your turn, move the cursor to any square but the one that's flashing and press the fire-button. After each turn, the number of pieces each player has left is displayed at the sides of the screen.

You can move your pieces only in a forward direction until they reach your opponent's back row. Then, when they are "kinged," they can move forward or backward. Kinged pieces are identified by a K in the center.

In the one-person version of Checkers, the computer controls the black pieces and you control the white. Although the computer plays defensively, it can't resist the chance to jump an opposing piece, so, by using one of your pieces as bait, you may be able to set up a multiple jump for yourself.

Entering zero when you're prompted for the number of players puts the computer in Auto-Play mode. This feature is handy for getting acquainted with the game or studying the computer's strategy.

To end play, press the F1 key. If you press F1 during the computer's turn, the machine will finish its move before the game ends. R

Tony Brantner, a carpenter by trade, is a self-taught computer programmer who says he chose the C-64 because of its "tremendous" graphics potential.

Listing 1. Checkers program.

```
10Ø REM---CHECKERS          :REM*87
11Ø POKE52,56:POKE56,56:CLR
                            :REM*149
12Ø GOSUB158Ø               :REM*213
13Ø V=53248:S1=54272:S2=S1+7:SC
    =1Ø24:TC=646:A=RND(-TI)
                            :REM*65
14Ø FORA=1TO38:SP$=SP$+CHR$(32)
    :NEXT                   :REM*117
15Ø DIM BD(63),CH(1),MV$(1),D(1
    ,3),TL(1),PL(1)         :REM*185
16Ø FORZ=ØTO63:BD(Z)=SC+168+INT
    (Z/8)*8Ø+(ZAND7)*3:NEXT
                            :REM*236
17Ø CH(Ø)=163:CH(1)=171     :REM*54 ►
```

RUN it right: **C-64; joystick**

ILLUSTRATED BY CYNTHIA CARROZZA

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Tough Break For The Enemy!

ECHELON: 3-D Space Flight Simulation

ECHELON is the code name for a top secret military facility at the edge of our solar system. Your orders are to report to ECHELON to be trained to operate the 21st Centuries most advanced spacecraft, the C-104 Light Cruiser.

Once trained you must protect shipping and mining operations from attack by renegade pirate vessels who have terrorized commerce and are beginning to gain an upperhand.

Included in ECHELON is the LipStik™, voice activated control headset. Using the headset adds an entirely new dimension of realism to the simulation.

WINNER! Peoples Choice Awards — *RUN MAGAZINE*
"Outstanding sound and graphics . . . Fascinating depth." — *COMPUTE!*
"Takes space simulation to a whole new level . . . — *COMPUTER ENTERTAINER*

HEAVY METAL: Modern Land Combat!

Do you have the courage, skill and intelligence to move up the ranks in today's modern army? Here's your chance to find out.

Find yourself in a full simulation of an M1 A1 Abrams tank, the U.S. Army's most sophisticated and powerful main battle tank.

Or how about behind the wheel of an XR 311 FAV (fast attack vehicle) going over 100 mph attacking enemy supply depots. Trying to defend your supply stations is going to be less difficult using an ADAT (air defense anti-tank) system, but it will never be easy. You'll face a challenge you never expected to get in OTS (Officer's Training School). Add to this the fact that battles are going on at three different fronts at once and you'll soon find out what you're made of. Do you have what it takes? TAKE THE HEAVY METAL CHALLENGE TO FIND OUT!

Enemy Spacecraft moving in for the kill!

Explore the ruins of an ancient civilization!

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Software Incorporated

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Inside view of your M-1 Abrams Main Battle Tank

The Tactical Command Display (TACC) allows you to plan your strategy.

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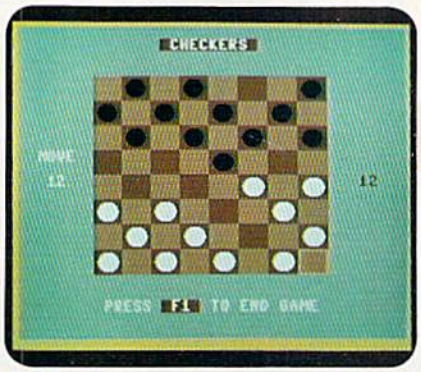
CHECKERS



Play a friend or the computer in this Checkers game.

```
18Ø MV$(Ø)=LEFT$(SP$,4):MV$(1)=
    "MOVE"                  :REM*59
19Ø D(Ø,Ø)=7:D(Ø,1)=9:D(Ø,2)=-7
    :D(Ø,3)=-9              :REM*172
2ØØ FORA=ØTO3:D(1,A)=-D(Ø,A):NE
    XT                      :REM*45
21Ø POKEV+39,7:POKEV+4Ø,2
                            :REM*16Ø
22Ø POKE2Ø4Ø,13:POKE2Ø41,14
                            :REM*252
23Ø FORA=S1TOS1+24:POKEA,Ø:NEXT
                            :REM*17Ø
24Ø POKES1+1,37:POKES1+5,9
                            :REM*21Ø
25Ø POKES2+1,5:POKES2+5,8:POKES
    2+6,24Ø:POKES1+24,15:REM*97
26Ø GOSUB111Ø               :REM*62
27Ø P1=Ø                    :REM*146
28Ø REM---MAIN              :REM*184
29Ø P2=P1:P1=1-P1:M=Ø       :REM*192
3ØØ CY=1Ø:CX=2:GOSUB149Ø:POKETC
    ,1:PRINTMV$(P1)         :REM*2Ø8
31Ø CX=34:GOSUB149Ø:POKETC,Ø:PR
    INTMV$(P2)              :REM*222
32Ø IFPL(P1)THEN44Ø         :REM*25Ø
33Ø REM---COMPUTER          :REM*94
34Ø M1=1:FORZZ=ØTO63        :REM*186
35Ø IFPEEK(BD(ZZ))=CH(P1)THENGO
    SUB93Ø                  :REM*216
36Ø NEXT:IFM1=1THEN68Ø      :REM*3Ø
37Ø IFM1<6THENGOSUB86Ø:GOTO41Ø
                            :REM*126
38Ø GOSUB82Ø:IFTL(P2)=ØTHEN68Ø
                            :REM*81
39Ø M1=1:ZZ=QD:GOSUB93Ø     :REM*74
4ØØ IFM1>=6THEN38Ø          :REM*223
41Ø GETA$:IFA$=CHR$(133)THEN68Ø
                            :REM*2Ø2
42Ø GOTO29Ø                 :REM*255
43Ø REM---PLAYER            :REM*75
44Ø R=P1*7:C=R:POKEV+3,Ø:REM*34
45Ø GOSUB72Ø:IFA$=CHR$(133)THEN
    68Ø                     :REM*13Ø
46Ø IFPEEK(L)<>CH(P1)THEN45Ø
                            :REM*56
47Ø K=-(PEEK(L+1)=166)      :REM*133
48Ø POKEV+2,PEEK(V):POKEV+16,(P
    EEK(V+16)AND1)*3:POKEV+3,PE
    EK(V+1)                 :REM*232
49Ø RF=R:CF=C:LF=L          :REM*153
5ØØ GOSUB72Ø:IFA$=CHR$(133)THEN
    68Ø                     :REM*2Ø8
51Ø REM---TEST              :REM*69
52Ø IFR=RFANDC=CFTHEN5ØØ
                            :REM*1Ø1
53Ø IFPEEK(L)<>16ØTHEN62Ø
                            :REM*239
54Ø RM=RF-R:CM=CF-C:IFABS(RM)<>
    ABS(CM)THEN62Ø          :REM*17
55Ø IFK=ØANDSGN(RM)<>SGN(P1-.5)
    THEN62Ø                 :REM*19Ø
56Ø IFABS(RM)=1ANDM=ØTHENGOSUB8
    6Ø:GOTO29Ø              :REM*134
57Ø IFABS(RM)<>2THEN62Ø     :REM*21
58Ø RJ=RF-RM/2:CJ=CF-CM/2
                            :REM*49
59Ø LJ=BD(RJ*8+CJ)          :REM*233
6ØØ IFPEEK(LJ)=CH(P2)THEN66Ø
                            :REM*16
61Ø REM---ILLEGAL MOVE      :REM*134
62Ø IFMTHEN29Ø              :REM*131
63Ø POKES2+4,33:FORA=1TO2ØØ:NEX
    T                       :REM*62
64Ø POKES2+4,32:GOTO44Ø:REM*1Ø2
65Ø REM---JUMP CHECKER      :REM*7Ø
66Ø GOSUB82Ø:IFTL(P2)THEN48Ø
                            :REM*4
67Ø REM---END OF GAME       :REM*124
68Ø Q$="PLAY AGAIN? [Y/N] ":SE$
    ="YN":GOSUB135Ø         :REM*236
69Ø IFA$="Y"THEN26Ø         :REM*21Ø
7ØØ POKE832,Ø:SYS832        :REM*2Ø9
71Ø REM---JOYSTICK          :REM*1Ø5
72Ø JS=PEEK(5632Ø)          :REM*72
73Ø GETA$:IFA$=CHR$(133)THENRET
    URN                     :REM*146
74Ø R=R+SGN(JSAND1)-SGN(JSAND2)
    AND7                    :REM*5
75Ø C=C+SGN(JSAND4)-SGN(JSAND8)
    AND7                    :REM*237
76Ø POKEV,88+C*24AND255:POKEV+1
    6,(PEEK(V+16)AND2)-(C=7)
                            :REM*158
77Ø POKEV+1,82+R*16         :REM*Ø
78Ø POKEV+21,3:FORA=1TO9Ø:NEXT:
    POKEV+21,Ø              :REM*43
79Ø IFJSAND16THEN72Ø        :REM*26
8ØØ L=BD(R*8+C):RETURN      :REM*51
81Ø REM---JUMP              :REM*84
82Ø FORA=ØTO2               :REM*1Ø2
83Ø POKELJ+A,16Ø:POKELJ+4Ø+A,16
    Ø:NEXT                  :REM*21
84Ø M=M+1:TL(P2)=TL(P2)-1:GOSUB
    129Ø                    :REM*159
85Ø REM---MOVE              :REM*94
86Ø FORZ=ØTO2:POKEL+Z+S1,P1:POK
    EL+4Ø+Z+S1,P1           :REM*255
87Ø POKEL+Z,PEEK(LF+Z):POKEL+4Ø
    +Z,PEEK(LF+4Ø+Z)        :REM*165
88Ø POKELF+Z,16Ø:POKELF+4Ø+Z,16
    Ø:NEXT                  :REM*26
89Ø IFR=7ORR=ØTHENK=1:POKEL+1,1
    66:POKEL+41,167         :REM*141
9ØØ POKES1+4,16:POKES1+4,17
                            :REM*142
91Ø RETURN                  :REM*24
92Ø REM---FIND COMPUTER MOVE
                            :REM*85
93Ø KD=-(PEEK(BD(ZZ)+1)=166)
                            :REM*33
94Ø FORDR=ØTO1+KD*2:MØ=Ø:REM*1Ø
95Ø D=ZZ+D(P1,DR):IFD<ØORD>63TH
    EN1Ø9Ø                  :REM*172
96Ø F1=PEEK(BD(D)):F2=Ø:DJ=D
                            :REM*143
97Ø D=D+D(P1,DR):IFD<ØORD>63THE
    N99Ø                    :REM*54
98Ø F2=PEEK(BD(D))          :REM*217
99Ø IFF1<>16ØTHEN1Ø4Ø       :REM*188
1ØØØ MØ=2:D=DJ:IFF2<>CH(P2)THEN
    MØ=3                    :REM*48
1Ø1Ø IFF2=CH(P1)THENMØ=4
                            :REM*126
1Ø2Ø IF(D<8ORD>55)ANDKD=ØTHENMØ
    =5                      :REM*1Ø2
1Ø3Ø GOTO1Ø7Ø                :REM*74
1Ø4Ø IFF1<>CH(P2)ORF2<>16ØTHEN1
    Ø9Ø                     :REM*18Ø
1Ø5Ø MØ=6:IFPEEK(BD(DJ)+1)=166T
    HENMØ=7                 :REM*169
1Ø6Ø IF(D<8ORD>55)ANDKD=ØTHENMØ
    =8                      :REM*193
1Ø7Ø MØ=MØ+RND(1)            :REM*215
1Ø8Ø IFMØ>M1THENM1=MØ:L=BD(D):L
    F=BD(ZZ):LJ=BD(DJ):R=INT(D
    /8):QD=D                :REM*9
1Ø9Ø NEXT:RETURN            :REM*228
11ØØ REM---SCREEN           :REM*147
111Ø POKEV+21,Ø:PRINTCHR$(147):
    POKETC,1                :REM*247
112Ø PRINTTAB(15)"{CTRL 9} CHEC
    KERS ":ZZ=96            :REM*21
113Ø FORA=ØTO63:FORZ=ØTO2
                            :REM*223
114Ø POKEBD(A)+Z,ZZ:POKEBD(A)+4
    Ø+Z,ZZ                  :REM*2Ø8
115Ø NEXT                    :REM*5
116Ø IF(AAND7)<7THENZZ=16Ø+(ZZ=
    16Ø)*64                 :REM*173
117Ø NEXT                   :REM*17
118Ø POKETC,Ø:A$="#"        :REM*33
119Ø FORA=1TO3:GOSUB152Ø:NEXT
                            :REM*3
12ØØ POKETC,1:A$="+"        :REM*176
121Ø FORA=6TO8:GOSUB152Ø:NEXT
                            :REM*73
122Ø REM---GET PLAYERS      :REM*141
123Ø Q$="PLAYERS [Ø,1 OR 2] ":S
    E$="Ø12":GOSUB135Ø:REM*136
124Ø PL(Ø)=Ø:PL(1)=Ø:A=VAL(A$)
                            :REM*151
125Ø IFATHENPL(1)=1:PL(Ø)=A-1
                            :REM*166
126Ø CY=22:CX=9:GOSUB149Ø:PRINT
    "PRESS {CTRL 9} F1 {CTRL Ø
    } TO END GAME"          :REM*96
127Ø TL(Ø)=12:TL(1)=12      :REM*213►
```

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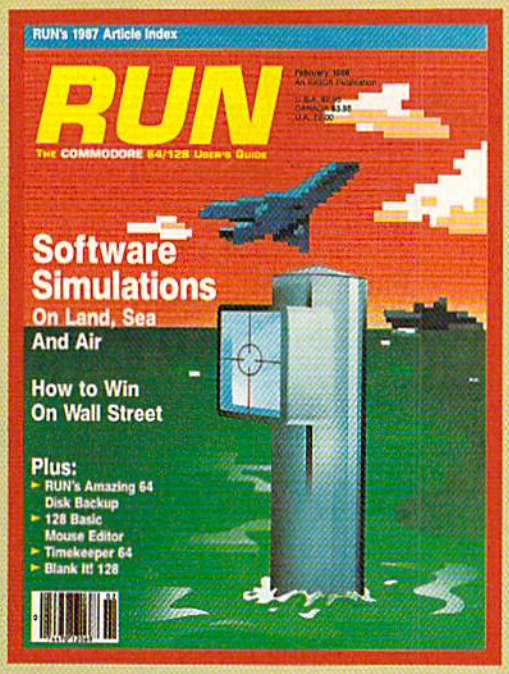

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CHECKERS

```
128Ø REM---PRINT TOTALS:REM*218
129Ø CY=12:CX=3:A=1:GOSUB131Ø
                        :REM*245
13ØØ CX=35:A=Ø          :REM*65
131Ø GOSUB149Ø:POKETC,A:REM*111
132Ø PRINTRIGHT$(STR$(TL(A)),2)
                        :REM*112
133Ø RETURN             :REM*197
134Ø REM---GET KEY      :REM*248
135Ø CY=22:GOSUB146Ø    :REM*196
136Ø CX=(4Ø-LEN(Q$))/2:GOSUB149
     Ø                  :REM*93
137Ø POKETC,1:PRINTQ$;  :REM*184
138Ø POKE198,Ø:POKE2Ø4,Ø
                        :REM*138
139Ø WAIT198,15:GETA$:Z=LEN(SE$
     )                  :REM*1Ø3
14ØØ IFA$=MID$(SE$,Z,1)THEN143Ø
                        :REM*24
141Ø Z=Z-1:IFZTHEN14ØØ  :REM*191
142Ø GOTO139Ø           :REM*236
143Ø POKE2Ø4,1:PRINTA$  :REM*22
144Ø FORA=1TO5ØØ:NEXT   :REM*2Ø2
145Ø REM---CLEAR LINE   :REM*232
146Ø POKE214,CY-1:PRINT:PRINTSP
     $                  :REM*252
147Ø RETURN             :REM*74
148Ø REM---PLOT         :REM*29
149Ø POKE214,CY-1:PRINT:PRINTTA
     B(CX);             :REM*232
15ØØ RETURN             :REM*1Ø8
151Ø REM---PRINT CHECKERS
                        :REM*56
152Ø CY=2+A*2:CX=8+(AAND1)*3:GO
     SUB149Ø            :REM*153
153Ø FORZ=ØTO3          :REM*1Ø1
154Ø PRINTCHR$(18);A$;"$%{CRSR
     DN}{3 CRSR LFs}*)({CRSR UP
     }{3 CRSR RTs}";    :REM*1Ø6
155Ø NEXT               :REM*15Ø
156Ø RETURN             :REM*16Ø
157Ø REM---INITIALIZE   :REM*1Ø9
158Ø PRINTCHR$(8)CHR$(147)
                        :REM*1Ø4
159Ø POKE56334,PEEK(56334)AND25
     4                  :REM*2Ø1
16ØØ POKE1,PEEK(1)AND251:REM*32
161Ø FORA=ØTO511:POKE14336+A,PE
     EK(53248+A):NEXT   :REM*151
162Ø POKE1,PEEK(1)OR4   :REM*47
163Ø POKE56334,PEEK(56334)OR1
                        :REM*191
164Ø POKE53272,(PEEK(53272)AND2
     4Ø)OR14            :REM*79
165Ø FORA=ØTO31:READZ:POKE14616
     +A,Z:POKE14616+63-A,Z:NEXT
                        :REM*42
166Ø FORA=ØTO7:POKE14616+64+A,P
     EEK(14616+A):NEXT  :REM*85
167Ø POKE5328Ø,7:POKE53281,15
                        :REM*247
168Ø POKE53282,1Ø:POKE53283,2
                        :REM*55
169Ø POKE53265,PEEK(53265)OR64
                        :REM*236
17ØØ REM---SPRITE CURSORS
                        :REM*125
171Ø FORA=832TO959:POKEA,Ø:NEXT
                        :REM*179
172Ø FORA=835TO874STEP3:POKEA,1
     92:POKEA+2,3:NEXT  :REM*78
173Ø FORA=ØTO2:POKE832+A,255:PO
     KE877+A,255:NEXT   :REM*37
174Ø FORA=896TO943:POKEA,255:NE
     XT                 :REM*62
175Ø RETURN             :REM*99
176Ø REM---CHARACTER DATA
                        :REM*1Ø6
177Ø DATAØ,Ø,Ø,3,7,15,15,31
                        :REM*3
178Ø DATAØ,Ø,255,255,255,255,25
     5,255              :REM*155
179Ø DATAØ,Ø,Ø,192,224,24Ø,24Ø,
     248                :REM*186
18ØØ DATAØ,Ø,255,255,255,153,14
     7,135              :REM*12
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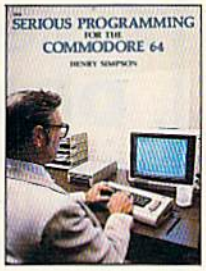

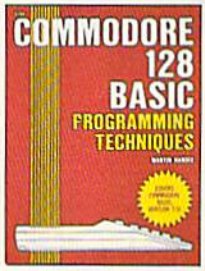

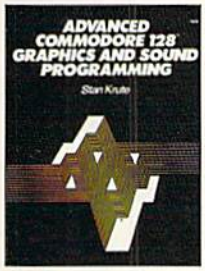

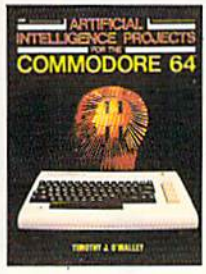

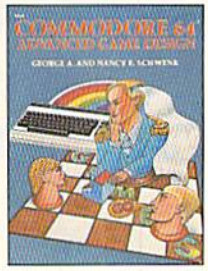

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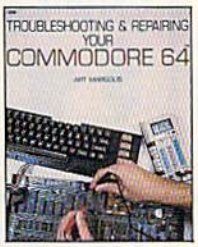

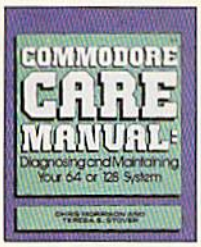

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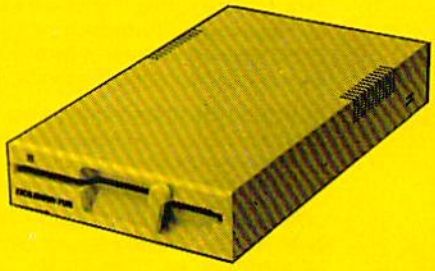

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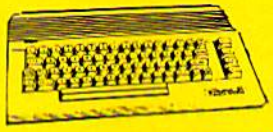

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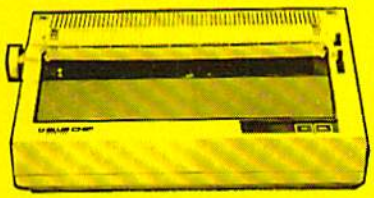

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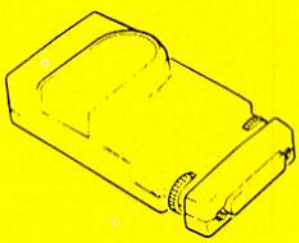

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Program Your Mouse and RAM Expander

Spice up your programs with the speed of RAM expansion and the ease the mouse provides.

By TOM BROWN

Two of the newest hardware accessories for the C-64 and C-128 owner are the 1351 proportional mouse and the 1764, 1700 and 1750 RAM expanders from Commodore. While these devices open up new computing opportunities, learning to program them can be frustrating to experienced and novice programmers alike, since they don't work like other Commodore devices.

The Mouse

The first mouse for the C-64 and C-128, the Commodore 1350, operates similarly to a joystick (or an upside-down trackball). While it has two buttons on top, only the left one can be used; the right button is wired in such a way that it can't be read properly. Since the 1350 is, in reality, nothing more than a joystick, its movements are often difficult to control.

The latest mouse from Commodore, the 1351, improves the situation by operating, not as a joystick, but as a pair of paddles. You may remember the paddle controller from the old Atari Pong-type games, where the only required movement is left-right or up-down. One end of the paddle is connected to a constant power source, the other to the SID (sound) chip, and between those two points there's a variable resistor (or potentiometer, from which we get the nickname "pot" for each paddle).

As you turn the paddle's knob, the voltage reaching the SID chip varies between 0 and +5, then the chip converts this voltage to a one-byte number in the range 0–255. Two paddles are normally connected to a single port, with one read at address 54297 ($D419) and the other at 54298 ($D41A), no matter which port is used.

It would be nice if we could use these two bytes as-is for screen coordinates.

However, there are two problems. First, unless you're in Multicolor mode, the screen is more than 255 pixels (dots) wide. Second, the conversion process isn't steady; the value for each paddle "jitters" back and forth, making it necessary to read the paddle many times and calculate an average.

The 1351 avoids these problems by using a whole new procedure. It keeps track of its own movements, automatically relaying its current X-Y position to the computer via the two SID chip locations mentioned above—one location for X and the other for Y.

Now, remember that I said the value in each location is a one-byte number (in the range 0–255). However, only six of the eight bits in that byte are meaningful (the highest and lowest aren't used). In other words, the actual X and Y values transferred to the computer range from 0 to 63.

Although the values of both X and Y are now smaller than the range of available screen positions, they are reliable and free of that annoying jitter. To use these smaller numbers, the *last* value read from the mouse must be stored and compared to the current value. This is because, when either the X or Y value reaches 64, it wraps around to 0! Comparing old and new values tells which direction the mouse is moving, so it's apparent whether a current value of 0 is actually 0 or 64, 128 or some other number.

It's necessary to keep an eye on the mouse at all times, so the movement is fast and accurate, but this can't be done from Basic. The only way the mouse can be used effectively is with a machine language routine included in the "housekeeping" chores the computer performs 60 times a second in its "interrupt" routine. Fortunately, the 1351 is packaged with a utility disk containing what we need, including several Basic programs that demonstrate how to use the machine language mouse reader for both the C-64 and C-128.

The Mouse Readers

The C-64 mouse reader is called M1351.64.BIN and loads into memory at 49152 ($C000). To use the mouse in the front port, activate the reader with SYS 49152; to use it in the rear port, activate it with SYS 49155. As you move the mouse around, the reader changes the position of sprite 0. Therefore, if your Basic program needs to know that position, use the following line:

```
X=PEEK(53248)+((PEEK(53264)AND1)
*256):Y=PEEK(53249)
```

Naturally, to see the mouse pointer move around the screen, you'll have to activate sprite 0. If you use the pointer definition (called Mouse.Pointer) on the 1351 disk, remember that it loads at 3584 ($0E00), which will interfere with your Basic program, unless the program is very short or you change the start-of-Basic pointer to point above 3584. The following lines activate the sprite, set its color to white, position it on the screen ►

RUN it right: **C-64 or C-128; 1351 mouse; 1700, 1750 or 1764 RAM expander**

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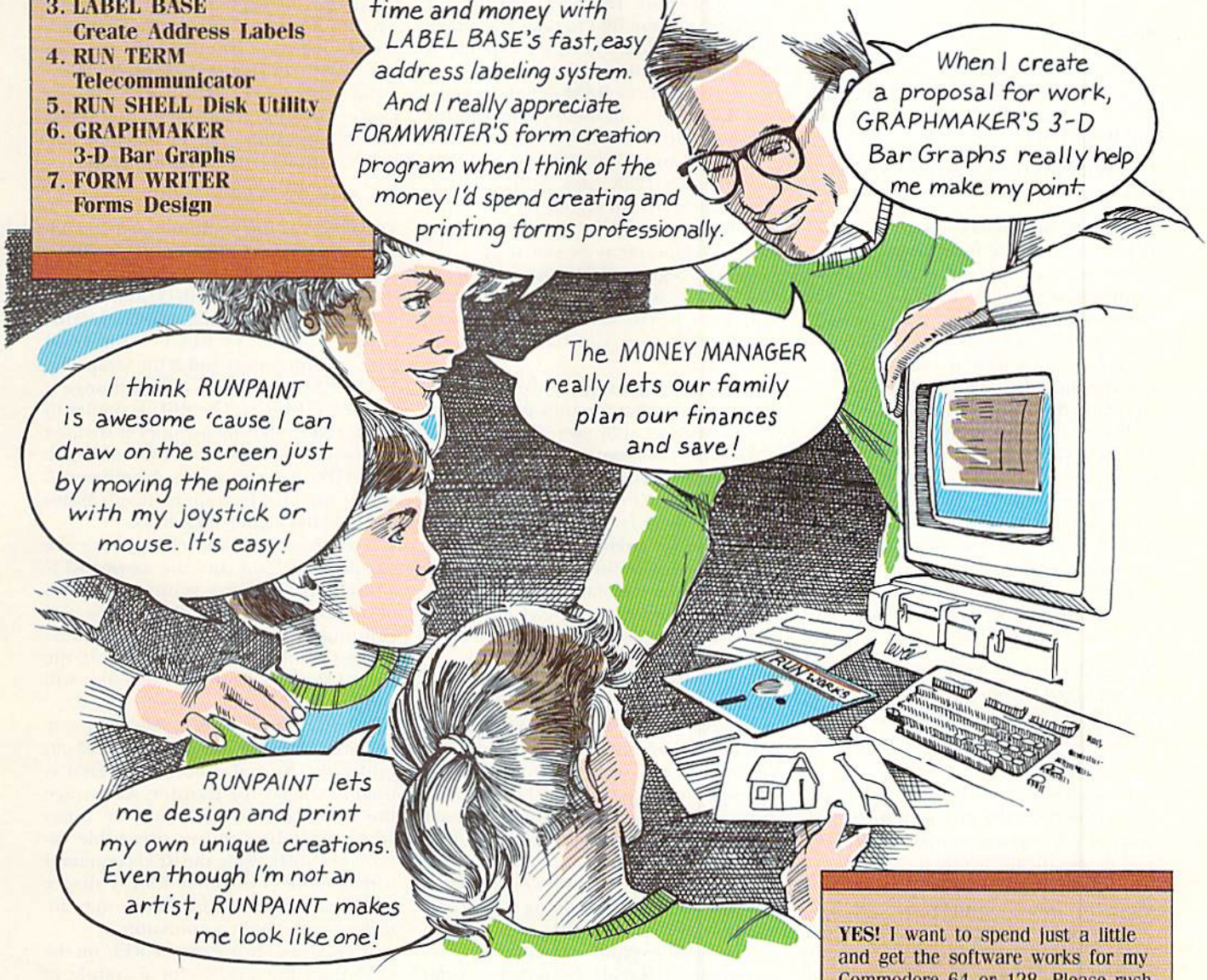

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at 100,100 and set the sprite definition to 3584:

```
V = 53248:POKEV + 21,1:
POKEV + 39,1:
POKEV + 0,100:POKEV + 1,100:POKEV +
  16,0:
POKE2040,56
```

The buttons on the 1351 mouse appear as joystick values, so reading them is relatively simple by using the following Basic line:

```
B = PEEK(C)AND17:B = ABS((B = 1) +
  (B = 16)*2 + (B = 17)*3)
```

Variable C should have a value of 56321 if you're using the front port or 56320 if you're using the rear port. The value returned in B is 0 if no button was pressed, 1 if the left button was pressed, 2 if the right button was pressed and 3 if both buttons were pressed. This lets you use the value in On/GoTo constructions in your own programs.

The C-128 reader is called M1351.128.BIN and loads at 6384 ($1800). To use the mouse in the front port, activate the reader with SYS 6144; to use it in the rear port, activate it with SYS 6147. This reader operates the same way as the C-64 version—that is, by manipulating the position of sprite 0. However, Basic 7.0 provides commands that make it easier to use sprites:

```
X = RSPPOS(1,0):Y = RSPPOS(1,1):REM
  Find X and Y position
SPRITE 1,1,2:REM Turn sprite on
MOVSPR 1,100,100:REM Position sprite
  at 100,100
```

It's easier to use the pointer definition from the 1351 disk with the C-128, since the 128 reserves that memory location specifically for sprite definitions. The above sprite commands replace the Pokes necessary on the C-64.

To read the mouse buttons, use "JOY(1)" with the front port and "JOY(2)" with the rear port. If the value returned is 1, the right button was pressed; if it's greater than 127, the left button was pressed.

The RAM Expander

The 6510 or 8510 CPU chip, the brain of the C-64 or C-128 computer, can access only 64K of memory at a time, although Commodore engineers have found clever ways to get around this limit and make more than 64K available to the user. However, the CPU isn't the only chip that needs access to computer memory. Because the VIC chip (which provides all 40-column video support) lacks its own memory, it has to "steal" some temporarily from the CPU. This periodic theft is called direct memory access, or DMA.

While the VIC chip is the only built-in device to use DMA, external devices can access it via pin 13 of the expansion (cartridge) port. The Z-80 cartridge for the C-64 was the first to take advantage of this capability. The RAM expansion unit (REU) is another.

There are three RAM expanders currently available, all identical except for the amount of memory they contain. The 1700 and 1750, for use with the C-128, have 128K and 512K, respectively; the 1764, designed for the C-64, has 256K. Also, the 1764 is packaged with a replacement power supply, because the regular C-64 power supply is inadequate to support an REU, and you'd run the risk of ruining your power supply each time you turned on your computer.

When writing programs for the C-64, don't assume that the user is limited to 256K, since a C-128 owner can still use a 1700 or 1750 expander in 64 mode! Even when writing programs for the C-128, you can't be sure of the amount of REU memory available. There's a "trace" on the circuit board of the 1700/1750 that determines how much RAM the device has (similar to the one in the 1541 disk drive that determines the drive device number). Cutting the trace tells the REU controller it has 512K.

When the 1700 was originally released, a random five units, with their traces cut, were tested. Three of the five became 1750s! The other two had 256K (in effect becoming 1764s). These changes took place, not because the trace was cut, but because the additional RAM had been installed in the factory. However, there's no guarantee that currently available 1700s will change when you cut the trace, and doing so will certainly void your warranty.

The RAM expander obeys four commands: Fetch (Load), Stash (Save), Swap and Verify. Since these commands are similar to those used on a disk drive, the REU is often referred to as a RAM disk. Unfortunately, you can't use one as a disk drive without special software, because an REU can't be operated from Basic (at least on the C-64).

The REU works by adding its own input/output registers to computer memory at 57088 ($DF00), and information such as memory size, start addresses, and so forth, must be poked into the proper registers before a final poke is made to the command register to trigger a transfer. While it's possible to do this from Basic, it's not easy; Basic isn't designed for bit-wise operations (where you set or clear a single bit in a byte). Also, you can't access the RAM beneath the ROMs or the input/output (I/O) chips from Basic.

The most effective way to use an REU is, again, through machine language. The Basic program in Listing 1 pokes a short machine language routine into the cassette buffer, giving you RAM expander access to all the RAM in the C-64—including that under the ROMs and the I/O chips. Use the machine language with the following Basic line:

```
SYS 820,A,B,C,D,E
```

Variable A is the computer starting address; B is the computer ending address, plus 1; C is the REU start address; D is the REU bank number (0–7) and E is the command. The commands include 0 for Save (computer to REU), 1 for Load (REU to computer) and 2 for Swap.

The REU "bank" may seem strange if you're a C-64 user. The REU is similar to the C-128 in that its memory is divided into separate blocks, each 64K in length. The 1700 has two banks (numbered 0 and 1), the 1764 has four banks (0–3) and the 1750 has eight banks (0–7).

Note that the bank setting is for the *starting* REU bank and the *starting* REU address. If, during a transfer, the end of a bank is reached, the transfer will continue, using the start of the next highest bank of REU memory. If the end of the last bank is reached, it will wrap around to the start of bank 0.

If you're a C-64 user, *don't* put any valuable information at 65280 ($FF00) under the Kernal, since the Kernal is used to trigger the transfer. Also, since the C-64 REU routine halts all interrupts, including the nonmaskable interrupt (NMI), using the REU command with a modem or other RS-232 device is not recommended, since it may interfere with data transmission.

It's easier to program the REU on the C-64 than the C-128—for a couple of reasons. First, the memory of the 128 is more complex. Second, and more importantly, the Basic 7.0 commands supplied to operate the REU may not work properly! Look at the bottom of the last page of the 1700/1750 owner's manual and you'll see reference to a problem in version 0 of the C-128 ROMs, as well as a brief test to see if you have version 0 or version 1 ROMs (if PEEK(65408) returns a 0, then you have version 0).

The brevity of the note implies a minor problem, but it's really far from minor. The "bug" lives in the version 0 Kernal (which means the problem exists even in machine language), and it guar-

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antees that some portion of transfers using any bank but 15 will result in ROM or I/O bytes being transferred instead of the RAM you intended. A second, relatively minor, bug prevents the Bank command from transferring bank 1 RAM. Instead, you have to manually set the VIC chip bank pointer to $D506, so both the VIC chip and the REU see the correct RAM.

Both bugs have been eliminated in version 1 ROMs. If you have version 0 ROMs, use the program in Listing 2 to effect the same fix. This program uses memory at the top of the function key page, but this should go unnoticed unless you use a lot of long key definitions.

Another oddity with the version 0 routine is that it deliberately makes sure the I/O chips are always banked in during the transfer (no matter what you set with the computer's Bank command). This, too, is fixed in version 1 ROMs and in Listing 2.

Basic 7.0 provides three commands for operating the RAM expander:

```
FETCH A,B,C,D
STASH A,B,C,D
SWAP A,B,C,D
```

Variable A contains the number of bytes to transfer (to a maximum of 65535), B is the starting address in the computer's memory, C is the starting address in the REU and D is the REU bank number (0–7). In version 1, or version 0 with the fix in place, use the Bank command to determine which computer bank is used for the transfer.

There are two types of interrupts possible on the 128, and version 1 ROMs and Listing 2 take care of only one. The other, the nonmaskable interrupt, can't be stopped with a simple SEI command in machine language. Fortunately, the only time you're likely to encounter an NMI (other than pressing the restore key) is when you're using the RS-232 port for telecommunications. In that case, you should restrict yourself to using bank 15 memory with the REU, to make sure the transfer won't be corrupted.

One final word of warning: You *must* have your C-128 running in 1-MHz (Slow) mode before triggering a transfer. Like the VIC chip, a RAM expander can't operate properly at the 128's faster speed. R

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

Listing 1. Program providing RAM expansion access to C-64 RAM.

```
10 PRINT"{SHFT CLR}{3 CRSR DNs}
   INSTALLING CODE...":GOSUB300
   00                    :REM*109
20 PRINT"{SHFT CLR}{CTRL 9}C-64
    RAM EXPANDER CONTROLLER"
                         :REM*80
30 PRINT"{2 CRSR DNs}USE A {CTR
   L 9} SYS {CTRL 0} COMMAND AS
    FOLLOWS:"            :REM*31
40 PRINT"{3 CRSR DNs}{CTRL 9}SY
   S 820,A,B,C,D,E{CTRL 0}
                         :REM*246
50 PRINT"{3 CRSR DNs}WHERE:"
                         :REM*190
60 PRINT"{CRSR DN}A = COMPUTER
   STARTING ADDRESS      :REM*147
70 PRINT"B = COMPUTER ENDING AD
   DRESS PLUS ONE"       :REM*152
80 PRINT"C = RAM EXPANDER START
    ADDRESS"             :REM*14
90 PRINT"D = RAM EXPANDER BANK
   NUMBER"               :REM*127
95 PRINT"E = COMMAND:{2 SPACEs}
   0 = COMPUTER TO R.E."
                         :REM*146
96 PRINT"{14 SPACEs}1 = R.E. TO
    COMPUTER"            :REM*162
97 PRINT"{14 SPACEs}2 = SWAP R.
   E. & COMPUTER"        :REM*46
98 END                   :REM*226
30000 I=820:REM C-64 RAM EXPAND
      ER ML ROUTINE      :REM*27
30010 READ A:IF A=256 THEN RETU
      RN                 :REM*138
30020 POKE I,A:I=I+1:GOTO 30010
                         :REM*169
30030 DATA 32,253,174,32,218,3,
      140,225            :REM*78
30040 DATA 3,141,226,3,32,253,1
      74,32              :REM*137
30050 DATA 218,3,140,227,3,141,
      228,3              :REM*76
30060 DATA 32,253,174,32,218,3,
      140,231            :REM*149
30070 DATA 3,141,232,3,32,198,3
      ,32                :REM*200
30080 DATA 253,174,32,158,183,1
      42,224,3           :REM*103
30090 DATA 32,253,174,32,158,18
      3,138,41           :REM*189
30100 DATA 3,141,233,3,173,225,
      3,141              :REM*65
30110 DATA 2,223,173,226,3,141,
      3,223              :REM*92
30120 DATA 173,231,3,141,4,223,
      173,232            :REM*122
30130 DATA 3,141,5,223,173,224,
      3,41               :REM*163
30140 DATA 3,141,6,223,173,229,
      3,141              :REM*51
30150 DATA 7,223,173,230,3,141,
      8,223              :REM*132
30160 DATA 173,234,3,141,10,223
      ,120,169           :REM*78
30170 DATA 127,141,13,221,173,2
      33,3,9             :REM*124
30180 DATA 128,141,1,223,165,1,
      41,252             :REM*210
30190 DATA 133,1,141,0,255,165,
      1,9                :REM*114
30200 DATA 3,133,1,169,144,141,
      13,221             :REM*200
30210 DATA 88,96,56,173,227,3,2
      37,225             :REM*73
30220 DATA 3,141,229,3,173,228,
      3,237              :REM*193
30230 DATA 226,3,141,230,3,96,3
      2,138              :REM*134
30240 DATA 173,76,247,183,0,0,0
      ,0                 :REM*237
30250 DATA 0,0,0,0,0,0,0,0,256
                         :REM*228
```

Listing 2. Program that fixes bugs in version 0 of C-128 ROMs, for use with a RAM expander.

```
10 IFPEEK(65408)=0THENPRINT"{SH
   FT CLR}{3 CRSR DNs}INSTALLIN
   G CODE...":GOSUB30000:PRINT"
   {3 CRSR DNs}DONE!":END
                         :REM*42
20 PRINT"{SHFT CLR}{5 CRSR DNs}
   SORRY, YOU DO NOT HAVE THE R
   OMS WITH"             :REM*143
30 PRINT"THE RAM EXPANDER BUG!"
                         :REM*71
40 PRINT"{CRSR DN}YOU DO NOT NE
   ED THIS PROGRAM!"     :REM*133
50 END                   :REM*178
30000 I=4324:REM FIX FOR C-128
      VERSION-0 ROMS     :REM*161
30010 READ A:IFA=256THEN 30030
                         :REM*237
30020 POKE I,A:I=I+1:GOTO30010
                         :REM*169
30030 I=1008             :REM*244
30040 READ A:IF A=256 THEN RETU
      RN                 :REM*168
30050 POKE I,A:I=I+1:GOTO 30040
                         :REM*247
30060 DATA 9,1,133,119,173,6,21
      3,133              :REM*129
30070 DATA 121,69,119,41,63,69,
      119,141            :REM*20
30080 DATA 6,213,165,119,120,17
      4,0,255            :REM*197
30090 DATA 140,1,223,96,256
                         :REM*72
30100 DATA 32,228,16,141,0,255,
      88,142             :REM*149
30110 DATA 0,255,165,121,141,6,
      213,96,256         :REM*153 ■
```

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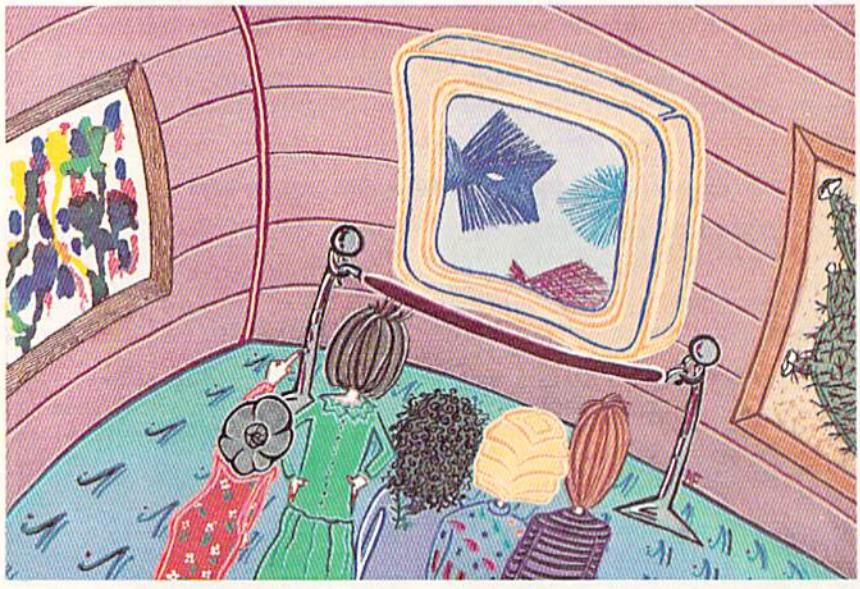

By CHARLES ORCUTT

Colorful shapes undulate on the screen, one flowing into the other, fascinating to watch. That's the power of Rainbow Run, my C-64 kinetic art program.

The moving, largely curved forms that Rainbow Run creates on the screen are generated by straight lines. I've specified the coordinates of the end points of the first line, but then the program takes over, calculating the coordinates of new points and drawing a line between each successive pair.

This process continues indefinitely, but very shortly the program also starts erasing lines, beginning with the first. As pixels are drawn, they are recorded in a memory table, and the location in the table preceding the current position contains the information with which to erase previously lighted points.

The program follows some rules in its creative process. First, it calculates a mirror equivalent for each point, then acts on these points similarly. The mirroring is done from left to right and from top to bottom, but the sequence can be switched using a joystick in port 2. To activate vertical symmetry, move the joystick left; for horizontal symmetry, move the joystick right. A second rule dictates that when point generation (or what appears as a moving point) reaches a screen boundary, its direction reverses, its speed changes (randomly) and the display assumes a new color.

Rainbow Run is a machine language program in the form of a hex loader, and, although it's only about 1500 bytes long, it occupies all the C-64's available memory. It was inspired by Swish, the impressive kinetic art program by Glen Bredon, but it introduces two important variations.

First, it operates in Hi-Res mode, which provides better horizontal resolution than the Multicolor mode Swish uses. Second, because hi-res calls for more speed, Rainbow Run employs a different technique for providing data for the erasure tail. Swish records the end points of the lines in its memory table, which means the line-draw routine must continuously recalculate the points. Rainbow Run records the memory locations and bit set of the plots, so three bytes are needed to record the erasure tail for each lighted pixel.

Type in the Basic program in Listing 1, checking for typos with *RUN*'s Checksum program, and save a copy to disk. Then run that program to write a file called "+RAINBOW ML" to your disk. Finally, load and run the "+RAINBOW ML" program to see the display. Just make sure you have some time to spare, because you'll be glued to the screen! Ⓡ

Charles Orcutt is an electronics technician who's worked in broadcasting and computer repair. He's owned Commodores since 1983 and spends a lot of his spare time working with Basic and machine language.

Listing 1. Rainbow Run program.

```
Ø REM CREATE RAINBOWS ML PROGRA
  M                          :REM*235
5 OPEN 8,8,8,"+RAINBOW ML,P,W"
                             :REM*57
1Ø READ A$:IF A$="-1" THEN CLOS
  E8:END                     :REM*78
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 ►
```

RUN it right: **C-64**

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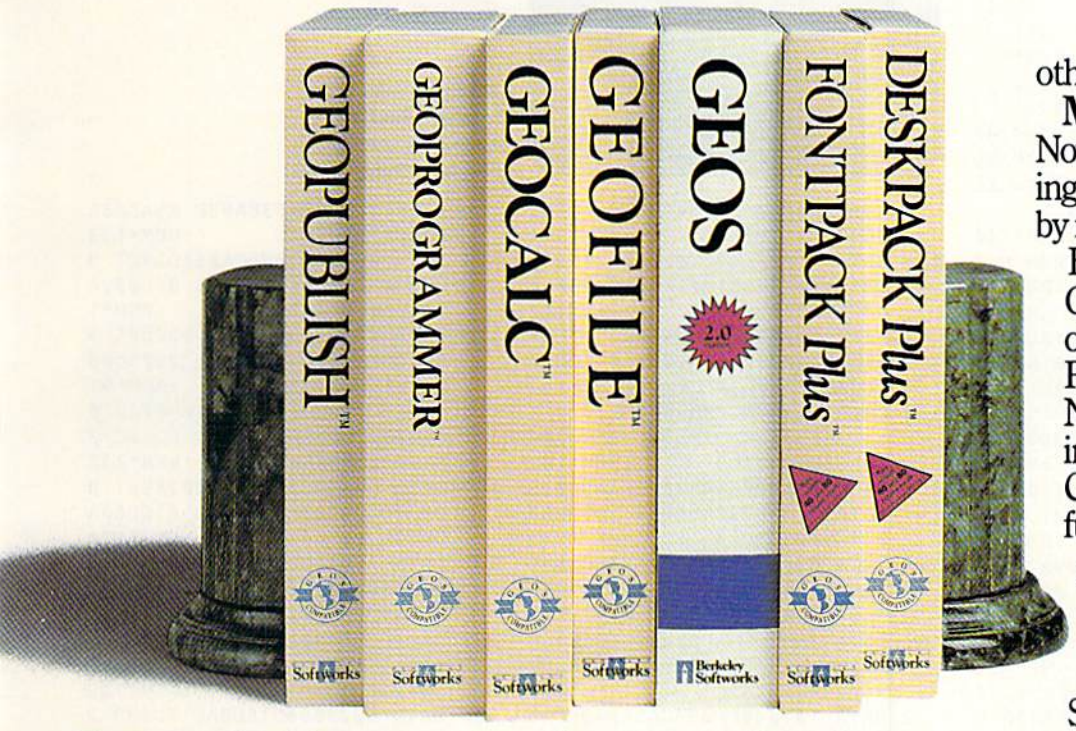

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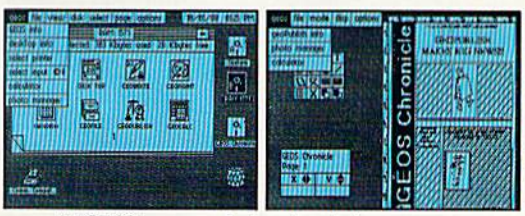

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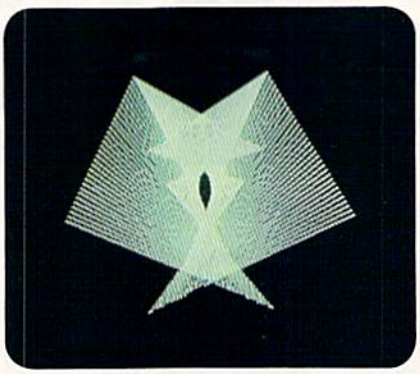
THE LIGHT FANTASTIC

```
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 DATA FOR RAINBOW PR
   OGRAM                  :REM*1Ø9
1Ø1 DATA Ø1Ø8ØBØ8ØAØØ9E323Ø36 3
   1ØØØØØØA9Ø08D2ØD08D 21DØAØØ
   ØB915ØDFØØ72Ø          :REM*24
1Ø2 DATA D2FFC84C17Ø8AØØØA296 C
   8DØFDE8DØFAAØ27EEØ6 ØDADØ6Ø
   D29ØFFØF69918          :REM*224
1Ø3 DATA D999EØD9993ØDA998ØDA 9
   9DØDA881ØE4A5C5C93C DØD2A9Ø
   Ø85CA85C885C9          :REM*23Ø
1Ø4 DATA A93285CDA94B85CBA9ØØ 8
   5CC2Ø64ØC2Ø38ØC2Ø4E ØC2ØØCØ
   C2Ø22ØCEEØ6ØD          :REM*122
1Ø5 DATA ADFEØCFØ1F18A5CA6DØ2 Ø
   D85CA38CDØ9ØD9Ø2DAD FEØC49Ø
   18DFEØC2ØEDØB          :REM*244
1Ø6 DATA 2ØØCØC4CB7Ø838A5CAED Ø
   2ØD85CA38CDØ2ØDBØØE ADFEØC4
   9Ø18DFEØC2ØED          :REM*224
1Ø7 DATA ØB2ØØCØCADFFØCFØ1F18 A
   5CD6DØ4ØD85CD38CDØA ØD9Ø2DA
   DFFØC49Ø18DFF          :REM*189
1Ø8 DATA ØC2ØEDØB2Ø22ØC4CF7Ø8 3
   8A5CDEDØ4ØD85CD38CD Ø4ØDBØØ
   EADFFØC49Ø18D          :REM*225
1Ø9 DATA FFØC2ØEDØB2Ø22ØCADØØ Ø
   DFØ2918A5C86DØ3ØD85 C8A5C96
   9ØØ85C9FØ3FA5          :REM*13Ø
11Ø DATA C838CDØ7ØD9Ø37ADØØØD 4
   9Ø18DØØØD2ØEDØB2Ø38 ØC4C4BØ
   938A5C8EDØ3ØD          :REM*1Ø3
111 DATA 85C8A5C9E9ØØ85C9DØ16 A
   5C838CDØ3ØDBØØEADØØ ØD49Ø18
   DØØØD2ØEDØB2Ø          :REM*239
112 DATA 38ØCADØ1ØDFØ2918A5CB 6
   D05ØD85CBA5CC69ØØ85 CCFØ3FA
   5CB38CDØ8ØD9Ø          :REM*199
113 DATA 37ADØ1ØD49Ø18DØ1ØD2Ø E
   DØB2Ø4EØC4C9FØ938A5 CBED05Ø
   D85CBA5CCE9ØØ          :REM*18Ø
114 DATA 85CCDØ16A5CB38CDØ5ØD B
   ØØEADØ1ØD49Ø18DØ1ØD 2ØEDØB2
   Ø4EØC2ØA5Ø94C          :REM*3
115 DATA 74Ø8A5Ø1Ø9Ø185Ø1ADØØ D
   CC97BDØØBADØCØD49Ø1 8DØCØD2
   Ø64ØCC977DØØB          :REM*224
116 DATA ADØBØD49Ø18DØBØD2Ø64 Ø
   CA5Ø129FE85Ø12ØAAØB 2Ø06ØAA
   DØCØDFØØ92ØAA          :REM*17
117 DATA ØB2ØDEØB2Ø06ØAADØBØD F
   Ø1A2ØAAØB2ØC3ØB2Ø06 ØAADØCØ
   DFØØC2ØAAØB2Ø          :REM*157
118 DATA DEØB2ØC3ØB2Ø06ØA6Ø38 A
   5AEE5AB85BBA5AFE5AC 85BC2Ø6
   2ØA85B4C9Ø1DØ          :REM*162
119 DATA Ø2A9ØØ85B52Ø73ØAA5BB 8
   5B1A5BC85B238A5BØE5 AD85BBA
   9ØØE9ØØ85BC2Ø          :REM*119
12Ø DATA 62ØA85B62Ø73ØAA5BB85 B
   3A5B185B7A5B285B8A5 B385B9A
   9ØØ85BA4C88ØA          :REM*17
121 DATA A5B8C5BADØØ4A5B7C5B9 6
   ØA5BC3ØØAFØØ3A9Ø16Ø A5BBDØF
   96ØA9FF6ØA5BC          :REM*21Ø
122 DATA 1Ø1Ø49FF85BCA5BB49FF 8
   5BBE6BBDØØ2E6BC6ØA5 AB85FAA
   5AC85FBA5AD85          :REM*1Ø2
123 DATA BD2ØE8ØA38A5ACC5AFDØ Ø
   DA5ABC5AEDØØ7A5ADC5 BØDØØ16
   Ø2Ø57ØA9Ø21A5          :REM*142
124 DATA B91865B385B9A5BA69ØØ 8
   5BAA5AB1865B485ABA5 AC65B58
   5AC2Ø57ØAFØØ2          :REM*53
125 DATA BØB7A5B71865B185B7A5 B
   865B285B8A5AD1865B6 85AD4C8
   8ØAAØØØA5FC91          :REM*129
126 DATA A7C8A5FD91A7C8A5CE91 A
   718A5A769Ø385A7A5A8 69ØØ85A
   8C91FDØØ8A9ØØ          :REM*236
127 DATA 85A7A94Ø85A8C9CFDØØ8 A
   9ØØ85A7A9EØ85A8C9FF DØØ8A9C
   885A7A9ØD85A8          :REM*81
128 DATA AØØØB1A785A9C8B1A785 A
   AC8B1A7AØØØ49FF31A9 91A9A5B
   DA829F885FE85          :REM*198
129 DATA FCA9ØØ85FDØ6FC26FDØ6 F
   C26FD18A5FC65FE85FC A5FD69Ø
   Ø85FDØ6FC26FD          :REM*56
13Ø DATA Ø6FC26FDØ6FC26FD9829 Ø
   71865FC85FCA5FD69ØØ 85FD18A
   5FA29F865FC85          :REM*1Ø4
131 DATA FCA5FB65FD85FD18A9ØØ 6
   5FC85FCA92Ø65FD85FD A5FA29Ø
   749Ø7AABDØDØD          :REM*18
132 DATA 85CEAØØØ11FC91FC6ØA5 C
   A85ADA5C885ABA5C985 ACA5CD8
   5BØA5CB85AEA5          :REM*45
133 DATA CC85AF6Ø38A93FE5AE85 A
   EA9Ø1E5AF85AF38A93F E5AB85A
   BA9Ø1E5AC85AC          :REM*133
134 DATA 6ØA9C738E5CA85ADA9C7 3
   8E5CD85BØ6ØADØ6ØD29 ØFDØØ2A
   9Ø1ØAØAØAØAAØ          :REM*1
135 DATA ØØ99ØØØ499ØØØ599ØØØ6 9
   9E8Ø6C8DØF16ØADØ6ØD 29Ø3DØØ
   2A9Ø18DØ2ØDA9          :REM*91
136 DATA C738EDØ2ØD8DØ9ØD6ØAD Ø
   6ØD29Ø3DØØ2A9Ø18DØ4 ØDA9C73
   8EDØ4ØD8DØAØD          :REM*232
137 DATA 6ØADØ6ØD29Ø7DØØ2A9Ø1 8
   DØ3ØD38A94ØEDØ3ØD8D Ø7ØD6ØA
   DØ6ØD29Ø7DØØ2          :REM*171
138 DATA A9Ø18DØ5ØD38A94ØEDØ5 Ø
   D8DØ8ØD6ØA98Ø85CEA9 ØØ85FC8
   5A5A92Ø85A685          :REM*182
139 DATA FDA9ØØA8A21F91A5C8DØ F
   BE6A6CA1ØF6ADØ6ØD29 ØFDØØ2A
   9Ø12ØF2ØBAD18          :REM*122
14Ø DATA DØØ9Ø88D18DØAD11DØØ9 2
   Ø8D11DØ78ADØEDC29FE 8DØEDCA
   5Ø129FC85Ø1A9          :REM*227
141 DATA C885A585A7A9ØD85A685 A
   8AØØØA92Ø91A5C8DØF9 E6A6A5A
   6C91FDØF1A9ØØ          :REM*31
142 DATA 85A5A94Ø85A6AØØØA92Ø 9
   1A5C8DØF9E6A6A5A6C9 CFDØF1A
   9ØØ85A5A9EØ85          :REM*221
143 DATA A6AØØØA92Ø91A5C8DØF9 E
   6A6A5A6C9FFDØF16ØØ1 Ø1Ø1Ø1Ø
   3Ø3Ø6Ø6ØØØØØØ          :REM*1Ø
144 DATA ØØØØØØØØØ1Ø2Ø4Ø81Ø2Ø 4
   Ø8Ø93Ø5ØEØDØDØDØDØD ØDØD2Ø2
   Ø2Ø2Ø2Ø2Ø2Ø2Ø          :REM*43
145 DATA 2Ø2Ø2Ø2Ø2Ø2Ø7261696E 6
   26F772Ø72756EØDØDØD ØDØD2Ø2
   Ø2Ø2Ø2Ø2Ø2Ø2Ø          :REM*46
146 DATA 2Ø2Ø2Ø625Ø2Ø63484152 4
   C4553206F5243555454 ØDØD2Ø6
   D4F5645206A4F          :REM*23Ø
147 DATA 592Ø322Ø6C4546542Ø46 4
   F522Ø76455254494341 4C2Ø735
   94D4D45545259          :REM*148
148 DATA ØDØD2Ø2Ø6D4F56452Ø72 4
   947485420464F522Ø68 4F52495
   A4F4E54414C2Ø          :REM*119
149 DATA 73594D4D45545259ØDØD 2
   Ø2Ø2Ø2Ø2Ø2Ø2Ø2Ø2Ø68 4954203
   C7370616365 3E         :REM*181
15Ø DATA 2Ø544F2Ø534545204954 Ø
   ØØØ                    :REM*152
151 DATA -1                :REM*5
```



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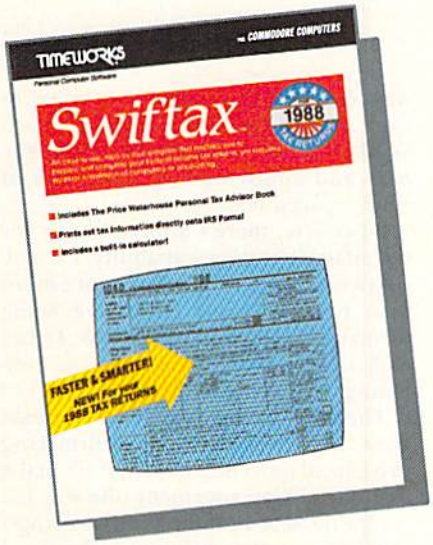

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Circle 146 on Reader Service card.

Power Drive

Here's how to realize the potential of Commodore's 1581 disk drive.

By GENE AMAYA

For years, the major complaint expressed by owners of the C-64 and C-128 computers has been the slowness of the disk drive—that is, the time required to load or save a program. To solve the problem, they've purchased fast loaders, and, in some cases, software publishers have included fast-loading routines in their programs.

Now, there's another solution: the 1581 disk drive. Not only is it much faster than the older 1541 and 1571 drives, but it's quiet, doesn't heat up and can store huge quantities of data on one disk. If you're interested in a drive that can load an article of this length in less than five seconds on the C-128 and store approximately 45 articles of this size on one disk, then read on.

Commodore accomplished all this by coming up with a new design, which departs in major ways from the older drives. To assist those interested in the new drive, I've written this article to explain the 1581's operation and how you may realize its potential. The focus is on coupling the 1581 with a C-128, but most of the information applies equally to other Commodore computers.

The Disk

The 1581 uses a standard, double-sided 3½-inch disk. This 1-megabyte, unformatted storage medium is not only smaller, but somewhat more durable than the normal 5¼-inch disk. You can write-protect it by moving a plastic tab located on the disk case.

When formatted, a 1581 disk contains 80 tracks, with 40 sectors each, and can accept 296 files. One full track is devoted to the directory, leaving a mind-boggling 3160 blocks for data storage. To illustrate just how much data such a disk can hold, one was enough to receive the contents of an entire box of partially filled 5¼-inch floppies, a total of 3056 blocks in 170 files. Put another way, one disk has sufficient space to store a word processing program such as RUN Script, a medium-sized dictionary and approximately 250 pages of single-spaced text.

Of course, there's a price to pay for this massive storage capability: Formatting a disk takes a long time, since more than twice as many tracks are being formatted as on a standard disk. Other disk maintenance tasks, such as validating, take longer, too.

The 1581 is engineered to increase speed of operation by minimizing drive-head movement. First of all, in the logical track arrangement (the way the computer sees it; the physical arrangement is somewhat different and will not be described here), track 40 contains all the directory information, including the bit availability map (BAM). The drive then writes to the tracks in a sequence that proceeds away from track 40, first to one side and then to the other: track 41, then track 39, then 42, then 38, and so on.

Furthermore, the drive's two heads, one above and one below the disk, write to one track until it is full, even if it takes more than one file to fill it. On a given track, sectors 1 to 20 are written to one side of the disk, and sectors 21 to 40 to the other side. In view of this arrangement, you should always use disks that have a double-sided rating designation. Otherwise, you may lose data. You do not, of course, have to be concerned with where a particular file resides, since this is managed by the drive's DOS.

Partitions

If it's convenient to your purposes to categorize your files, you might want to use the 1581 disk's option of being divided into sections, called partitions, each of which contains its own subdirectory and is accessed through the main, or root, directory. Any partition you establish must reside completely above or below track 40, because the DOS won't let it contain that track, which holds the main directory. The demo disk that comes with the 1581 contains a utility program you can use to partition your disks should you want to use this option.

You may find the advantages of partitioning overbalanced by certain drawbacks. For example, files within a partition are invisible to the main directory, which contains only partition names; so, to view or load a file, you must remember which partition it's in and access the subdirectory for that partition. Using partitions also requires your involvement in establishing partition size and monitoring space available within the partition. Furthermore, you should be aware that if the partition directory track is overwritten, all data in that partition may be lost.

Disk Management

Disk management is of prime importance with the 1581. Listing a directory with up to 296 entries to find a specific file is cumbersome at best. Before transferring a group of files to the 1581, develop a plan and test it on a disk containing at least 100 directory entries, so you'll know the plan is valid for a full disk. You might consider partitioning the disk, but there is the drawback that you can't go directly from one subdirectory to another, but must access each through the main directory.

There is another 1581 disk management option available that involves the * wild card. In addition to the conventional use of the wild card, the 1581 lets you use it as the first character in a search string. Therefore, by selectively naming or renaming files using filenames with a common ending, you can display portions of the master directory. For example, if all files saved from RUN-Script ended with .R, it would be easy

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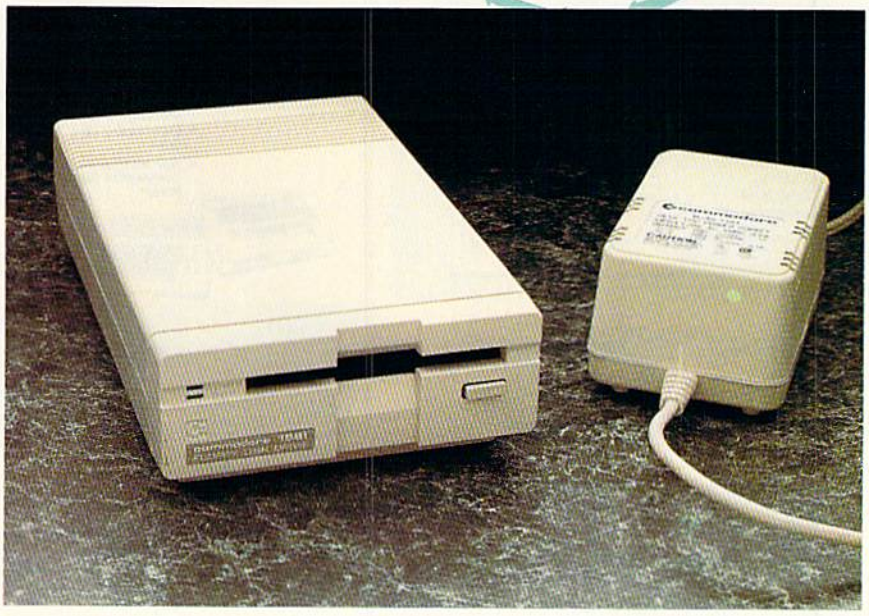
to display a directory of those files by entering CATALOG "*.R" on the C-128, or LOAD"$:*.R",8 on the C-64. If you used number 1 as the suffix character, CATALOG"*1" would list entries ending in 1, 11, 21, and so forth. Files ending with a discrete number could be accessed by assigning a leading decimal point to the suffix (as in .1 or .11) and including the decimal point in the search string. The * can also be used as the middle character of a search string. For example, CATALOG"R*T" (C-128) or LOAD"$:R*T",8 (C-64) would find files named REPORT, RUNSCRIPT, RECEIPTS-AUGUST, and so forth.

If you use RUN Script from *RUN*'s Productivity Pak III disk as your word processor, you can list a partial directory to the screen by pressing F1$$ and F3, then typing in the search string, including an appropriately placed wild card, and pressing return. Usually, if the search string is well chosen, all the matching filenames will fit on one screen. Try it with a disk that contains more than 100 files.

As the size of a directory grows, the C-128's F3 key tends to be used less and the Catalog or Directory command, accompanied by a search string, more. These commands need not be typed in full. DI{shiftedR} and C{shiftedA} work equally well. C{shiftedA}"**" displays the disk name and number of blocks free.

There's still another approach to handling large directories: a menu program that displays the directory on the screen a section at a time or lets you scroll it on the screen. An easy method to load programs is normally associated with menu programs of this type. This is probably your best approach with disks that contain more than 100 files, but I have yet to find a menu program that does all the things desirable with the C-128/1581 combination. Try to find one that's fast-loading, displays a lot of files per screen and provides for easy selection of the program to be loaded. Once you've found a good program, you could set it to autoboot, so you can easily locate the program you need.



Commodore's 3½-inch disk drive is a wonder of compact storage space.

Software Compatibility

As I indicated earlier, the 1581 directory occupies track 40. The directory on the 1541 and similar drives, on the other hand, is on track 18. This difference renders some programs unusable with the 1581 and requires others to be modified to work properly. For instance, programs containing direct-access commands, such as Block Read, to read a directory must be modified to identify the correct track and sector containing the desired file information.

An example of this is the Auto Menu program on the Productivity Pak III disk, where line 130 must be changed from T = 18:S = 1 to T = 40:S = 3. The directory of the 1581 functions similarly to that of the 1541, but it's constructed differently. As you can see from the example, file information on a 1541 starts at sector 1, while on the 1581 it starts at sector 3.

A little thought reveals why some other programs won't work with a 1581 without extensive modification. Attempting to copy from a 1541 to a 1581 using a non-1581-compatible copy program that makes a track-for-track duplication will write the directory on track 18, if it works at all. Track 40 will be totally blank, thereby making the copy useless. Not only will the directory be dislocated, the tracks on the 1581 will contain from 17 to 21 sectors instead of the normal 40. Even if the directory could be written to track 40 in the proper format, the DOS would probably crash due to the partially filled tracks.

I assume that most, if not all, 1541 fast-copy programs and fast loaders don't work with the 1581. These programs and cartridges usually modify the drive DOS, and, because the 1581's elec-

Continued on p. 65.

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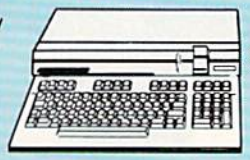

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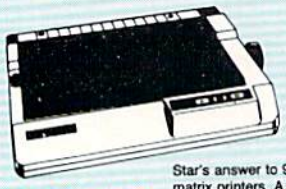

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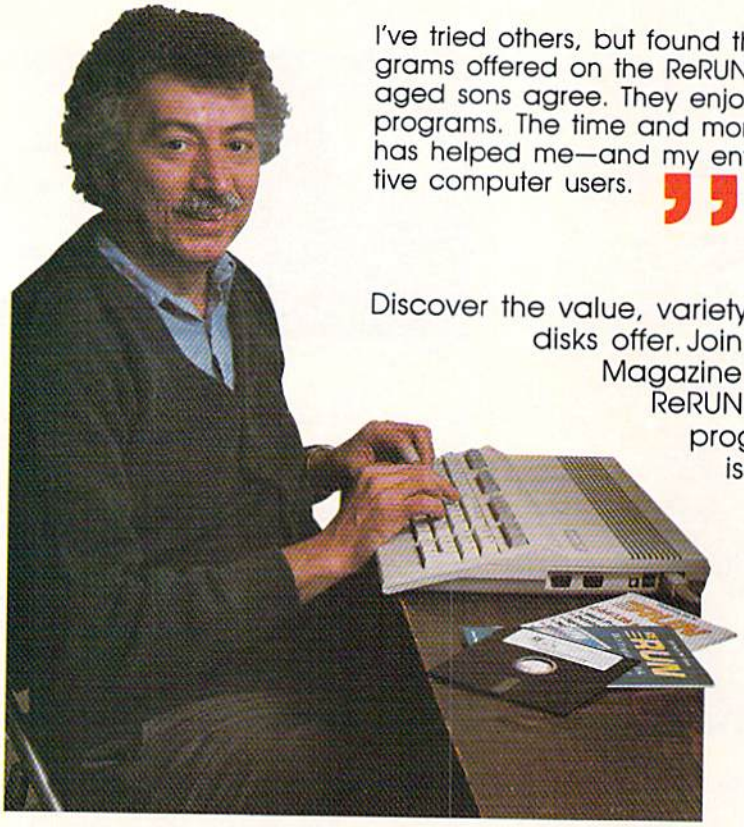

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From p. 63.

tronic architecture is quite different from the 1541's, it won't accept the modifying commands.

The 1581 also doesn't work with some online services, such as QuantumLink. During part of the downloading process, Q-Link reads track 18 to verify that the receiving disk has sufficient space for the data, but, on the 1581, track 40 contains the blocks-free information.

CP/M users need to purchase a 1581-specific CP/M disk. It's available from Commodore.

Excluding the Burst mode, the 1581 operates at one speed with the C-64 and a faster speed with the C-128, where it loads about 26 blocks per second. The drive reads the serial bus to determine if it's connected to a fast device (C-128) or slow device (C-64 and others) and adjusts data transfer speed accordingly.

Copying to 1581 Format

Protected software can't be copied to the 1581 format for obvious reasons, but many other packages and files can be. As I mentioned before, you can't use a copy program that creates a track-for-track duplication of the original disk, but copy programs that employ a load-and-save scheme will work. Unicopy, which is included on the utility disk that comes with the drive, accomplishes this task nicely.

Although many programs can be copied to the 1581 format and will run with no difficulty, it's best to test each program after you've transferred it. If it hangs up or won't run at all, perhaps you can debug it. Debugging a compiled or machine language program takes considerable expertise, and you must have the proper compiler, but most programs that hang up are ones that address specific tracks and sectors of the drive memory, and they take less programming knowledge to fix.

Try listing the program and scanning the lines between those that open and close the drive for commands like Block Read, M-R, or others that you'll find in chapters 6 and 7 of the *1581 User's Guide*. If you find such a command, try to determine if it's the source of the problem and then correct it.

It may not be obvious that some programs require modification. One such appears on page 107 of the *User's Guide*. I ran it several times before I realized that the disk-side information was incorrect. After I determined that the program was originally written for the 1571, changing CHR$(239) in line 170 to CHR$(32) corrected the problem.

On the other side of the coin, sometimes a program may appear to need modification when it doesn't; you just didn't follow the procedure properly in running it. Experience has shown me that most non-copy-protected programs can be copied and will run properly without modification, the exceptions being disk-drive utilities.

A utility disk and documentation come with the 1581, but they have some problems. First, the documentation doesn't fully explain how the programs operate. For example, it took me several tries to determine the proper steps to make the autoboot program work, because an erroneous message indicates that the autoboot track contains data.

Also, a program for copying a file from one disk to another using a single 1581 is not included in the package. Fortunately, Unicopy 128, written by Jim Butterfield, does this task nicely and can be downloaded from QuantumLink. Finally, the Catalog function in the Sector Editor program displays only the first 99 disk directory entries. This limitation appears in other software used with other drives, such as the 1541, but it's normally not a problem because of the unlikelihood of exceeding the 99 entries. I shouldn't be too critical here, though, because the 1581 utility disk programs aren't intended to be 1581-unique; they're provided for use with any one of several drives.

A final word of warning: Be sure to heed the advice on page 7 of the *1581 User's Guide* about removing the disk before turning the power off. The 1581 is not as forgiving as the 1541, and I've lost two disks for failing to do this. Apparently, the heads are parked over track 1 when the power is cut and the cover on the disk exerts pressure against the heads. If the disk is removed, a portion of track 1 is destroyed. Then, the next time the disk is used, the directory can't be accessed, because the DOS tries to read track 1 before track 40. This hypothesis is based on the fact that after many tries, I did access the directory on a damaged disk and it appeared to be intact. Attempts to format these damaged disks always abort with read error 23 or write error 25 on track 1, sector 0.

Drawbacks aside, after using a 1581 drive for a while, you'll be reluctant to go back to your 1541, and, if you have a C-128, you'll unleash the full power of this speedy mass storage device. ■

Gene Amaya, a Certified Professional Logistician and logistics engineering specialist, is also a programmer primarily interested in adapting applications software for use with the C-128 and the 1581 drive.

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A Love-ly Idea

Send personalized Valentines this year, with the help of your Commodore.

An example of what's possible with The Valentine Maker program.

By JIM BORDEN

February brings out the romantic in the stodgiest of us, and sends us in droves to the Hallmark store. But wouldn't your thoughts seem more heartfelt if they were "homemade?" Well, with Valentine Maker, you can design your own greetings, even if you're not handy with pen and brush, then save your designs to disk and print them out for cards. The program works with the Commodore MPS-803 printer and compatibles, as well as most Star and Epson models.

When you run Valentine Maker, the help screen appears and asks you to select a printer. If you have a Commodore or compatible, enter 0. If you have a Star (Gemini) or Epson or compatible, enter 1 or 2. You must specify a printer at this point; you can't do it later. After you type the printer number and press return, there's a short delay while several machine language routines are read into memory.

The graphic screen and the help screen are Valentine Maker's two displays. The former is for creating designs, while the latter lists the commands you can use and is the launching point for screen saves and loads. You toggle between the screens with control/H.

As the help screen indicates, the control key is used to execute all functions except loads and saves. The functions listed in the top part of the help display can be activated from the graphic screen only.

Creating Designs

Your designs can consist of keyboard characters in three sizes and pictures that I've built into the program. The three character sizes are normal (one-column), selected with control/N; big (four-column), selected with control/B; and jumbo (8-column), selected with control/J. Only uppercase/graphics characters are available. You can display them in reverse by pressing control/9.

A special graphic screen cursor, consisting of two dots, indicates the upper-left and lower-right corners of the block that will contain the next character you type. You can see the block if you activate Reverse mode. Since you can't see the block in Regular mode, you can "fine tune" the position of a big or jumbo character by moving the cursor in normal size (where the dots more nearly indicate the size of the character), then switching to the larger size to type the character.

Typing a character at the end of a line moves the cursor to the next line, except when you're at the bottom of the screen. In that case, the cursor advances to the home position.

I've built three pictures into Valentine Maker: a box of candy (control/C or the stop key), a heart (control/L, for love) and a vase of flowers (control/F). The pictures must fit entirely on the screen or their commands will produce nothing. Also, if two overlap, the more recent one will obliterate part of the earlier one.

You can change the pictures to adapt the program to Christmas or any other occasion. Just note that the Data statement above each picture is its printed (not displayed) width and height, and that you can't include any reverse (RVS) codes in the Print statement. Even if you change the pictures, control/C, control/L and control/F will still be the commands to display them.

All the keys except Commodore/shift, the color keys and the function keys work on the graphic screen.

Saving and Loading

You can save your design screens to disk by moving to the help screen and pressing the S key (not control/S). When prompted, type a filename for the screen and press return. If you've already used that name on the disk, an error message will appear and the screen won't be saved. To identify screen files in the directory, Valentine Maker automatically prefixes their filenames with a period. During the save, the display toggles to the graphic screen, then, when the save is complete, the help screen is restored. ►

RUN it right: **C-64; printer**

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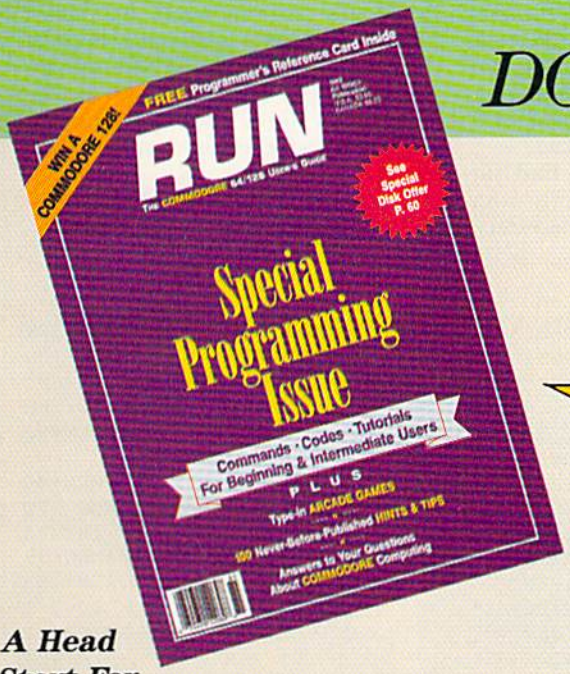

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Loading a screen is somewhat similar to saving one. Press L, enter the filename (without the period prefix) and press return. The screen will toggle, the new screen will load and the help screen will reappear.

PRINTOUTS

You can print a screen at any time by pressing control/P. The screen is dumped as a text/graphics printout, with quotation marks printed as bit-mapped characters to avoid Quote mode problems.

With either a Commodore or compatible printer, the picture appears wider in the printout than on the screen. If you have a Star (Gemini) or Epson printer, the dump produces a printout with proportions similar to those on the screen.

You might have to change the secondary address in the Open statement (line 1280) for your interface. If so, use a number that produces Transparent mode without line feeds. A value of 5 works for the Cardco B interface.

Try a few quick pictures to find out if your printer works properly with Valentine Maker; then, if necessary, change the secondary address and try again. When you find the best secondary address, save the program with the change.

If you use a cartridge such as the Epyx Fast Load, you might have to remove it to run this program. Again, do a quick picture, then save, load and print it. If the program doesn't work with the cartridge plugged in, you'll know before you end up with a masterpiece on the screen and a locked-up computer. R

Jim Borden, RUN's former Magic columnist, is a freelance programmer and writer.

Listing 1. Valentine Maker program.

```
10 REM VALENTINE MAKER-JIM BORD
   EN                        :REM*199
20 GOSUB630:PRINT"{SHFT CLR}":S
   YS49452:POKE53287,1:POKE5328
   8,1:PRINT"{SHFT CLR}"
                             :REM*212
30 REM-- MAIN LOOP           :REM*159
40 SX=C*8+24:SY=R*8+50:SC=BS+R*
   MC+C                      :REM*133
50 POKE53248,SXAND255:POKE53249
   ,SYAND255:HI=-1*(SX>255)
                             :REM*196
60 SX=SX+SZ*8-24:SY=SY+SZ*8-21
                             :REM*197
70 POKE5325Ø,SXAND255:POKE53251
   ,SYAND255:H2=-2*(SX>255)
                             :REM*174
80 POKE53264,HI+H2           :REM*6
90 POKE2Ø4Ø,14:POKE2Ø41,15:POKE
   53269,3:REM SPRITES ON
                             :REM*154
100 GET A$:IFA$=""THEN1ØØ
                             :REM*173
110 IFA$="{CRSR UP}"ANDR=>SZTHE
   NR=R-SZ                   :REM*165
120 IFA$="{CRSR DN}"ANDR<26-SZ*
   2THENR=R+SZ               :REM*197
130 IFA$="{CRSR LF}"THENC=C-SZ:
   IFC<ØTHENR=R-SZ:C=MC-SZ:IFR
   <ØTHENR=25-SZ             :REM*189
140 IFA$="{CRSR RT}"THENC=C+SZ:
   IFC+SZ>MCTHENC=Ø:R=R+SZ:IFR
   +SZ>24THENR=Ø             :REM*92
150 IFA$=CHR$(14)THENSZ=1
                             :REM*49
160 IFA$=CHR$(2)ANDR<22ANDC<37T
   HENSZ=4                   :REM*3
170 IFA$=CHR$(1Ø)ANDR<18ANDC<33
   THENSZ=8                  :REM*163
180 IFA$=CHR$(16)THEN ON PC+1 G
   OSUB115Ø,127Ø,127Ø:GOTO4Ø:R
   EM PRINT SUB              :REM*184
190 IFA$=CHR$(2Ø)ANDC=>SZTHEN G
   OSUB185Ø                  :REM*46
200 IFA$=CHR$(148)ANDC<41-SZ*2T
   HEN GOSUB191Ø             :REM*54
210 IFA$="{SHFT CLR}"ORA$="{HOM
   E}"THENR=Ø:C=Ø:PRINTA$;
                             :REM*251
220 IFA$="{CTRL 9}"THENPRINTA$;
   :REM RVS ON               :REM*95
230 IFA$="{CTRL Ø}"THENPRINT:RE
   M RVS OFF (SAME AS RETURN)
                             :REM*136
240 IF(A$=CHR$(13)ORA$=CHR$(141
   ))THENR=R+SZ:C=Ø:PRINT"{HOM
   E}":IFR+SZ>25THENR=Ø:REM*31
250 IFA$=CHR$(5)GOTO54Ø:REM EXI
   T                         :REM*15
260 IFA$=CHR$(8)THENGOSUB56Ø:A$
   =CHR$(8):REM MENU         :REM*136
270 REM PICTURES             :REM*24
280 IFA$=CHR$(3)THENPN=Ø:GOSUB1
   96Ø                       :REM*163
290 IFA$=CHR$(12)THENPN=1:GOSUB
   196Ø                      :REM*92
300 IFA$=CHR$(6)THENPN=2:GOSUB1
   96Ø                       :REM*22Ø
310 IFASC(A$)>31 AND ASC(A$)<12
   8 THEN36Ø                 :REM*156
320 IFASC(A$)<16Ø THEN 4Ø
                             :REM*161
330 :                        :REM*133
340 REM PROCESS VALID CHAR
                             :REM*186
350 :                        :REM*153
360 OC=PEEK(BS):PRINT"{HOME}"A$
   ;:IFA$=CHR$(34)THENX=PEEK(B
```


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```
    S+1):PRINTA$;:POKEBS+1,X
                          :REM*94
37Ø IFSZ>1THEN 43Ø        :REM*24
38Ø POKESC,PEEK(BS):IFSC>BSTHEN
     POKEBS,OC            :REM*235
39Ø C=C+1:IFC=MCTHENC=Ø:R=R+1
                          :REM*23Ø
4ØØ IFR=25THENR=Ø         :REM*26
41Ø GOTO4Ø                :REM*24
42Ø :                     :REM*223
43Ø SYS49152:POKEBS,OC:IFSZ=8TH
    EN49Ø                 :REM*19Ø
44Ø FORZ=ØTO3:FORY=ØTO3:POKESC+
    Y+Z*MC,CR(PEEK(4951Ø+Z*4+Y)
    )                     :REM*183
45Ø NEXT:NEXT:C=C+4:IFC>36THENR
    =R+4:C=Ø              :REM*215
46Ø IFR>21THEN R=C        :REM*2Ø2
47Ø GOTO4Ø                :REM*84
48Ø :                     :REM*24
49Ø FORZ=ØTO7:FORY=ØTO7:Q=PEEK(
    49526+Z*8+Y)*128:POKESC+Y+Z
    *MC,Q+32              :REM*122
5ØØ NEXT:NEXT:C=C+8:IFC>32THENR
    =R+8:C=Ø              :REM*65
51Ø IFR>17THEN:R=C        :REM*31
52Ø GOTO4Ø                :REM*138
53Ø :                     :REM*78
54Ø POKE53269,Ø:POKE788,49:PRIN
    TCHR$(9);:END         :REM*5Ø
55Ø ;                     :REM*99
56Ø POKE53269,Ø:SYS49452:MU=1:G
    OSUB 63Ø              :REM*1Ø9
57Ø GET A$:IFA$=CHR$(5)GOTO54Ø:
    REM EXIT              :REM*1Ø8
58Ø IF A$=CHR$(8)THEN PRINT"{SH
    FT CLR}{CTRL 1}";:SYS49452:
    FORX=1TO1Ø:GET B$:NEXT:RETU
    RN                    :REM*16
59Ø IFA$="S"THEN GOSUB171Ø
                          :REM*84
6ØØ IFA$="L"THEN GOSUB178Ø
                          :REM*96
61Ø GOTO57Ø:REM ONLY EXIT OR TO
    GGLE/SAVE/LOAD        :REM*1Ø9
62Ø :                     :REM*164
63Ø POKE5328Ø,11:POKE53281,12:P
    RINT"{CTRL 1}{SHFT CLR}"CHR
    $(142)CHR$(8);        :REM*172
64Ø PRINT"TEXT SIZE:{9 SPACEs}P
    ICTURES:              :REM*27
65Ø PRINT"CTRL+N=NORMAL{6 SPACE
    s}CTRL+C=CANDY BOX    :REM*69
66Ø PRINT"CTRL+B=BIG (4X){4 SPA
    CEs}CTRL+F=FLOWERS    :REM*2Ø6
67Ø PRINT"CTRL+J=JUMBO (8X){2 S
    PACEs}CTRL+L=LOVE (HEART)":
    PRINT                 :REM*81
68Ø PRINT"{4 SPACEs}CRTL+P = PR
    INT CURRENT SCREEN    :REM*171
69Ø FORX=1TO1Ø:PRINT"----";:NEX
    T                     :REM*82
7ØØ PRINT"{4 SPACEs}CTRL+H = TO
    GGLE THIS SCREEN      :REM*72
71Ø PRINT"{4 SPACEs}CTRL+E = EX
    IT TO BASIC           :REM*199
72Ø PRINT"USE S OR L FROM THIS
    SCREEN TO SAVE OR"    :REM*51
73Ø PRINT" LOAD A SCREEN FILE."
                          :REM*26
74Ø FORX=1TO1Ø:PRINT"----";:NEX
    T:PRINT               :REM*15Ø
75Ø IF MU THEN RETURN     :REM*126
76Ø POKE788,52:PRINT"SELECT PRI
    NTER:"                :REM*38
77Ø INPUT"{2 SPACEs}Ø=COMMODORE
    ; 1=STAR; 2=EPSON";A$:PC=AS
    C(A$+CHR$(Ø))-48      :REM*77
78Ø IF PC<ØORPC>2 THENPRINT"ONL
    Y Ø, 1 OR 2 ALLOWED":GOTO77
    Ø                     :REM*96
79Ø FOR X=49152TO495ØØ:READZ:PO
    KEX,Z:Y=Y+Z:NEXT      :REM*182
8ØØ IFY<>47973THENPRINT"DATA ER
    ROR":END              :REM*35
81Ø DATA 169,Ø,141,49,192,173,Ø
    ,4,141,48,192,162,3,14,48,1
    92,46,49,192,2Ø2      :REM*231
82Ø DATA 2Ø8,247,24,169,2Ø8,1Ø9
    ,49,192,141,49,192,173,14,2
    2Ø,41,254,141,14      :REM*226
83Ø DATA 22Ø,165,1,41,251,133,1
    ,162,7,189,Ø,24Ø,157,1Ø2,19
    3,2Ø2,16,247,165      :REM*2Ø1
84Ø DATA 1,9,4,133,1,173,14,22Ø
    ,9,1,141,14,22Ø,162,63,169,
    Ø,157,118,193         :REM*87
85Ø DATA 2Ø2,16,25Ø,169,11Ø,141
    ,11Ø,192,169,193,141,111,19
    2,16Ø,Ø,24,169,8      :REM*231
86Ø DATA 1Ø9,11Ø,192,141,11Ø,19
    2,162,Ø,185,1Ø2,193,1Ø,144,
    3,254,Ø,24Ø,232       :REM*178
87Ø DATA 224,8,2Ø8,245,2ØØ,192,
    8,2Ø8,226,169,118,133,251,1
    69,193,133,252        :REM*249
88Ø DATA 169,1Ø2,141,16Ø,192,16
    9,193,141,161,192,162,Ø,16Ø
    ,Ø,177,251,1Ø         :REM*75
89Ø DATA 2ØØ,17,251,1Ø,16Ø,8,17
    ,251,1Ø,2ØØ,17,251,157,2Ø6,
    186,24,165,251        :REM*139
9ØØ DATA 1Ø5,2,133,251,232,138,
    41,3,2Ø8,223,24,165,251,1Ø5
    ,8,133,251,224        :REM*43
91Ø DATA 16,2Ø8,212,96,169,39,1
    41,93,193,173,Ø,4,162,Ø,142
    ,241,192,141,24Ø      :REM*112
92Ø DATA 192,162,3,14,24Ø,192,4
    6,241,192,2Ø2,2Ø8,247,24,16
    9,2Ø8,1Ø9,241         :REM*1Ø4
93Ø DATA 192,141,241,192,173,14
    ,22Ø,41,254,141,14,22Ø,165,
    1,41,251,133,1        :REM*199
94Ø DATA 162,7,189,Ø,24Ø,157,94
    ,193,2Ø2,16,247,16Ø,7,162,Ø
    ,3Ø,94,193,42         :REM*41
95Ø DATA 232,224,8,2Ø8,247,72,1
    65,1,9,4,133,1,173,14,22Ø,1
    73,14,22Ø,9,1         :REM*7
96Ø DATA 141,14,22Ø,1Ø4,32,21Ø,
    255,136,16,22Ø,238,193,192,
    2Ø8,3,238,194         :REM*5
97Ø DATA 192,2Ø6,93,193,16,149,
    96,169,Ø,133,251,133,253,16
    9,4,133,252,169       :REM*12
98Ø DATA 194,133,254,16Ø,Ø,177,
```

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LOVE-LY IDEA

```
    251,72,177,253,145,251,1Ø4,
    145,253,23Ø,251      :REM*95
99Ø DATA 23Ø,253,2Ø8,4,23Ø,252,
    23Ø,254,165,251,2Ø1,232,2Ø8
    ,23Ø,165,252,2Ø1     :REM*132
1ØØØ DATA 7,2Ø8,224,96   :REM*87
1Ø1Ø BS=1Ø24:MC=4Ø       :REM*251
1Ø2Ø R=Ø:C=Ø:REM SCREEN CURSOR
                         :REM*9
1Ø3Ø SZ=1:REM NORMAL TEXT
                         :REM*129
1Ø4Ø FORX=896TOX+127:POKEX,Ø:NE
    XT:POKE896,128:POKE1Ø22,1
                         :REM*138
1Ø5Ø DIM C$(15),CR(15):FORX=ØTO
    15:READ C$(X),CR(X):NEXT
                         :REM*1ØØ
1Ø6Ø DATA" ",32,"{COMD D}",1Ø8,
    "{COMD F}",123,"{COMD I}",
    98,"{COMD C}",124,"{CTRL 9
    }{COMD K}{CTRL Ø}",225,"{C
    TRL 9}{COMD B}{CTRL Ø}",25
    5,"{CTRL 9}{COMD V}{CTRL Ø
    }",254               :REM*83
1Ø7Ø DATA "{COMD V}",126,"{COMD
     B}",127,"{COMD K}",97,"{C
    TRL 9}{COMD C}{CTRL Ø}",25
    2,"{CTRL 9}{COMD I}{CTRL Ø
    }",226,"{CTRL 9}{COMD F}{C
    TRL Ø}",251,"{CTRL 9}{COMD
     D}{CTRL Ø}",236     :REM*48
1Ø8Ø DATA "{CTRL 9} {CTRL Ø}",1
    6Ø                   :REM*21Ø
1Ø9Ø Q$(Ø)=CHR$(8):Q$(1)=Q$(Ø)
                         :REM*145
11ØØ FORX=1TO6:READ Y:Q$(Ø)=Q$(
    Ø)+CHR$(255-Y):Q$(1)=Q$(1)
    +CHR$(128+Y):NEXT    :REM*121
111Ø Q$(Ø)=Q$(Ø)+CHR$(15):Q$(1)
    =Q$(1)+CHR$(15)      :REM*129
112Ø DATA Ø,7,Ø,Ø,7,Ø    :REM*58
113Ø FORX=ØTO2:READ PX(X),PY(X)
    :NEXT                :REM*193
114Ø RETURN              :REM*7
115Ø Z=BS:OPEN4,4:CMD4,"";:REM
    DUMP SUB FOR 8Ø3     :REM*183
116Ø FORX=ØTO24:PRINT CHR$(15);
    :FORY=ØTO39          :REM*124
117Ø CH=PEEK(Z):RV=146:IFCH>127
    THENRV=18:CH=CH-128
                         :REM*161
118Ø IFCH<32THENCH=CH+64:GOTO12
    2Ø                   :REM*113
119Ø IFCH<64THEN122Ø     :REM*151
12ØØ IFCH<96THENCH=CH+32:GOTO12
    2Ø                   :REM*115
121Ø CH=CH+64            :REM*6Ø
122Ø Z=Z+1:IFCH=34THENPRINT Q$(
    1+(RV=18));:GOTO124Ø
                         :REM*142
123Ø PRINT CHR$(RV)CHR$(CH)CHR$
    (146);               :REM*121
124Ø NEXT:PRINT CHR$(8):NEXT:PR
    INT#4,"";            :REM*121
125Ø CLOSE4:RETURN       :REM*216
126Ø :                   :REM*35
127Ø PT=1Ø3:IF PC=2THENPT=42:RE
    M SELECT 9Ø DPI CHAR
                         :REM*16Ø
128Ø POKE49345,Ø:POKE49346,4:OP
    EN4,4,5:CMD4,CHR$(27)"A"CH
    R$(8);:REM 8/72 LF:REM*138
129Ø FORX=ØTO24:REM DO 25 LINES
    -SEND 9Ø DPI/32Ø DOTS COMM
    AND                  :REM*185
13ØØ PRINT CHR$(27)CHR$(PT)CHR$
    (6)CHR$(64)CHR$(1);
                         :REM*229
131Ø SYS49339:PRINT CHR$(13)CHR
    $(1Ø);:NEXT:PRINT#4,"";:CL
    OSE4:RETURN          :REM*113
132Ø :                   :REM*1Ø3
133Ø DATA 12,7           :REM*12Ø
134Ø PRINT TAB(C)"{4 SPACEs}{7
    COMD Ps} "           :REM*228
135Ø PRINT TAB(C)"{3 SPACEs}{SH
    FT N}{6 SPACEs}{SHFT N}{CO
    MD H}"               :REM*133
136Ø PRINT TAB(C)"{2 SPACEs}{SH
    FT N}{6 SPACEs}{SHFT N} {C
    OMD G}"              :REM*84
137Ø PRINT TAB(C)" {SHFT N}{6 S
    PACEs}{SHFT N}{2 SPACEs}{C
    OMD G}"              :REM*59
138Ø PRINT TAB(C)" {SHFT O}{5 C
    OMD Ys}{SHFT P}{2 SPACEs}{
    SHFT N} "            :REM*7Ø
139Ø PRINT TAB(C)" {COMD G}CAND
    Y{COMD N} {SHFT N}{2 SPACE
    s}"                  :REM*3Ø
14ØØ PRINT TAB(C)" {SHFT L}{5 C
    OMD Ps}{SHFT @}{SHFT N}{3
    SPACEs}"             :REM*69
141Ø RETURN              :REM*22
142Ø DATA 12,9           :REM*22Ø
143Ø PRINTTAB(C)"{3 SPACEs}{2 C
    OMD Ps}{2 SPACEs}{2 COMD P
    s}{3 SPACEs}"        :REM*212
144Ø PRINTTAB(C)"{2 SPACEs}{SHF
    T N}{2 SPACEs}{SHFT M}{SHF
    T N}{2 SPACEs}{SHFT M}{2 S
    PACEs}"              :REM*88
145Ø PRINTTAB(C)" {SHFT N}{8 SP
    ACEs}{SHFT M} "      :REM*25Ø
146Ø PRINTTAB(C)"{COMD M}{1Ø SP
    ACEs}{COMD G}"       :REM*1ØØ
147Ø PRINTTAB(C)" {SHFT M}{8 SP
    ACEs}{SHFT N} "      :REM*223
148Ø PRINTTAB(C)"{2 SPACEs}{SHF
    T M}{6 SPACEs}{SHFT N}{2 S
    PACEs}"              :REM*2Ø8
149Ø PRINTTAB(C)"{3 SPACEs}{SHF
    T M}{4 SPACEs}{SHFT N}{3 S
    PACEs}"              :REM*4Ø
15ØØ PRINTTAB(C)"{4 SPACEs}{SHF
    T M}{2 SPACEs}{SHFT N}{4 S
    PACEs}"              :REM*35
151Ø PRINTTAB(C)"{5 SPACEs}{SHF
    T M}{SHFT N}{5 SPACEs}"
                         :REM*58
152Ø RETURN              :REM*12Ø
153Ø DATA 9,8            :REM*91
154Ø PRINTTAB(C)"{3 SPACEs}{CTR
    L 9}{SHFT LB.}{CTRL Ø}{SHF
    T Z}{CTRL 9}{COMD *}{CTRL
    Ø}{3 SPACEs}"        :REM*166
155Ø PRINTTAB(C)"{3 SPACEs}{SHF
    T Z}{SHFT W}{SHFT Z}{3 SPA
```


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LOVE-LY IDEA

```
    CEs}"                   :REM*22Ø
156Ø PRINTTAB(C)"{CTRL 9}{SHFT
    LB.}{CTRL Ø}{SHFT Z}{CTRL
    9}{COMD *}{CTRL Ø}{COMD *}
    {SHFT Z}{SHFT LB.}{CTRL 9}
    {SHFT LB.}{CTRL Ø}{SHFT Z}
    {CTRL 9}{COMD *}{CTRL Ø}"
                            :REM*37
157Ø PRINTTAB(C)"{SHFT Z}{SHFT
    W}{SHFT Z} {SHFT B} {SHFT
    Z}{SHFT W}{SHFT Z}":REM*79
158Ø PRINTTAB(C)"{COMD *}{SHFT
    Z}{SHFT LB.}{SHFT M}{SHFT
    B}{SHFT N}{COMD *}{SHFT Z}
    {SHFT LB.}"             :REM*173
159Ø PRINTTAB(C)"{3 SPACEs}{COM
    D *}{CTRL 9} {CTRL Ø}{SHFT
     LB.}{3 SPACEs}"        :REM*4Ø
16ØØ PRINTTAB(C)"{4 SPACEs}{CTR
    L 9} {CTRL Ø}{4 SPACEs}"
                            :REM*68
161Ø PRINTTAB(C)"{3 SPACEs}{CTR
    L 9}{3 SPACEs}{CTRL Ø}{3 S
    PACEs}"                 :REM*2Ø6
162Ø RETURN                 :REM*228
163Ø :                      :REM*158
164Ø REM FILENAME+ERR CHANNEL
                            :REM*232
165Ø INPUT"FILENAME";F$:IF LEN(
    F$)>15THEN PRINT"TOO LONG"
    :GOTO165Ø               :REM*17Ø
166Ø F$="."+F$              :REM*1Ø3
167Ø OPEN1,8,15:OPEN8,8,8,F$:CL
    OSE8                    :REM*78
168Ø INPUT#1,A,B$,C,D:CLOSE1:RE
    TURN                    :REM*163
169Ø :                      :REM*21Ø
17ØØ REM SAVE FILE          :REM*174
171Ø GOSUB164Ø:IFA=ØTHEN PRINT"
    FILE EXISTS!":RETURN
                            :REM*91
172Ø IF A<>62THENPRINTA;B$;C;D:
    RETURN                  :REM*187
173Ø SYS49452:OPEN8,8,8,F$+",P,
    W"                      :REM*85
174Ø PRINT#8,CHR$(Ø)CHR$(4);
                            :REM*182
175Ø FOR X=1Ø24TO2Ø23:PRINT#8,C
    HR$(PEEK(X));:NEXT      :REM*42
176Ø CLOSE8:SYS49452:GOSUB63Ø:R
    ETURN                   :REM*176
177Ø :                      :REM*35
178Ø REM LOAD FILE          :REM*195
179Ø POKE788,49:GOSUB164Ø:IF A>
    ØTHENPRINTA;B$;C;D:RETURN
                            :REM*15Ø
18ØØ SYS49452:OPEN8,8,8,F$:GET#
    8,A$,B$                 :REM*141
181Ø IFASC(A$+CHR$(Ø))+ASC(B$)*
    256<>1Ø24THENPRINT"NOT A S
    CREEN FILE!":GOTO183Ø
                            :REM*56
182Ø FOR X=1Ø24TO2Ø23:GET#8,A$:
    POKEX,ASC(A$+CHR$(Ø)):IFST
    =ØTHEN NEXT             :REM*195
183Ø CLOSE8:SYS49452:GOSUB63Ø:P
    OKE788,52:RETURN        :REM*151
184Ø :                      :REM*1Ø9
185Ø PRINT"{HOME}";:IFR=ØTHEN18
    7Ø                      :REM*214
186Ø FORX=1TOR:PRINT"{CRSR DN}"
    ;:NEXT                  :REM*215
187Ø FORX=1TOSZ:PRINTTAB(C);:FO
    RY=1TOSZ                :REM*136
188Ø PRINTCHR$(2Ø);:NEXT:IFX<SZ
    THENPRINT"{CRSR DN}";
                            :REM*244
189Ø NEXT:PRINT"{HOME}";:C=C-SZ
    :RETURN                 :REM*216
19ØØ :                      :REM*161
191Ø FORX=ØTOSZ-1:FORY=1Ø63+(R+
    X)*MC TO 1Ø24+(R+X)*MC+C+S
    Z STEP-1                :REM*222
192Ø POKE Y,PEEK(Y-SZ):NEXT
                            :REM*241
193Ø FORY=YTOY-SZ+1STEP-1:POKEY
    ,32:NEXT                :REM*11
194Ø NEXT:RETURN            :REM*62
195Ø :                      :REM*223
196Ø IFR>24-PY(PN)ORC>38-PX(PN)
     THEN RETURN:REM NO ROOM!
                            :REM*88
197Ø PRINT"{HOME}";:IFR=ØTHEN19
    9Ø                      :REM*178
198Ø FORX=1TOR:PRINT:NEXT
                            :REM*125
199Ø ON PN+1 GOSUB134Ø,143Ø,154
    Ø                       :REM*1
2ØØØ PRINT"{HOME}";:RETURN
                            :REM*22Ø ■
```

RUN AMOK

Item: A number of readers have asked for help in using Lou Wallace's Panels program (Panel Maker, November 1988, p. 50). First of all, when you type in the listing from the magazine, save it under the filename PANELS.BAS and run it. This causes the actual machine language Panels program to be created on disk. Then, to run programs that use Panels' commands, type, in Direct mode:

```
LOAD"PANELS",8,1
NEW
```

Or, if you want to have a program load Panels for you, add this line to the program:

```
10 IF A = 0 THEN A = 1:
   LOAD"PANELS",8,1
```

Item: We regret an error in the documentation for Crazy Caverns (December 1988, p. 48) that has brought us many complaining calls. The program was modified before publication, but we slipped in not making a necessary change in the article. In the little boot program (second column in the text), line 20 should read SYS 16384. ■

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One Step Beyond Basic

Knowing the subtleties of your computer is the key to more sophisticated programming.

By MORTON KEVELSON

In using Basic, you've become familiar with the operation of the Peek and Poke commands, although you may not know just what they do to the computer. These commands give the Basic programmer direct access to the insides of the machine—a link to both the hardware and the machine language programs that govern its behavior.

When you program in Basic, you're actually providing a list of instructions for subsequent interpretation by a large machine language program that's built into the permanent memory of the computer. The computer can't understand Basic directly, but, under the control of this Basic interpreter, it can execute the programs you write.

Basic uses portions of the computer's RAM (random access memory) as a kind of scratch pad for its operations. By carefully manipulating the contents of RAM, you can make Basic behave in unexpected and useful ways.

We work with two-byte numbers that represent addresses in the computer's memory. In general, Basic uses these addresses in RAM as pointers or vectors. Pointers can be used to identify the places in RAM or ROM (read-only memory) where data is stored, or they can be used as markers to identify regions in RAM. Basic examines the address it's directed to by the pointer and uses or manipulates the data it finds there; or, it compares the pointer to other values and takes appropriate action.

A vector represents the starting address of another machine language program or subroutine. Machine language instructions are normally executed in the order in which they are stored in memory.

However, the use of vectors lets the programmer change the order of execution of the instructions. One way of accomplishing this is to store the starting address of the program or the subroutine to which execution must branch.

This is somewhat similar to Basic's GoTo command.

The Microprocessor

The C-64 and C-128 are based on the 6510 and 8502 microprocessors, which are slightly modified versions of the popular 8-bit 6502 microprocessor. The 6510 and 8502 are functionally identical with the 6502 from a programmer's viewpoint, the only essential difference being that addresses 0 and 1 actually constitute a hardware port built into the 6510/8502. Thus, any reference materials on the 6502 apply to the 6510/8502, as well.

As an 8-bit microprocessor, the 6510/8502 handles data eight bits, or one byte, at a time. Since each bit can be 0 or 1 ("off" or "on," electrically speaking; hence, the employment of the base-2 number system in computer mathematics), we can easily calculate that a single byte can assume 256 possible values, ranging from 0 to 255 (the sum of 210 through 217). It's obvious that a range of 256 numbers isn't going to let you perform much useful calculation.

Programmers get around this limitation by combining bytes to represent a wider range of numbers, a process similar to combining the digits 0–9 to generate larger numbers. The 6510/8502 processor manipulates two bytes at a time (8 + 8 bits) to generate 65536 addresses (the 0 address plus the sum of 210 through 2115). As a result, the combination of two bytes can address 65536 memory locations. The first address is 0 and the last is 65535. Addresses are stored and examined in low-byte, high-byte format. That is, the value of the first byte is combined with 256 times the value of the second byte to generate the actual address.

Let's try some experiments. In Direct mode from the C-64's keyboard, enter:

```
PRINT PEEK(43)
```

or in C-128 mode:

```
PRINT PEEK(45)
```

In both cases, the computer should respond with a 1 (low-byte values).

Now for the high-byte values. On the C-64, try:

```
PRINT PEEK(44)
```

You should get an 8. Then, on the C-128, try:

```
PRINT PEEK(46)
```

This should result in 28. These numbers are the keys to the starting addresses for the storage of a Basic program in each computer's memory.

We can calculate the actual value of this address (low-byte value plus 256 times the high-byte value) or let the computer do it. On the C-64 enter:

```
PRINT (PEEK(43) + 256*PEEK(44))
```

The answer should be 2049. On the C-128,

```
PRINT (PEEK(45) + 256*PEEK(46)
```

should result in 7169.

Programmers usually refer to the high byte as the page number. Thus, a 6510/8502 can address 256 pages of memory, with each page containing 256 bytes. If you continue with machine language ►

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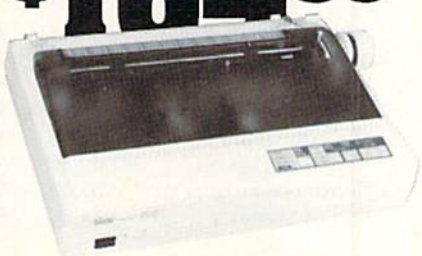

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programming, you'll discover that the first two pages, 0 and 1, have particular significance to the microprocessor.

Both the C-64 and the C-128 actually contain more than the 65536 bytes of memory that can be accessed directly by the microprocessor. The C-64 contains additional memory in the form of ROM, where the Basic interpreter and the Kernal are stored. The C-128 actually contains two 65536-byte banks of RAM and even more ROM than the C-64. Both computers have additional hardware in the form of custom memory-management chips that assist the microprocessor in accessing the extra memory.

In the C-64, the interpretation of a Basic program is a complex dance in which the microprocessor fetches its instructions from the ROM in one bank while it manipulates the Basic in the RAM of another bank. The C-128 contains an eternal triangle, with the Basic ROM in one bank, the Basic program stored in the RAM of a second bank, and the numeric and string data that's used by the Basic program stored in RAM in yet a third bank. It's this memory manipulation of hardware and software that makes the C-64 and the C-128 the most sophisticated 8-bit computers of all time. (Manipulation of the C-64 and C-128 memory bank schemes is an advanced topic beyond the scope of this article.)

The addresses we've examined represent the start of the Basic program storage area in memory. You might also expect the end of the Basic program to be at an address the computer knows, enabling you to keep track of how much space is left for your program. This is true, except there's more to a Basic program than instructions. A working program manipulates numeric and string data, which requires storage space of its own, so the Basic interpreter must allocate space for this data as well.

Table 1 lists the pointers Basic uses to keep track of things. The listed contents of these pointers are their values after power-up or a reset and before any programs have been entered or loaded or any variables have been assigned. For the C-128, the addresses stored in these pointers require special interpretation. The Start-of-Basic, End-of-Program and Top-of-Basic pointers contain addresses in bank 0 RAM. The remaining pointers all contain addresses located in bank 1 RAM.

Several Basic commands can directly affect the contents of these pointers. Conversely, you can manipulate the contents to suit your own purposes. For example, you may want to reserve parts of RAM for storage of sprites, bit-mapped graphics or machine language programs.

Table 1. Pointers used in Commodore Basic.

Function	Address		Contents	
	C-64	C-128	C-64	C-128
Start-of-Basic	43,44	45,46	1,8	1,28
Start-of-Variables	45,46	47,48	3,8	0,4
End-of-Program		4624,4625		3,28
Top-of-Basic		4626,4627		0,255
Start-of-Arrays	47,48	49,50	3,8	0,4
End-of-Arrays + 1	49,50	51,52	3,8	0,4
Bottom-of-Strings	51,52	53,54	0,160	0,255
End-of-Memory	55,56	57,58	0,160	0,255

Memory Management

Now we'll examine how Basic manages its memory resources, looking at the C-64 and C-128 separately, since they differ significantly in how they handle memory. Starting with the C-64, Table 2 shows the allocation of address space by Basic. Notice that the Basic program storage area actually contains four components. The start and end of each component are stored in the pointers I've mentioned above, with the values in these pointers dynamically allocated as Basic uses RAM.

Let's start with the FRE function. It returns a value that represents the remaining space available for Basic program or data storage. Try it out with:

```
PRINT FRE(0)
```

The 0 is a dummy variable that could be replaced by practically anything. The chances are that you got a negative number, which simply means you have more than 32767 bytes free. The value returned by FRE is an unsigned two-byte integer, and, since Basic only knows about signed two-byte integers, it interprets the result as negative. To fix this, enter:

```
PRINT FRE(0) + 65536
```

or

```
PRINT FRE(0) + 2116
```

What FRE actually does is subtract the value of the pointer in End-of-Arrays + 1 from the value of the pointer in Bottom-of-Strings. You can easily change the value that's returned by FRE by changing the contents of those two pointers.

It would be even more useful to reserve part of RAM for some other purpose, say a machine language subroutine or a bit-mapped graphics screen. For example, change the End-of-Memory pointer with:

```
POKE 56,128
```

This effectively reserves 8K of RAM, from 32768 to 40959, for your own use. Of course, to finish the job you must also change Bottom-of-Strings with:

```
POKE 52,128
```

As an alternative to the second of these Poke commands, you could use a CLR command. In addition to setting the Bottom-of-Strings pointer equal to the Top-of-Memory pointer, CLR sets the End-of-Arrays + 1 pointer and the Start-of-Arrays pointer equal to the Start-of-Variables pointer. As a result, all of a program's variables are lost, but the program remains in memory. If CLR is executed from a running program, all the variables are reset, For-Next and GoSub-Return references are lost, input/output activity is aborted, files are aborted (but not closed), and

Table 2. Allocation of C-64 memory by Basic.

0 – 1023:	System RAM
1024 – 2047:	Screen RAM
2048 – 40959:	Basic program storage; String Data; Array Data; Variable Data; Program Code
40960 – 49151:	Basic ROM
49152 – 53247:	Free RAM
53248 – 57343:	Input/output hardware Color Memory Character Generator
57344 – 65535:	Kernal ROM

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the keyboard and screen are made the active input/output devices.

It's also possible to reserve space at the end of a Basic program. After the program has loaded, check the contents of Start-of-Variables, increase it by the amount of space you need and then use the CLR command to adjust the other pointers accordingly. The reserved space can now be filled with whatever data you intended. The next Save command will save not only the program, but also the contents of the memory you've reserved at the end of the program. Finally, Start-of-Basic can be moved up to reserve some space before the program starts. For example, to allocate 1K, enter:

```
POKE 44,12:CLR
```

The Load command has some interesting properties. When executed in Direct mode, a disk load resets all the pointers, reads a program file into memory and then sets the pointers to the start and end of the program. If a nonrelocating LOAD"filename",8,1 is performed, an Out-of-Memory error may result on subsequent Load commands, because the three pointers in 45–50 were set above the Bottom-of-Strings pointer by the load. This would happen, for example, if you loaded a machine language program into the 4K block at 49152. The simplest way out of this dilemma is to execute a NEW after a nonrelocating load.

Under program control, the load does not reset any of the pointers. However, execution of whatever Basic program is in memory starts from wherever the Start-of-Basic pointer indicates. This means that in order to do things like load a machine language subroutine under program control, you have to write code something like the following:

```
10 IF FL = 1 THEN GOTO 30
20 FL = 1:LOAD"ml routine",8,1
30 rest of program
```

When this program is first run, variable FL equals 0. In line 20, FL is set to 1 and the nonrelocating load takes place. When it's done, execution resumes at line 10, but this time FL equals 1 and line 20 is bypassed.

The fact that the Load command doesn't change any pointers when executed under program control can effectively make an additional 4K available for Basic programming. The following code shows how:

```
10 POKE 44,192:POKE49152,0
20 LOAD"short program",8
```

In this example, line 10 sets Start-of-Basic to 49152 and pokes 0 into that address. The short program in line 20 can be any Basic program that's less than 4K long. That line loads the short program and starts executing it, leaving the original program, starting at 2048, intact and in memory.

You can pass control back to the original program with a line something like this:

```
100 POKE 44,8:GOTO line number in original program
```

Conversely, you can get back into the short program with something like:

```
200 POKE 44,192:GOTO line number in short program
```

This sort of thing can be lots of fun.

Memory Management in the C-128

In the C-128, things are somewhat different. To start with, that machine keeps its Basic program in RAM bank 0, while the associated strings and variables are stored in RAM bank 1, so there's less interaction between the memory pointers. Also in contrast to the C-64, the spaces available for program and data storage are independent of one another, so data storage isn't restricted by the length of the program. Finally, the C-128 has the BLoad and BSave commands to facilitate handling the contents of memory.

One thing you will have to watch out for is the Graphic statement. When GRAPHIC N (with N any value from 1 through 4) is executed, the Start-of-Basic pointer is moved up 9K. Specifically, the content of address 46 is changed from 28 to 64. If a GRAPHIC CLR is executed, the reverse takes place. In addition, any Basic programs in memory at the time are moved to the new location.

In the C-128, it's easy to reserve memory at the top of program storage in RAM bank 0. Just change the contents of 4626 and 4627. For example, to reserve 4K enter:

```
POKE 4627,240
```

The FRE(0) function returns the available memory in RAM bank 0 as the difference between the values in Top-of-Basic and End-of-Program. In the C-128, the resulting 16-bit, unsigned integer is handled properly without any further effort by you. It's also possible to allocate memory in RAM bank 1 by adjusting the contents of Start-of-Variables or End-of-Memory. In either case, it's necessary to adjust the other pointers or perform a CLR to finish the job. The FRE(1) function returns the difference between the End-of-Arrays + 1 pointer and the Bottom-of-Strings pointer.

We've made just a start at drawing the memory map of the C-64 and C-128. To sketch in more, you'll need good reference material, such as the books listed in Table 3. If you're a C-128 user, don't neglect the C-64 library. An understanding of the design of the C-64, especially the operation of the sound and graphic chips, is essential to learning the C-128. ■

Morton Kevelson, an electrical engineer by profession, devotes his spare time to the care and feeding of the C-64 and C-128, two Amigas and four children, not necessarily, he claims, in that order.

Table 3. Books on the architecture of Commodore computers.

C-64:

1. *Commodore 64 Programmer's Reference Guide*, Commodore Business Machines, Inc.; Howard W. Sams & Co., Inc.
2. *Mapping the Commodore 64*, by Sheldon Leemon; Compute! Publications, Inc.
3. *Programming the Commodore 64*, by Raeto Collin West; Compute! Publications, Inc.
4. *Anatomy of the C-64*; Abacus Software

C-128:

1. *Commodore 128 Programmer's Reference Guide*, Commodore Business Machines, Inc.; Bantam Computer Books
2. *Mapping the Commodore 128*, by Ottis R. Cowper; Compute! Publications, Inc.
3. *Commodore 128 Internals*, by K. Gertis, J. Schieb & F. Thrun; Abacus Software
4. *Commodore 128 Basic 7.0 Internals*, by Dennis Jarvis & Jim D. Springer; Abacus Software

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GAMES GALLERY

The latest in Origin's Ultima series of fantasy adventure games is rich in detail and challenge.

By DENNIS BRISSON

History tells us that the blind Greek poet Homer was the first great storyteller. His tales of Achilles in the *Iliad* and of Ulysses in the *Odyssey* were transmitted orally from generation to generation until they could be recorded.

The storyteller of the future will use a computer, not only to generate his tale, but also as the medium by which his story is conveyed.

Programmer Richard Garriott (aka Lord British) considers himself the storyteller of the 80s and 90s. His sentences are programming lines. He weaves the images—not through metaphors or similes—but through graphics on the screen. The tale unfolds—not chapter by chapter—but disk by disk. And the reader—er, computer user—plays an integral role in determining the character development and plot of the story.

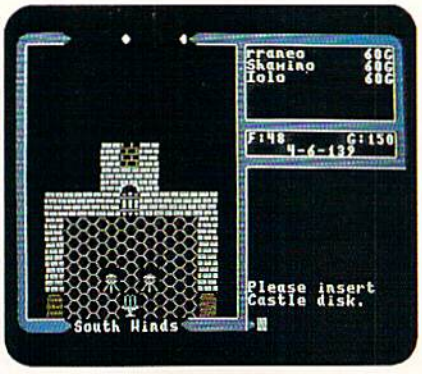
WARRIORS OF DESTINY

Garriott has just released Ultima V: Warriors of Destiny, his fifth in the series of fantasy role-playing adventure games from Origin. The game supports both 64 and 128 modes.

Ultima is not just a game, insists Garriott, who began programming the series in 1980. "The computer, which is my vehicle for telling a story, allows the user to interact with the story."

You'll find all the traditional elements of fantasy role-playing: creating a character, combat, keyboard-entered commands, gathering clues and objects to help solve the game, conversations with characters you meet. But in Ultima V, there's a lot more involved.

First, the attention to detail is incredible. If you pass by a mirror, your image is cast; your character also makes use of furniture and can play musical instruments. Ultima V takes advantage of the additional memory on the 128 with music befitting the location and situation. All these aspects of the game are integral to the plot of the story. "One of my goals," notes Garriott in literary fashion, "is to create a believable alternate reality through a willing suspension of disbelief."



Virtue, as well as strength, is necessary for success in Ultima V.

Second, the main character must rely as much on virtue and adherence to a code of ethics as on strength and skill to defeat his opponents. "World exploration and discovery are the main goals. Creating a character to fight monsters is secondary," notes Garriott.

Ultima VI, already in the works, will be the third game in the second trilogy (IV–VI). While the first trilogy (I–III) was a simple good-guy-vs.-bad-guy scenario, the second involves more intricate plot twists. Garriott's games place a high value on valor and honor. The key to winning the game is to answer correctly when faced with certain ethical and moral dilemmas (sort of like a medieval game of Scruples). While there are plenty of combat situations, virtues are just as important as skill, courage and strength. Your three main adversaries are cowardice, deceit and cunning, which, of course, can only be overcome by bravery (courage), truth and forthrightness, respectively.

Rich in detail, with many levels of challenge, Warriors of Destiny is not for the casual game player; it requires a sustained commitment. For example, the documentation states that there are "over 30 towns and dungeons to explore." I don't doubt it.

Four double-sided disks give you some idea of the hours and hours of game playing and involvement required to determine the whereabouts of Lord British in the vast Underworld and restore him as the rightful ruler of Britannia. You'll encounter scores of interactive characters—some will thwart your attempts, some will help you, and some are in need of your help—in many different settings in the vast world of Britannia. There are plenty of combat scenarios, but, as in Ultima IV, it takes more than defeating the bad guys to win in this game.

Although it's certainly not necessary to have played previous Ultimas, if you're familiar with the series, then you should feel right at home with Ultima V. The keyboard-entered commands are the same, but before you tackle this adventure, be sure to familiarize yourself with the manual and other support materials—including a cloth map of Britannia, which has become the Ultima trademark—that accompany this game. Garriott has added new magic spells, a more advanced weaponry system and even the Runic alphabet, which plays a part in solving this adventure game.

The software makes good use of the Commodore's impressive graphics and sound capabilities.

If you persist, you will eventually win at this game. But win or lose, you'll most of all be entertained and challenged by this latest version.

Ultima V represents Garriott's most ambitious achievement to date. Britannia is a complete world that lives in the mind of Garriott, who has successfully brought it to life on the screen for Ultima fans and dedicated role-playing adventurists.

TIMES OF LORE

Origin has also introduced an equally entertaining, although much less complex, adventure game called Times of Lore. It has no detailed command instructions to learn, no lengthy manuals to wade through, and no complex characters to create. Just boot up the disk and plunge into hours of fun.

The main feature of this game is its ease of use and immediate playability. Programmer Chris Roberts has devised an icon-based, menu-driven system that quickly gets you into the game. If you've never played fantasy games, then Times ►

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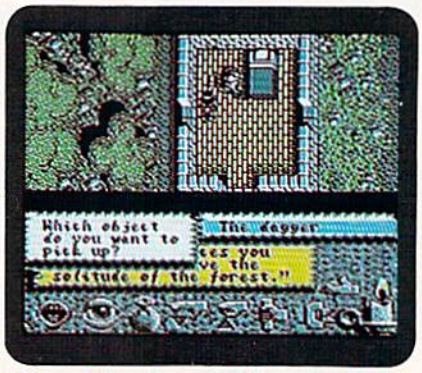
of Lore is a great introduction.

There's plenty of combat action, and it's completely joystick-operated, which makes for fast, enjoyable action. You choose one of three adventurers, who must mingle with the characters you encounter to learn of strange occurrences in the kingdom. Engaging the townspeople in conversation is easy with the icon system. There are five types of enemies you must defeat, and you must accumulate food, gold, magic potions and scrolls and other special objects to complete your mission.



Times of Lore is a good introduction to fantasy role-playing games.

Times of Lore successfully mixes elements of arcade and adventure; there's plenty of action here to keep your trigger finger happy.

If you've always been curious about role-playing adventures, but lacked the time or commitment to become involved, then Times of Lore is for you. Or, if you're making the transition from arcade play to role-playing games, then this is the game I'd highly recommend.

The graphics are impressive, the characters are enjoyable, the music is essential, the game play is exciting, but, best of all, the ease of use is a welcome feature. The novice adventurer, as well as the seasoned gamer, will enjoy this one.

Kudos to Chris Roberts and the Origin people for a delightful, yet challenging, game. If I had known fantasy role-playing was this painless, yet rewarding, I would have ventured into this enchanting world eons ago.

ORIGIN

With the release of Times of Lore, Origin sheds its image as a one-product company. Officials at Origin admit that Times of Lore represents the "broadest base appeal of any product we've put out." Recently named the best publisher at the Computer Game Developer's Conference, Origin promises some exciting new entertainment packages in the next two years.

"We're sitting on a goldmine of diversified new entertainment software titles," notes president Robert Garriott. Plans call for about half-a-dozen new titles each year. *(Both Ultima V ($59.95) and Times of Lore ($39.95) are distributed by Broderbund Software, 17 Paul Drive, San Rafael, CA 94903.)* ■

Dennis Brisson enjoys game playing as a relaxing change from his labors as RUN*'s Editor-in-Chief.*

ULTIMA V GAME-PLAYING HINTS

ON OUR LAST VISIT to Britannia, we had an opportunity to visit with Lord British himself, who offered us the following game-playing hints.

1. — Beware the Shadowlords. Avoid these mean dudes at all costs. In fact, Lord British suggests that if you encounter one in a city, you should immediately leave and move on, or camp outside the city until the Shadowlord has left. Fighting these nasties in combat is futile, anyway. It will take more than strength and skill to defeat them.

2. — When he isn't out destroying evil, Lord British occupies a private room in his castle. By obtaining some magic keys during the course of the game, you will be able to enter his chambers. However, really clever players have found that you can gain access by moving the cannons located along the walkway and blasting the door down.

3. — Once you're in his room, find the harpsichord and play the magical tune that is listed in the play book. One of the characters you meet will teach you how to play. Once you have played the tune, "something wonderful will happen," according to Lord British.

4. — When they need a change of scenery from their underworld abode, the evil Shadowlords hang out in a secret surface-world location, which you must eventually visit. Known only to Lord British and his most loyal followers, this hideaway can be reached by sailing into Last Hope Bay and landing at the southernmost tip. Using climbing gear, you will scale a series of mountains, all the while heading south until you reach Stone Gate, where the Shadowlords reside.

5. — Lord British emphasizes that only by conversing with the different characters you meet and piecing together the clues they provide will you be able to complete your mission. Sometimes, you'll encounter a shy character who will not divulge important information in your initial encounter. Be persistent, because he or she may be more conversant on a second meeting.

Remember, whatever happens in your journey, don't despair. Be sure to read the supporting material that accompanies the disks and, above all, be true to the Avatar ethic. R

TIMES OF LORE GAME-PLAYING HINTS

1. — Even the longest journey begins with a first short step, so, to start you on your way, be sure to talk with the monk at the inn in the capital city of Eralan for your first mission instructions.

2. — On your second mission—to recover the Tablet of Truth from Heidric's castle—talk to the inhabitants of Ganestor to learn of a secret passageway into the castle. The object of your quest is located in one of the rooms on the first floor.

3. — On one of your other missions—to kill an evil Lyche—you find out that the only way to do so is to douse him with holy water, which can be purchased from Friar Kaine of Rhyder.

4. — Several times, when further travel seems impossible (in a dungeon or corridor), locate a lever in the wall, or push on pressure plates, to disclose a secret passageway.

5. — Among the possessions you accumulate in the game are the blue scroll, which temporarily freezes character movement, and the red scroll, which kills all hostile creatures on the screen. Also, keep a sharp lookout for the ring of invisibility, the boots of speed, the scroll of transportation, the magic axe, the potion of blinking and the dagger.

6. — Only by conversing with the townspeople and other characters will you accumulate valuable keywords to use in future conversations. R

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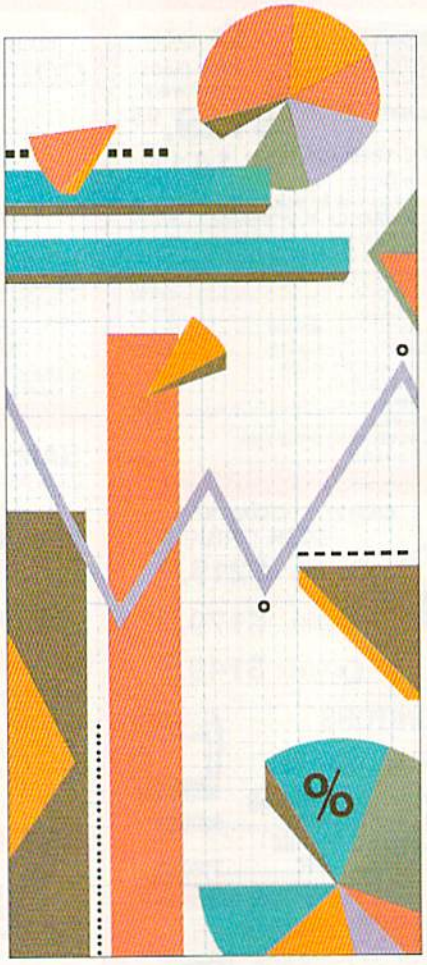
GEOWATCH

Graph, map, plot, design, plan, create, depict. What do all these verbs have in common? geoChart!

By ELLEN RULE

I'VE ALWAYS KNOWN THAT Uncle Sam takes a bite out of my paycheck, but I never realized how big a slice it is until I saw it detailed in pie-chart form! A pie chart is just one of nine types of graphs available in Berkeley Softworks' latest offering, geoChart, for use within GEOS 64 and GEOS 128 in 40-Column mode.

You're probably asking yourself, "What would I do with a utility like geoChart?" Well, I select any line from my budget spreadsheet and use it to view the trends of my electric or phone bill, grocery costs or any other variable expense. There are a number of other possible applications for graphs or charts: displaying the direction of school grades, illustrating science and math projects or analyzing the proportion of interest to principal in home mortgage payments.



CHARTING THOSE GRAPHS

Creating graphs with geoChart is done in either Chart mode or Data mode. When you first enter geoChart, you view a default column chart in Chart mode. Entering Data mode requires pasting in a text scrap of your data through the use of the drop-down menu or the Commodore/T key combination. You can construct the text scrap within any version (64 or 128) of geoWrite, geoFile or geoCalc, or you can do it within Note Pad, version 2.0, which is included on the geoChart disk. Because you can keep only one text scrap on a disk at any one time, the Text Manager, found on your GEOS disk, is also useful here.

In order to utilize geoChart to its fullest, it's important to have a good grasp of the terminology. (Terms are explained in the introductory chapters, as well as in Appendix A, of the manual.) The data in a text scrap must be organized in a specific way, and geoChart's vocabulary is related to that organization.

GeoChart interprets non-numeric data entered in the upper-left corner of the text scrap as the chart's title. The column headings in your text scrap are designated as the "series names." The "category names," selected from the labels of the rows down the left side of your scrap, are the basis for measurement. (Once the chart is formatted, you can edit or delete any of the text data.)

Your text scrap can contain up to 50 columns and 25 rows of values. After geoChart partitions the data, you select four sets of values, "data series," for each chart, with up to 20 values in each series. An intuitive method of selection lets you highlight squares from a grid icon that is shaped to match your scrap. You can then exit Data mode by clicking on the Chart icon.

Once you have entered the data into geoChart, you can manipulate it in many different ways in Chart mode. You can change the chart type and the numeric range of the data you want displayed by using a drop-down menu and without re-entering the data.

A CHART BY ANY OTHER NAME...

GeoChart produces nine chart types: the familiar pie, bar and area, as well as point, line, column, unibar, scatter-point and scatter-line graphs. (In case your high school algebra is a little rusty, Appendix C in the manual gives chart samples.) You can add, change or delete text of the chart title, legend and axis labels, and you can also alter the fonts, point sizes and styles of the text areas. Simply re-enter Data mode to select different data sets at any time.

Markers represent your data values. If the marker is a point on a line or point graph, you select its shape from four different styles. If the marker is a filled shape, as in a pie or bar chart, 32 fill patterns are at your disposal.

Axis values can include negative numbers, and the formats of these values—percentage, dollar amounts, and so forth—are under your control. Also at your discretion is the choice of grid style for those charts that incorporate a background grid.

When the chart is finished, you can print it directly to any GEOS-compatible printer using a standard printer driver, or you can create a photo scrap to be pasted into another document. Berkeley has added an interesting feature here. The first option given when you select "copy" from the Edit menu creates a full-size scrap of the screen, useful for pasting into geoPublish. However, the scrap is too big if you want to paste into geoWrite or geoPaint.

Anticipating this, geoChart's creators have given you the options "to geoWrite" and "to geoPaint"; these build two different sizes of condensed photo scraps that can be imported, without resizing, into the corresponding application. (GEOS 2.0 owners might find that attempting to import a full-screen scrap into geoPaint by scaling and smoothing yields less than satisfactory

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results when text items are present in the chart.) Since only one photo scrap can reside on your disk, have the Photo Manager handy and paste the scrap into a photo album without exiting from geoChart.

Users familiar with other GEOS applications will intuitively be able to update, recover, rename, print or conduct other file-management operations within geoChart. For those with less GEOS experience, Chapter 7 in the documentation, entitled File Management, details the procedures.

Data Ought To Do It

Data preparation is the most complicated aspect of geoChart. Fortunately, the manual is quite detailed, and the results are worthwhile. Chapter 2, Learning geoChart, has a hands-on, step-by-step tutorial that guides you through the preparation of your first chart. The individual components of row and column labels and title and data sets are reviewed for your convenience.

The manner in which the text scrap is contructed depends on your source—geoCalc, geoFile, geoWrite or Notepad 2.0. It's generally accepted that it's best to store and manipulate large amounts of numeric data through a spreadsheet like geoCalc. In this case, to create a text scrap, you simply highlight the areas you want to export, then select "copy text scrap" from the Options menu.

On the other hand, you might have stored mixed data (text and numbers) in geoFile, the GEOS database. For instance, text information regarding your favorite ball players, along with their playing statistics, provides material suitable for use in geoChart. Imagine how snappy your school paper or bowling league's newsletter would look with the scores of your star players compared and contrasted in a graphic chart!

At first, I experienced some frustration while attempting to copy a text scrap from geoFile. I resorted to my geoFile manual to find that I had to be in Form-Design mode in order to cut a scrap that was ultimately geoChart-compatible. It seems that the pre-release version of the geoChart manual, from which I am working, neglects to mention this small fact. That problem solved, I found that the geoFile data produced an acceptable chart.

As mentioned, a text scrap can also be created within geoWrite or Notepad 2.0, but I tend to think of this as the "quick and dirty" method of data entry, for use when the figures to be charted don't already exist in usable form. Titles, headings and row labels are laid out in the prescribed configuration, using tabs or commas to separate the items.

In Conclusion

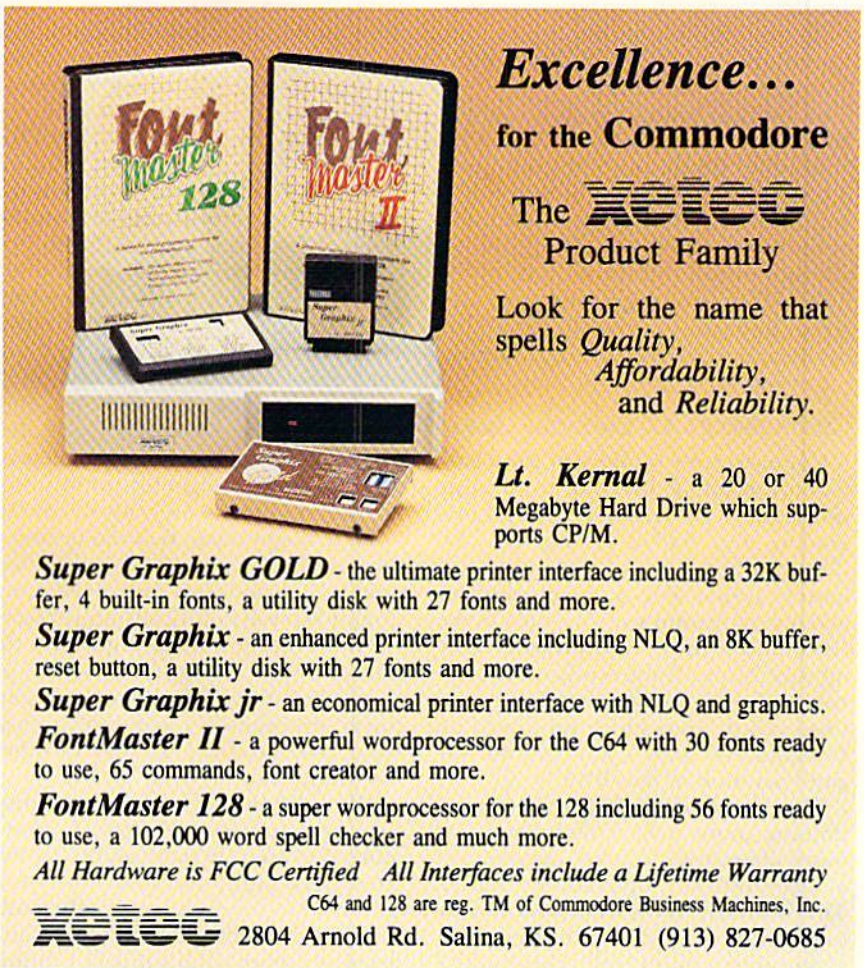
When preparing data for entry into geoChart and deciding which chart to use, give careful thought to exactly what it is you want to depict. For example, do you want to contrast two sets of data, such as the total cost of a car with two different interest rates or payment terms? In this case, because the two items are selected as the data sets, a bar graph might be utilized.

Or perhaps you want to see the relative proportions of your monthly expenses. I find that lumping items together—utilities and credit card payments—in a pie chart gives me a clear view of my financial outlay. In other words, the data that's suitable for one type of chart might not be right in another.

While preparation of data involves some effort and forethought, the resulting versatility makes geoChart a one-of-a-kind program. Aside from GEOS itself, little investment is required, and owners of any version of geoFile, geoCalc and geoWrite can make the most of these applications.

The manual's detailed explanations, tutorial section and appendices are well written and well organized. The output is visually appealing and easily integrated into the other GEOS applications. Number-crunching software is hard to get excited about; geoChart's performance and adaptability make it an uncommon exception, especially for $29.95. ■

This month's geoWatch columnist, Ellen Rule, is a psychiatric R.N. who finds time not only for extensive user-group involvement, but also for a home-based business, Home Computer Resource. Send in your questions or comments to geoWatch, RUN Magazine, 80 Elm St., Peterborough, NH 03458.



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TELECOMPUTING WORKSHOP

This month we spotlight CompuServe, America's largest telecommunications network.

By LOREN LOVHAUG

MY SERIES ON THE THREE major online networks concludes this month with a look at CompuServe, the oldest and largest consumer telecommunications network in the United States.

Throughout this series, I've resisted the temptation to simply list the huge number of services offered by any of the networks. Instead, I've related my opinions by paying particular attention to the quality of each network's Commodore 64 and 128 support.

I believe that in the interest of fairness and journalistic credibility, I should once again mention my familiarity with both GEnie and Q-Link: I have served as a SYSOP on both networks. However, during my research, I've been very careful to use tangible evidence in formulating my opinions and have tried to eliminate any subjective bias.

In terms of online services, CompuServe is a vast network, much larger than either GEnie or QuantumLink. It is also more expensive, with access fees that run significantly higher than those of the other two. Due to CompuServe's size and number of services, there are many reasons you might choose to subscribe; however, I'm sorry to report that excellence in Commodore eight-bit computer support is not one of them.

COMPUSERVE'S COMMODORE AREA

CompuServe's support of the Commodore eight-bit line can be seen as divided into two distinct parts: a Commodore area and a Transactor area. Commodore—the corporation—is loosely responsible for the messages and text in several sections, such as the Commodore Service Forum and Commodore News. These sections are remnants of Commodore's "official" online support area, which was based on CompuServe until QuantumLink began operation in late 1985.

The Commodore Service Forum is nothing more than a set of message bases where users can ask questions of a lone "official" Commodore staffer. This is similar to the Commodore message base I referred to in my December 1988 column on Q-Link. There is one notable difference, however: On CompuServe, there does not appear to be anyone from Commodore's engineering staff correcting the official voice's technical errors. Without such a presence, the user gets only vague and, far too often, inaccurate responses from someone whose expertise is in administration, and not in the actual usage, programming or maintenance of Commodore equipment.

The Commodore News section contains a series of text files, which can be read while online, and a small software update area. Included are sections on educational resources, Commodore press releases, user group information and a service-center directory. While these topics sound exhaustive, the text is terribly dated and of limited value. For example, the educational resources section contains lists of software for older computers like the PET and VIC-20, and several of the named software producers have been out of business for years. This is also apparent in the user-group and service-center listings.

Along similar lines, the software update area features a two-and-one-half-year-old patch program to update CP/M 3.0 on the C-128, a program that was rendered obsolete over a year ago. It also contains a simple Xmodem terminal package for the C-64 and C-128 that dates back to the days when Xmodem in the Commodore eight-bit world was a novelty and not the necessity it is today.

Some might argue that the information's age isn't CompuServe's fault, but rather Commodore's for abandoning CompuServe as its official online home. I believe that is a naive argument. Ultimately, what is on CompuServe is CompuServe's responsibility, and pertinent information could easily be obtained and updated by sources other than Commodore itself.

The most important factor national telecommunications networks have going for them is their ability to distribute the latest and most up-to-date information faster and more efficiently than any other medium. In this regard, at least in its eight-bit support, CompuServe is not taking advantage of a traditional network's strength.

COMPUSERVE'S TRANSACTOR AREA

After Commodore opted to leave it for Q-Link, CompuServe contracted with Transactor Publishing to fill the Commodore computer support vacuum. (*The Transactor* magazine has for years been renowned for its quality and its technical publishing.) Ideally, this should have meant that CompuServe would become *the* online resource for Commodore programmers and users with technical prowess.

Unfortunately, that *creme de la creme* idea has never materialized. Due to financial pressures and the increased demands SYSOPing places on an overworked staff, many of the principal authors and program contributors to *The Transactor* really don't spend much time online (even though they're listed as the primary managers of the online areas). This is really unfortunate, because those individuals are extremely knowledgeable and have a lot to offer. As it stands now, the assistant SYSOPs who do manage the area have little or nothing to do with *The Transactor*, nor do they sport the technical expertise of the magazine's authors and contributors.

There are three topic areas in the Transactor section: Communications, Programming and Arts and Games, and the information presented within them is generally informative and accurate. In addition, the assistant SYSOPs seem fairly good about answering questions in a reasonable amount of time.

Interestingly enough, I did notice that the response trees within these sections seem to be more "chatty" than those found on other networks. The informality of the dialogue between the SYSOPs and the user community produces a "homey" feeling, more indicative of the rapport one finds on many a local BBS.

The positive side of this is that the users and SYSOPs seem to have a good sense of community and an openness that fosters effective communication. On the negative side, this informality

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does, at times, lead to discussions that get sidetracked, overly personal and expensive to muddle through.

The download areas within the Transactor sections are similar to those found on Q-Link and GEnie, although they are smaller and seem to lag behind as far as getting the "latest and greatest" public domain programs.

What the CompuServe download areas have going for them is that many of the excellent programming examples and demonstrations from the magazine are online, and can be downloaded for those programmers who are interested and would rather not have to type them in.

Overall, CompuServe's software is complete and well thought out. Like GEnie's system software, it's computer independent, so the more sophisticated your terminal package, the more you'll get out of it. The message editors and Email systems are first class in power and sophistication, but, also like GEnie's, they require study and practice to use them effectively and efficiently.

Although I must admit I'm not overly impressed with CompuServe's C-64/128 support, I can say that the quantity and quality of its other services (financial, reference, shopping, and so on) are first rate. If you're looking for services other than for the C-64 or C-128, you may well be pleased with CompuServe. However, if your main interests are C-64 and C-128 support, I think you'd be better served on either Q-Link or GEnie. ■

You can write Loren Lovhaug care of Telecomputing Workshop, RUN Magazine, 80 Elm St., Peterborough, NH 03458.

You can also send him electronic mail on QuantumLink (LOVHAUG) or GEnie (Sparrow.J.).

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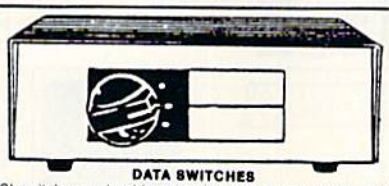

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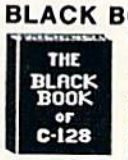

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COMMODORE CLINIC

Finding Commodore REUs and 1571 disk drives; disabling run-stop and restore; and an error in Crazy Caverns.

By LOU WALLACE

Q *I've been searching for the 1750 RAM Expansion Unit, but the computer supply companies tell me it's no longer available. Is there an alternative?*

—MAUREEN BRYSON
LAS VEGAS, NV

A The 1750 REU is still being made and sold and is becoming more popular (especially with GEOS users, where it's almost essential). At the World of Commodore show held in Philadelphia last November, I asked a Commodore executive about the dearth of REUs and was assured the company has resumed manufacturing them, including the 512K 1750 and the 256K 1764. Berkeley Softworks (publishers of GEOS) tell me they are now selling the REUs directly, and Briwall, one of *RUN*'s mail-order advertisers, just got in a shipment of 1750s.

Q *I have a C-128 and a 1571 drive, and I plan to add another 1571, but I can't find one anywhere. I did find a 1541-II drive, but didn't know if it would give me the same speed as the 1571. I've also thought of getting a 1581 drive, but can I copy files to it from the 1571? Will commercial productivity software work with the 1581?*

—BOBBY WHITE
COLUMBIA, TN

A Commodore tells me they're still producing the 1571 drive, but only enough to meet anticipated demand. However, if you shop around, you should be able to find one.

The 1541-II will not give you the speed or storage capacity of the 1571. It's just the latest version of the 1541, designed for the C-64, and it will be just as slow as your old 1541. Avoid using it with the 128.

The 1581 works very well with the 128, offering faster disk access and 2½ times the storage capacity. There are a variety of file-copy programs that copy files from the 1571 to the 1581. As for commercial programs working with the 1581, it all depends on how the programs were written. If a program uses just the standard CBM DOS routines, you shouldn't have any trouble, but if it expects the directory to be at track 18,0, you'll have problems, because the 1581 stores its directory information in a different location.

Q *Will* RUN *release updated versions of RUN Script 128 and RUN Term 128 that support the 1581 disk drive and 1750 RAM Expander?*

—R. E. THOMAS
QUEENS VILLAGE, NY

A The latest version of RUN Script 128 is on the Productivity Pack III disk. This is the word processor we use in our offices, and the only drive I use it with is the 1581. RUN Script does not use the 1750 REU to store longer documents in memory. However, it does work well with the latest release of RAMDOS 128 RAMDisk software, from Commodore.

The latest release of RUN Term 128 is on the new RUN Works disk. It supports many drives, including the 1581. It also uses an REU for capturing text, giving you an awesome 512K ASCII capture buffer with the 1750. (RUN Term 128 also supports the 1700 REU, and the new RUN Term 64 on RUN Works supports the 1764 in the same way.)

If you're interested in either of these disks, call the ReRUN order line at 1-800-343-0728.

Q *I use a C-64, and on power-up, the screen seems to be in Multicolor mode and all the characters keep changing colors. Loading a game produces tiny color blocks on the screen where blue should be. What's wrong?*

—JAMES HATCH
HAINES, AK

A The most likely culprit is a bad VIC chip. Since the VIC generates all the text, color and graphics on your 64, you often get treated to a light show instead of the normal blue screen when the chip goes bad. One went bad on me, and the sprites left trails on the graphic screen—a feat engineers tell me is impossible!

Have a service center check it out. A VIC chip is fairly easy to replace, and should cost around $40, depending on the price of the replacement chip.

Q *I want to disable the run-stop and restore keys to keep users from getting out of my Basic programs. Is there a way to do this?*

—JAMES WATSON
ATLANTA, GA

A It's as easy as adding two Poke commands. To disable the run-stop and restore keys, use:

```
POKE 808,234
```

To re-enable them, add this line:

```
POKE 808,237
```

Q *I typed in both the Crazy Caverns* (RUN, *December 1988) and Brickout! (December 1987) programs, using the Checksum program to catch mistakes, and all the values check out right, but I can't get the programs to run.*

—ELLEN ALLEYNE
HOLLIS, NY

A Possibly our fault. The program was modified before publication, but not the documentation. In the little boot program, line 20 should read SYS 16384. Also, when typing " + CAVERNS ML ", be sure you put a space between the L and the double quotes. When typing in hex loader listings, of course, be sure you include all the spaces in the Data statements. If you leave out spaces, the checksum numbers will match, but the program won't work properly. ■

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.

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LEARN TO WALK BEFORE YOU RUN

WE RECEIVE MANY LETTERS from new Commodore owners who want to type in program listings from *RUN* and need help in getting started. To answer many of the questions novice users have, we present the following guidelines.

1. First, keep in mind that as a beginner you should enter only short Basic programs. Avoid machine language listings and lengthy Basic programs until you get the hang of what you're doing.

2. To help you catch mistakes in typing in listings, we publish *RUN*'s Checksum program elsewhere in this issue.

3. If you intend to save the program you're typing in on a brand new disk, you must format that disk. To do this, insert the disk in your drive and type:

```
OPEN15,8,15 <press return>
PRINT#15,"N0:NAME,##" <press return>
```

The ## is a two-character identifier that can be any combination of letters or digits. NAME can be any title for the disk that you choose, as long as it's 16 characters or less.

After entering the above lines, wait for a few minutes while the disk spins inside the drive. When the disk stops, the formatting is done. Then type:

```
CLOSE15 <press return>
```

In 128 mode on a C-128, you can shorten this procedure by typing:

```
HEADER "NAME,##" <press return>
```

Caution: The formatting process erases any material already on the disk, so if you're formatting a used disk, make sure it doesn't contain any programs you want to keep. See item 11 below, on reading the disk directory, if you need to find out what's on the disk.

4. Before you start typing in a program listing, your computer's memory needs to be empty. To make sure it is, turn the computer off, wait a few seconds, and turn it on again.

5. As you type in the listing, remember to press the return key after typing each line. This enters the line into memory.

6. If you want to review what you've entered, type LIST and press the return key; all the lines you've entered will scroll by. You can slow the scrolling on the C-64 by holding down the control key, and on the C-128 by pressing the no-scroll key. To view certain specific lines, type LIST, followed by the line numbers you want; then press the return key. For example, LIST 10–50 displays lines 10 through 50, and LIST 20 displays only line 20.

7. If you find an error in a line, delete the incorrect characters with the insert-delete key, then retype that portion and press return to enter the new line in memory.

8. Be sure to save the program to disk fairly often during the typing process. Otherwise, you could lose all your work if a power glitch wipes out your computer's memory. To save a partial or complete Basic program listing, type:

```
SAVE "NAME",8 <press return>
```

In 128 mode on a C-128, you can press F5, type in NAME and press the return key. Here, NAME is the filename you want the program to have, not the disk name you used when formatting.

Each time you save a revised program to the same disk, you must change its filename, or a disk error will occur, even if only one character is changed. An easy way to vary the filename is by adding version numbers to the end of the basic name (Program.1 and Program.2, for example). The numbers will also tell you which version is the latest.

9. If you wish to erase (scratch) unwanted programs from a disk, type:

```
OPEN15,8,15 <press return>
PRINT#15,"S0:filename" <press return and wait a few seconds>
CLOSE15 <press return>
```

In 128 mode on a C-128, you can type:

```
SCRATCH "NAME" <press return>
```

Be sure not to erase the final version!

10. Always save the final version of a program to two disks, so you have a backup copy in case one of the disks gets damaged. When saving to two different disks, you can use the same program name in each case.

11. To view a complete list of the filenames on a disk (i.e., read the disk directory), type:

```
LOAD "$",8 <press return>
LIST <press return>
```

In 128 mode on a C-128, you can just press F3.

12. When you know what program you want to load, next make sure you know *exactly* how its filename is spelled in the disk directory, including punctuation, special characters and spaces. A mistake in the filename will keep the load from working.

If the disk directory is still on the screen when you enter the Load command, you can refer to that for the spelling. If the directory will be gone from the screen by the time you enter the Load command, jot down the exact spelling of the filename for reference. Once you're sure of the filename, load the program by typing:

```
LOAD "NAME",8 <press return>
```

In 128 mode on a C-128, you can just press F2, type in the filename and press the return key.

13. After you've loaded the program, enter RUN to use it. ■

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RUN's Checksum

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

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

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

{22 SPACEs}—press the space bar 22 times

{SHIFT CLR}—hold down the shift key and press the clr-home key

{2 CRSR DNs}—press the cursor-down key twice

{CTRL 1}—hold down the control key and press the 1 key

{COMD T}—hold down the Commodore logo key and press the T key

{FUNCT 1}—press the F1 key

{5 LB.s}—press the British pound key (*not* #) five times R

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

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(40960)THEN MO=64:SA=4
   9152
30 FOR I=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
```


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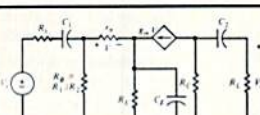

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